# COVAL

vacuum managers

# GLOBAL CATALOG

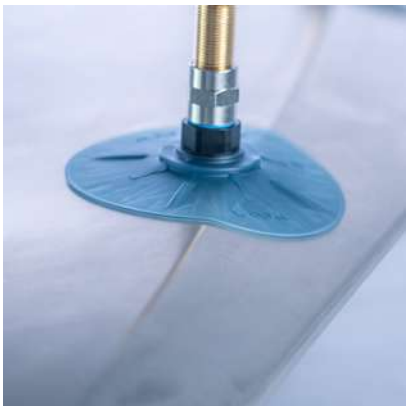
vacuum components

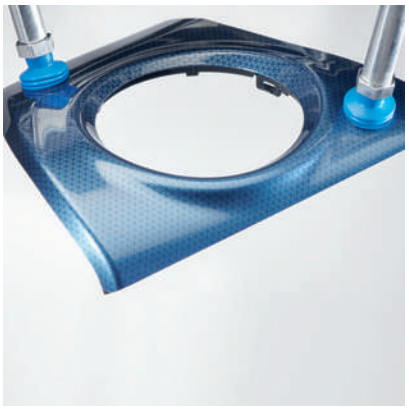
INTERACTIVE VERSION

## ADVANCED VACUUM SOLUTIONS

COVAL

vacuum managers





COVAL
vacuum managers

# 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.

La FRENCH FAB

# 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.

www.coval.com

### ▶ 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

3D COVAL Data

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

### ▶ 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.

Download on the App Store

ANDROID APP ON Google play

### ▶ 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.).

### ▶ 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.

LLOYD'S REGISTER · LRQA
ISO 9001
Certified Quality Management System

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.

IO-Link EtherNet/IP PROFINET NFC

# 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.

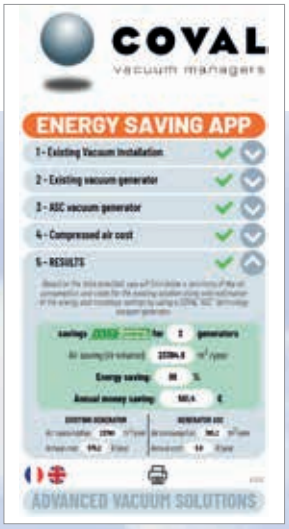
This unique app in the world of vacuum technology is very intuitive to use. Once you've entered the equipment's main characteristics (gripping cycle time, number of cycles, run time, volume to be evacuated), the savings are displayed automatically in euros, air volume, and savings percentage. In most 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.

La FRENCH FAB

# MADE IN FRANCE

COVAL is headquartered in the heart of the Auvergne-Rhône-Alpes region, a particularly powerful economic area in terms of research and industrial production. With their leading network of industrial subcontractors, proximity to university and research centers, and multiple business clusters linked directly to its core activity, COVAL's products and services are an obvious choice to be Made in France.

COVAL USA is the North American subsidiary of COVAL and is located in Raleigh, NC. This location was created to strengthen the global presence of their sales and distribution network and provide its customers with ever improving channels to discover and purchase COVAL products and services.
This subsidiary benefits its customers by offering:

- A nationwide network of authorized COVAL distributors.
- Regional sales representatives who can provide local, hands-on support.
- Easy access to a friendly and knowledgeable technical sales team.
- A fully stocked warehouse to reduce delivery times and improve efficiency.

Let the experienced team at COVAL support your vacuum needs and you will understand why we call ourselves "**vacuum managers**".

# 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.

## ▶ **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.

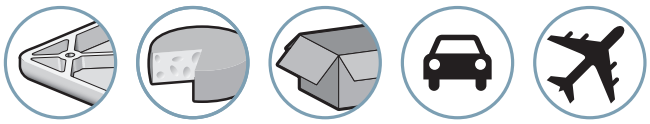
## ▶ **PRODUCTS** that you can trust:

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

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

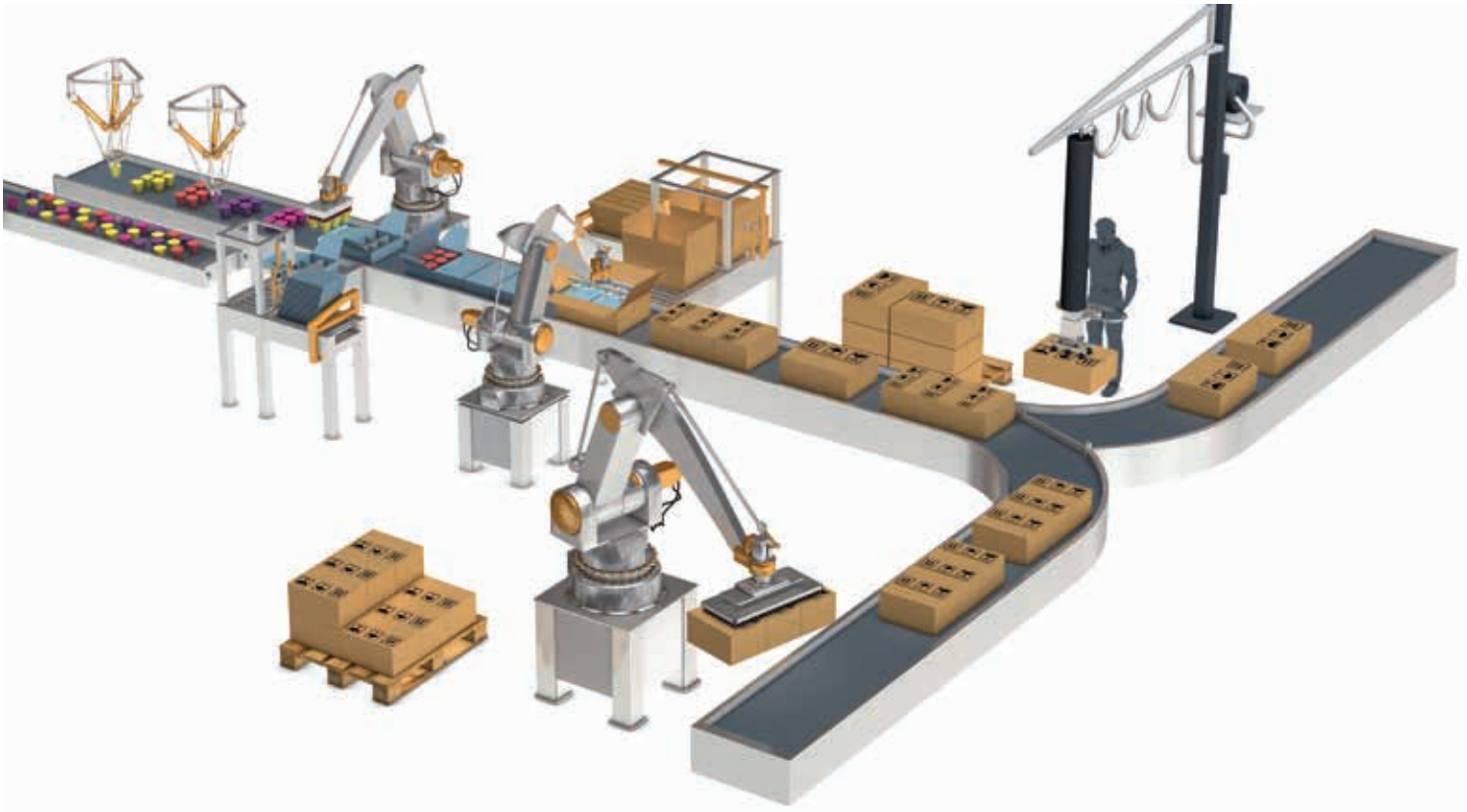
At COVAL, technical and sales teams are dedicated to strategic industry sectors: packaging, food processing, plastics, automotive, aeronautics, and robotics.
The experience they've acquired with major brands and manufacturers allows them to provide quick and efficient answers.

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



COVAL
vacuum managers

# 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

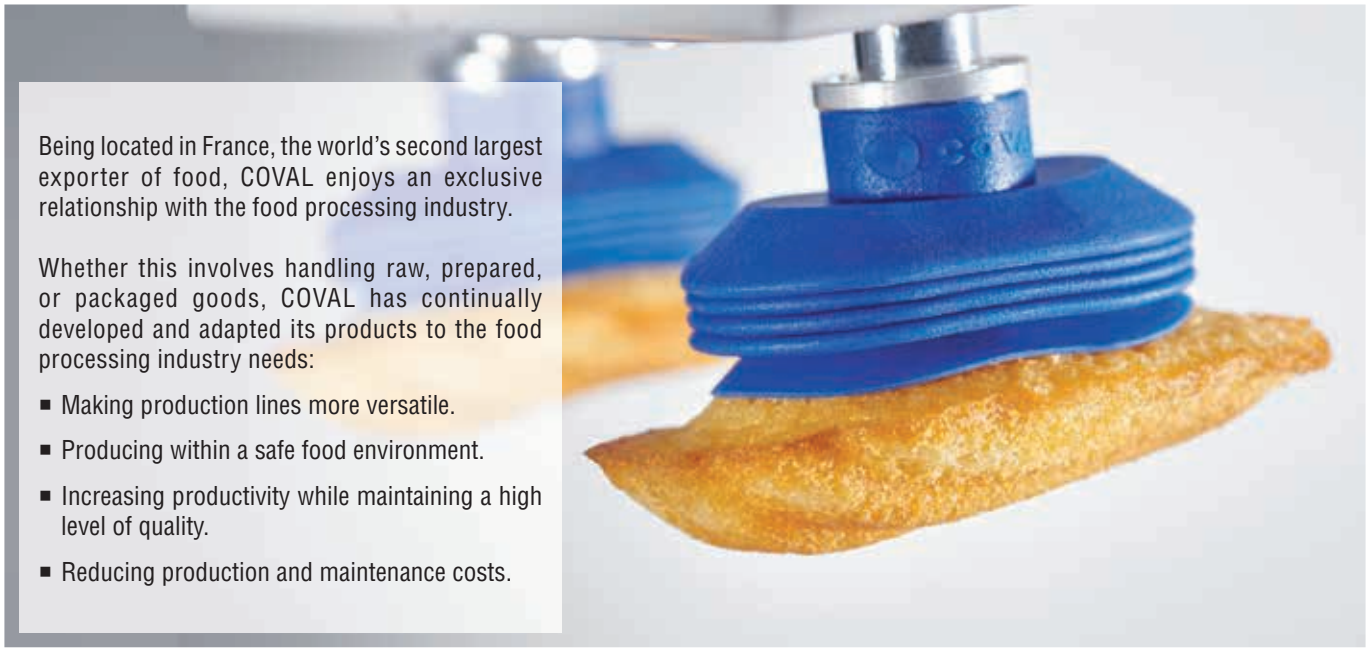
Vacuum grippers are used to grip several products (flow packs, tins, cans, etc.) or packages (palletization) at once.

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

➔ **See chapter 13.**

# 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.**

### ▶ 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 PUMPS

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

- **LEM and LEM+ series** for handing all porous or airtight parts.
- **LEMAX, LEMAX IO and LEMAX+ series** for handing 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.**

### ▶ 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.
- **CVG**: 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)

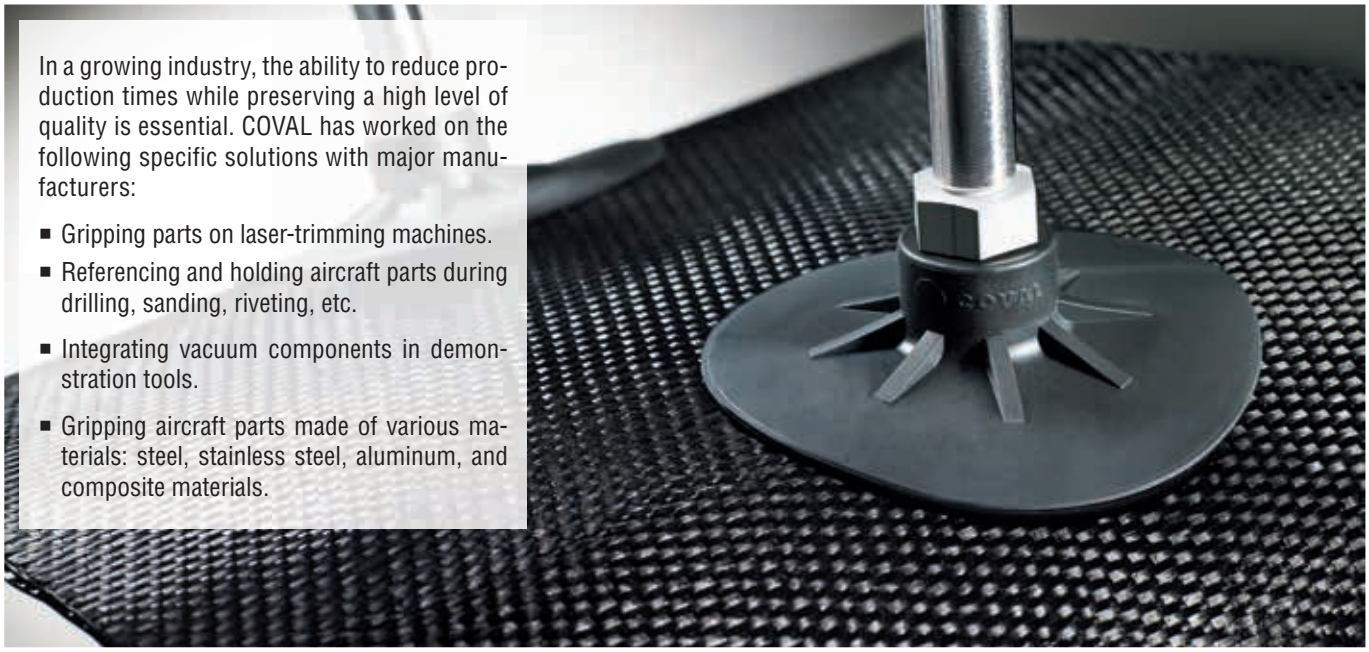
➔ **See chapter 2.**

### ▶ 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.**

# 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.**

### ▶ VPSC MARK-FREE ULTRA-FLAT SUCTION CUPS

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

➔ **See page 3/35.**

### ▶ 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.
- Incoming pressure reduced to 3.5 bar: ASR technology.
- 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.**

### ▶ CONTROL BOX WITH INTEGRATION FUNCTIONS

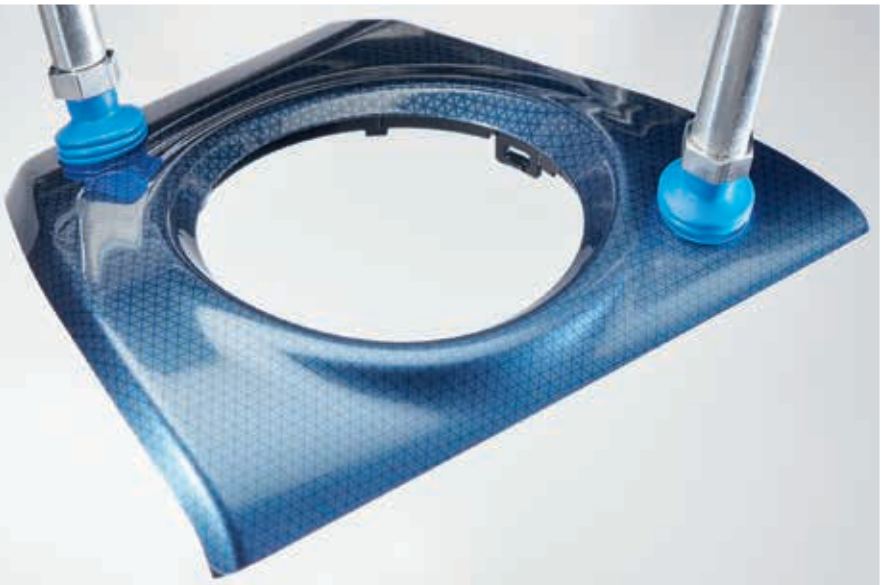
- Integrated pneumatic or electric vacuum pumps.
- Control and monitoring panel allowing you to manually or automatically select the gripping areas on a structure.
- Indicator light for visual alarm.
- Vacuum sequencing to assist with placement of a curved panel.

➔ **Upon request.**

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 266°F (130°C) up to 320°F (160°C) 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

# 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 1.02 to 3.25 SCFM | ■ | ■ | ■ | ■ | ■ | | | | |
| Suction flow rate from 4.41 to 9.71 SCFM | | | | | | ■ | ■ | ■ | |
| Suction flow rate from 24.72 to 56.50 SCFM | | | | | | | | | ■ |
| Maximum vacuum level: 60% | ■ | ■ | | | ■ | ■ | | | |
| Maximum vacuum level: 80 or 85% | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Vacuum control | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Blow-off control | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Integrated pressure regulator (ASR) AIR Saving Regulator | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | |
| Powerful blow-off | | | | | | □ | □ | □ | |
| Electronic vacuum switch with display | □ | □ | ■ | | | □ | ■ | ■ | □ |
| Electronic vacuum switch | | | | ■ | ■ | | | | |
| Pressure sensor | | | | | | | | ■ | □ |
| Vacuum check-valve | | | ■ | ■ | ■ | | ■ | ■ | |
| Automatic vacuum regulation (ASC) AIR Saving Control | | | ■ | ■ | ■ | | ■ | ■ | |
| 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.

AIR Saving Regulator

**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.

AIR Saving Control

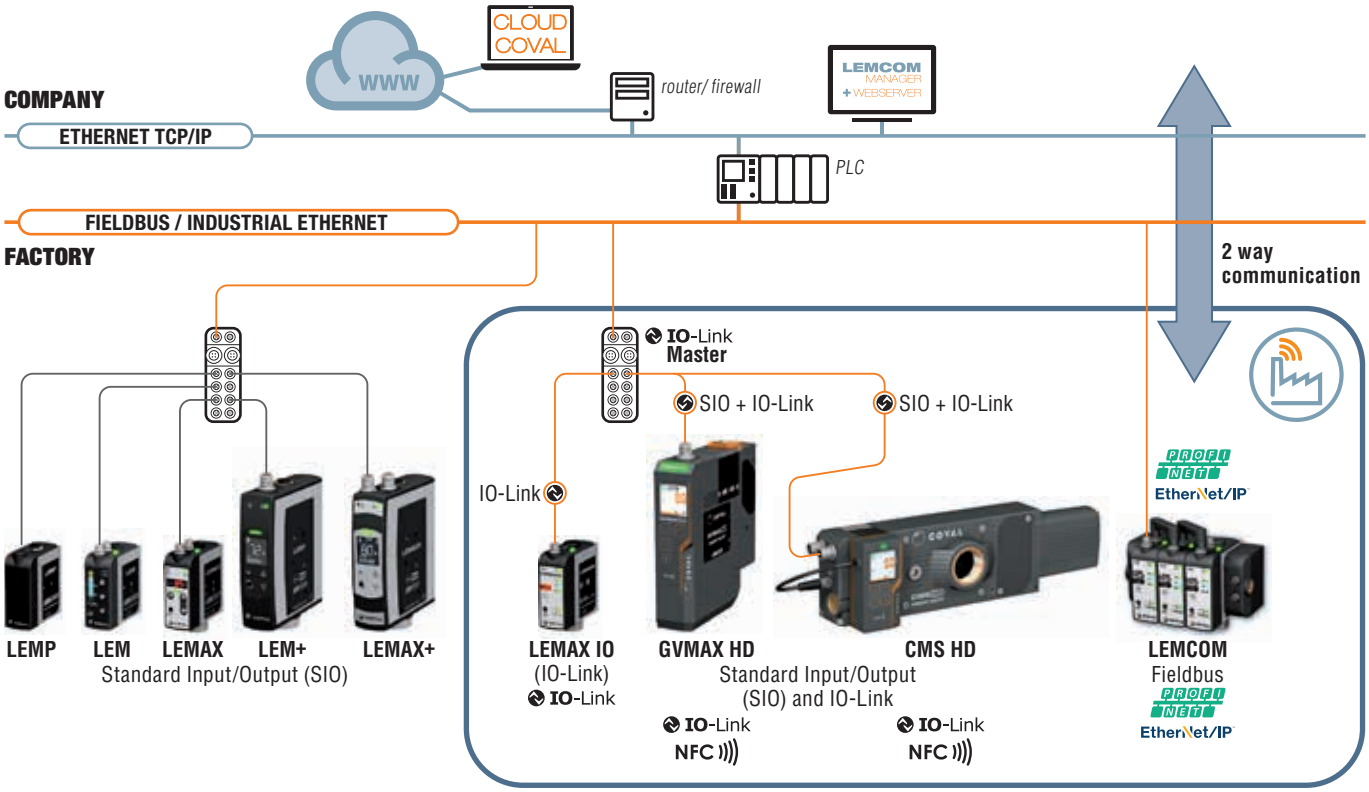
**ASC** (Air Saving Control)
A vacuum regulation system that auto-adjusts to the product being handled.

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.

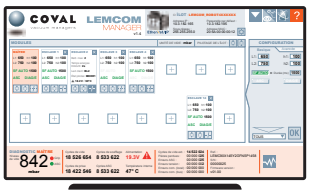
**IO-Link**

- 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.

COVAL
vacuum managers

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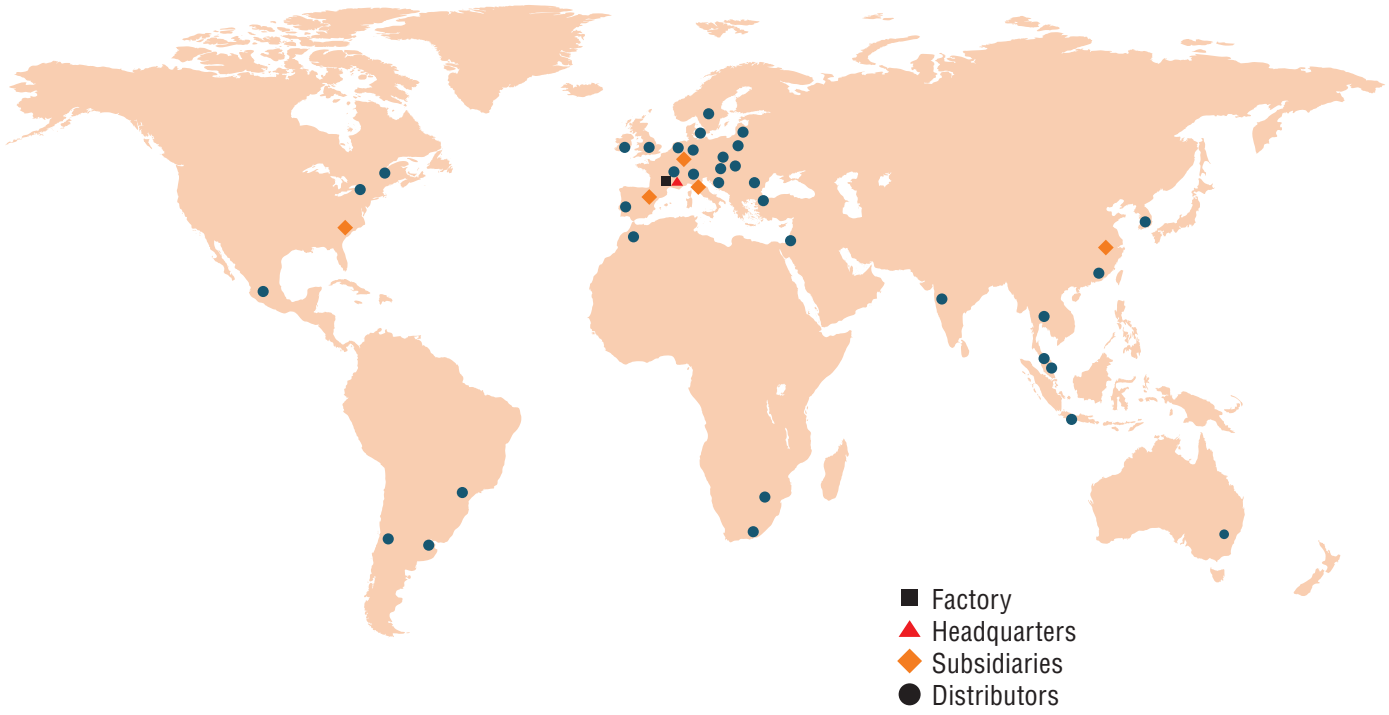


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## ADVANCED VACUUM SOLUTIONS

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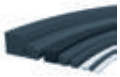

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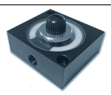

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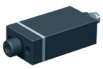

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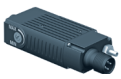

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# Vacuum Handling Guide

## 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.

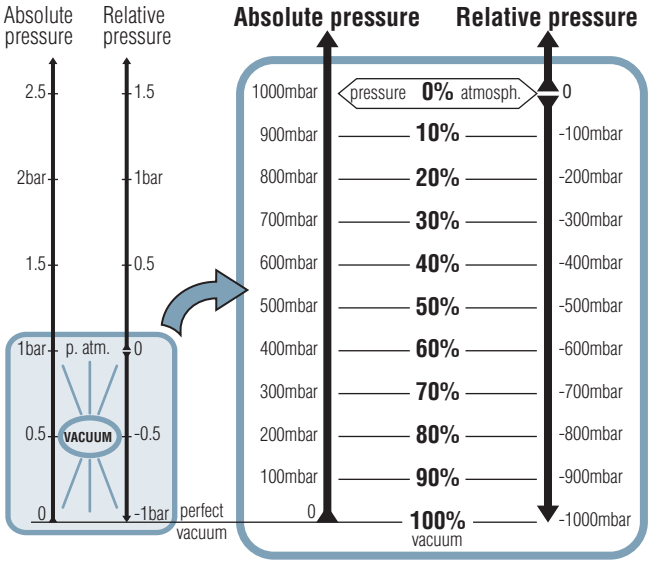
### MEASURING VACUUM LEVEL

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

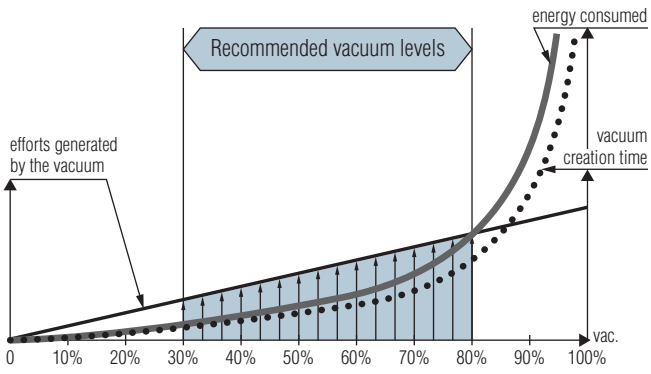
**Relative vacuum**

| % | 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

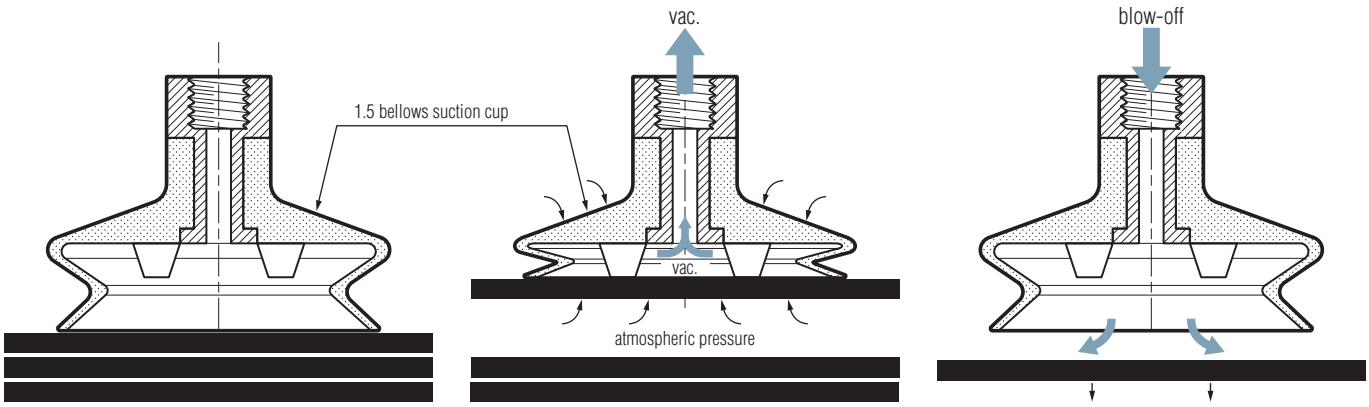
This is why the vacuum levels used should be limited, from 30% when a high flow of vacuum needs to be maintained, to 80% in an airtight circuit (no flow required to maintain the vacuum).



# 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

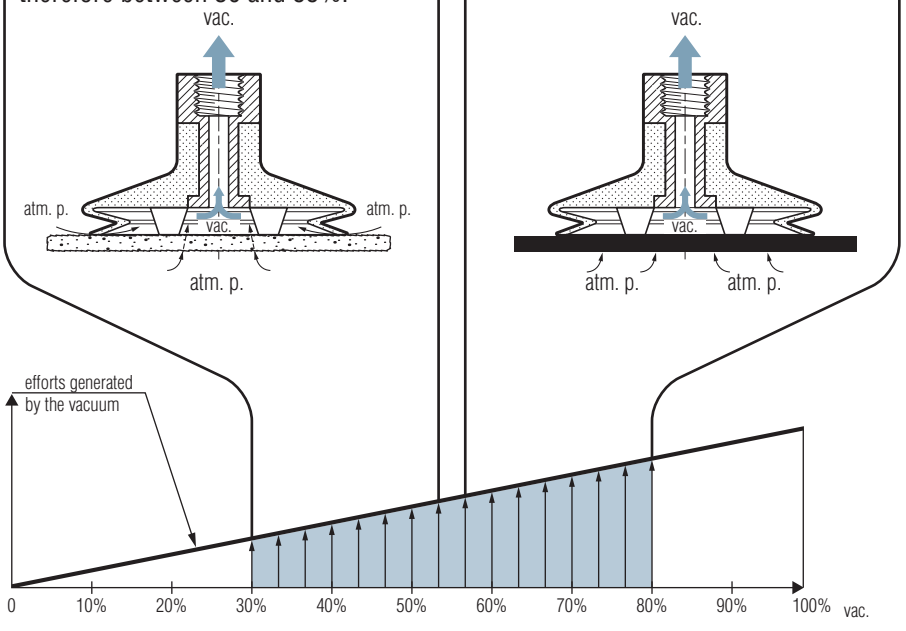
Greater vacuum flow must compensate for products and processes that cause air leaks such as cardbaord, agglomerated materials, rough wood, irregular surfaces, etc.

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

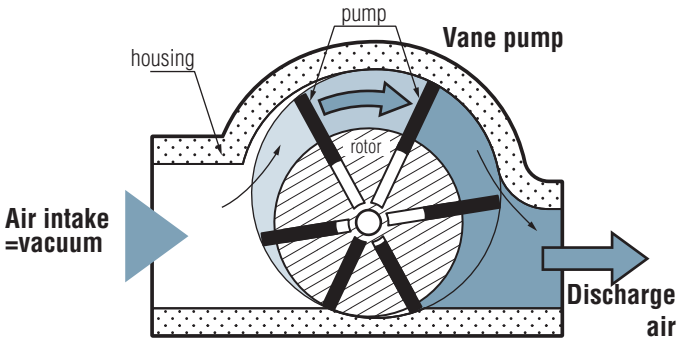
### 1- CONTINUOUS VACUUM, USING ROTARY VACUUM PUMPS

#### 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

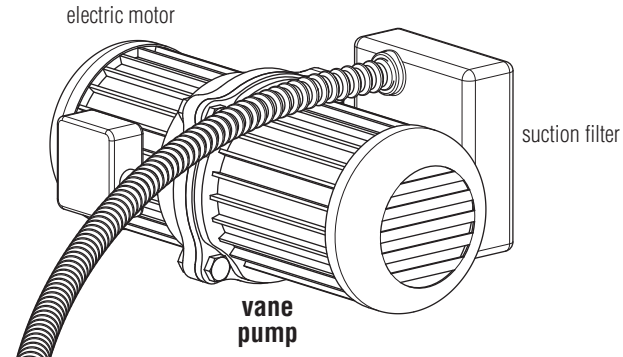
To maintain optimum output, rotary pumps must remain within average power levels: from 1 to 10 Kw. The suction capacity generated is much higher than the normal requirements of industrial suction cups.

#### 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.

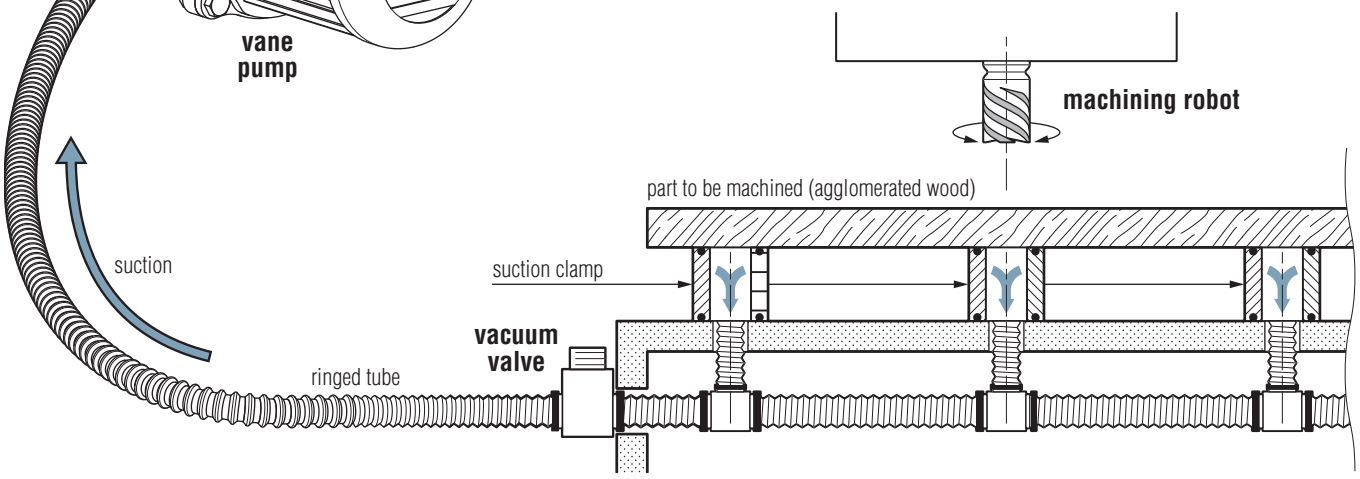
However, in the vast domain of vacuum gripping, rotary pumps are only used in rare instances, where an object requires a high level of suction flow rate that needs to be maintained for a long time during the cycle.

| Rotary Vacuum Pumps | |
|---|---|
| • Constant consumption, continuous generation of vacuum, even for intermittent requirements: not suitable for intermittent vacuum generation requirements.<br>• Located far from the suction cups. | **Applications :**<br>• Vacuum sources for various processes such as vacuum packing, etc.<br>• 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.

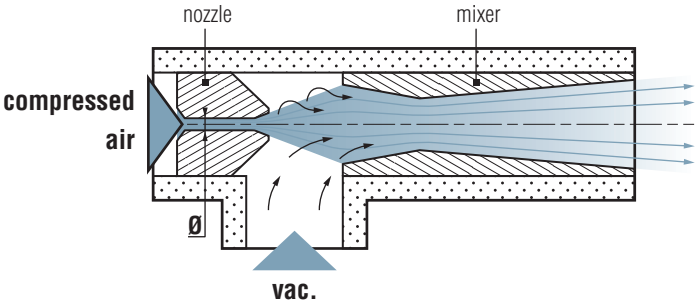


## INTERMITTENT VACUUM, USING VENTURI VACUUM PUMPS

### Venturi Vacuum Pump Principle

Using the "venturi" effect : a nozzle of diameter Ø 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.<br>• Installation very close to the suction cups.<br>• Suction flow rate and vacuum level optimized for each application. | **Applications :**<br>• 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 Ø

The diameter defines the force generated and therefore the suction capacity: Ø 0.5mm for micro suction cups, to Ø = 3mm with a suction capacity of 15.9 SCFM for several large suction cups.

■ Mixer profile

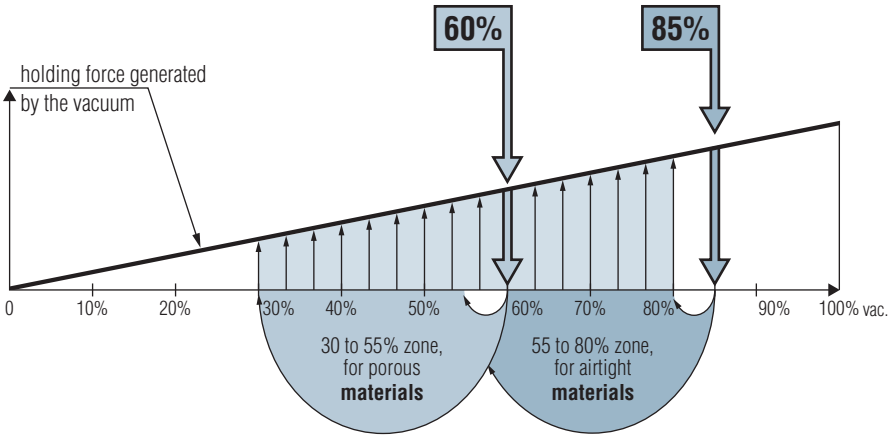
This profile defines the maximum level of vacuum achieved by the venturi.

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

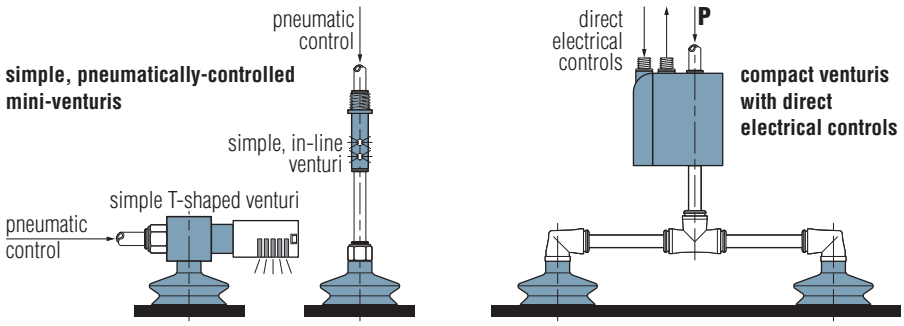
Venturi vacuum pumps are used for all normal vacuum gripping applications.

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 configurate 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 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.

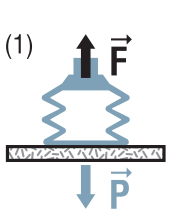
## SUCTION CUP FORCE CALCULATION

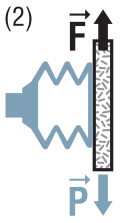
The force of a suction cup is proportional to its surface under vacuum and also depends on its shape, flexibility, material and especially on the level of vacuum attained inside the suction cup.

**Theoretical force**
F(lbf) = (S ($cm^2$) x V (%) x 0,01013) / 0.2248*
S = Surface of the suction cup ($cm^2$)
V = Vacuum level (%)
(*) coefficient to convert daN (decanewton) to lbf (pound-force)

**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

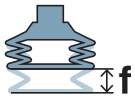
This indicates the minimum radius of a product to be reliably gripped by the suction cup.

### Internal volume

This corresponds to the volume which must be evacuated during a vacuum cycle. It must 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(*) | -4 to 266(*) | | |
| | **STN5** | 50 | Blue | ++ | +++ | ++ | ++ | -20 to 130(*) | -4 to 266(*) | | |
| | **STNV6** | 60 | Green | + | +++ | ++ | ++ | -20 to 130(*) | -4 to 266(*) | | |
| **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): 320 °F (160 °C)

++++ 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**

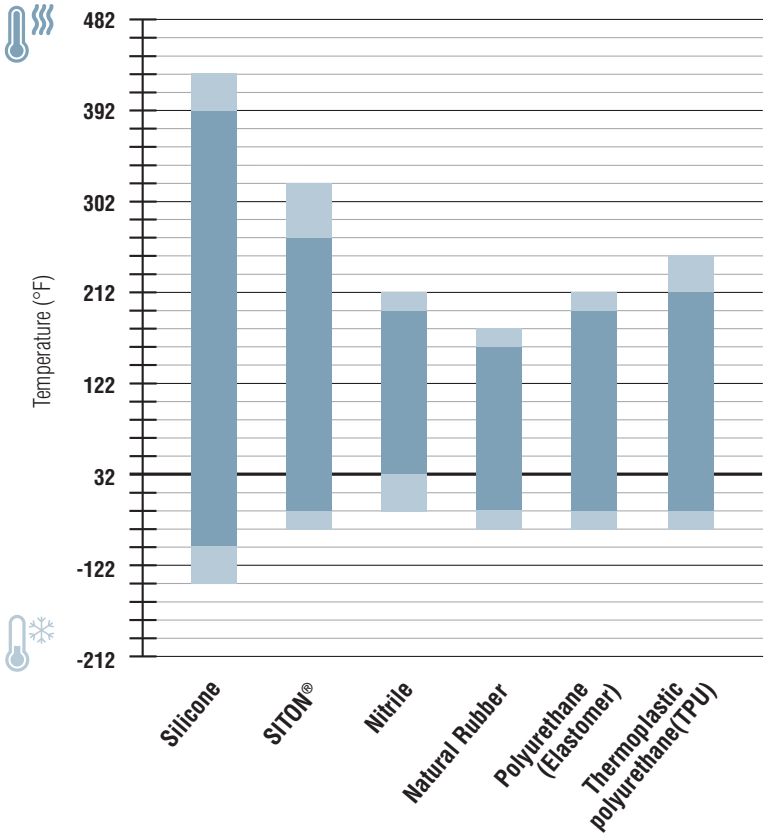
- Non-marking: clear, silicone-free compound.
- Withstands continuous temperatures of 266°F (130°C) up to 320°F (160°C) at peak.
- Excellent abrasion resistance.

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.

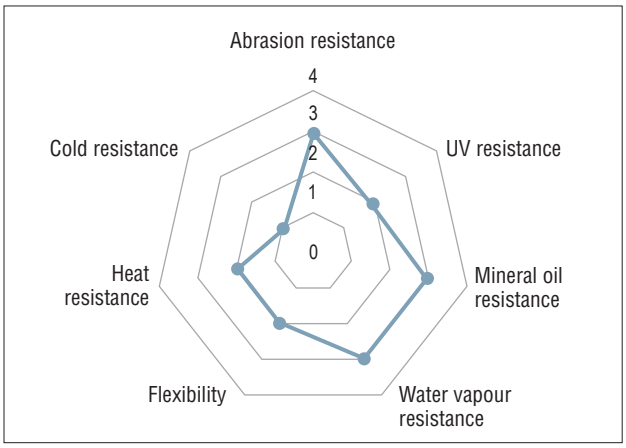
# Suction Cups

Selection Guide

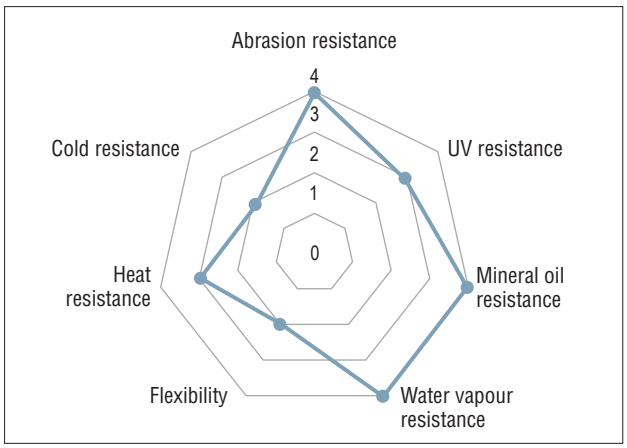


## Characteristics of COVAL materials

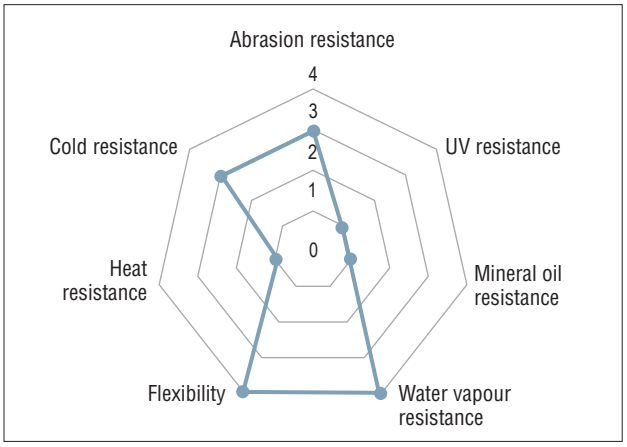
### NITRILE (NBR)



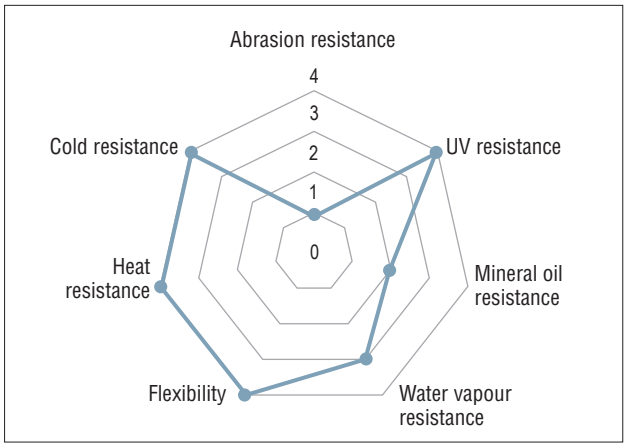

### SITON® (STN)



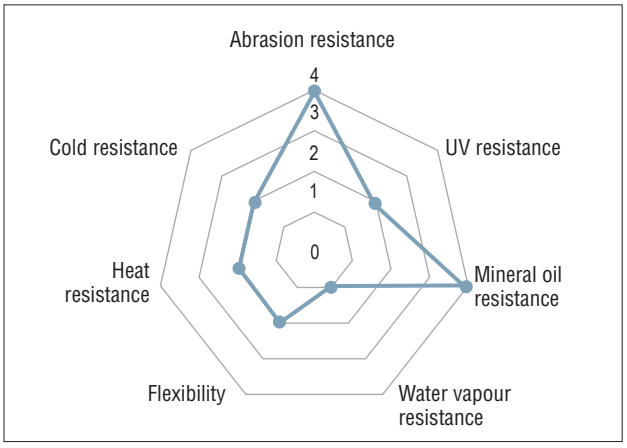

### NATURAL RUBBER (NR)



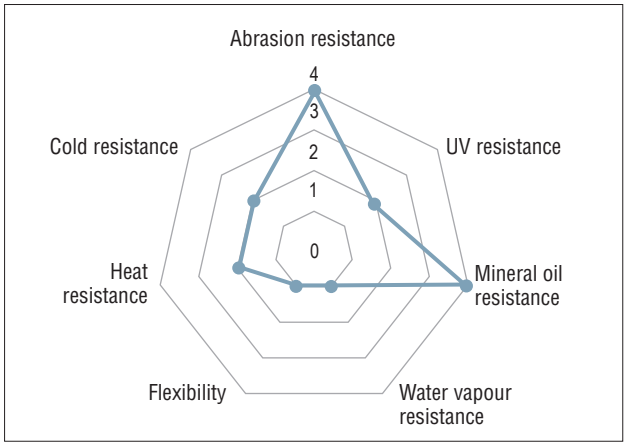

### SILICONE (SI_SIT_SIB_SIBL)




### POLYURETHANE (PU)

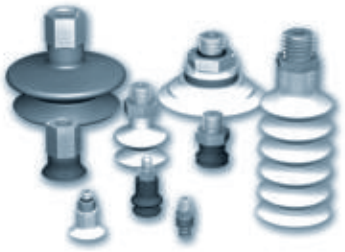



### THERMOPLASTIC POLYURETHANE (TPU)



# Suction Cups

## Suction Cup Fitting Options



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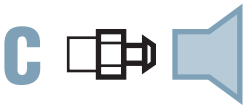
### Standard Configuration Options

COVAL suction cups offer versatile mounting and fitting options:

**Version C**:
Barbed fittings.



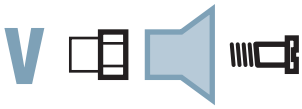

The suction cup is easily pressed onto the fitting.

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)



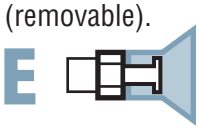

The V mounting utilizes a hollow screw passing through the suction cup and connecting to an adaptor on the opposite side, fixing the suction cup in place.

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).

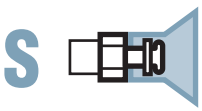



The fitting is factory pressed onto the suction cup.

**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



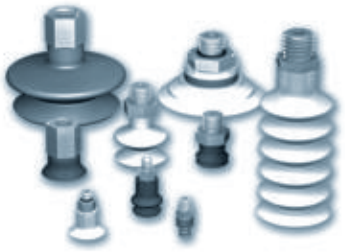

The fitting is factory-crimped onto the suction cup, ensuring a one-piece assembly.

**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"





### 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**

| (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 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 managment and order fulfillment.

Ex:

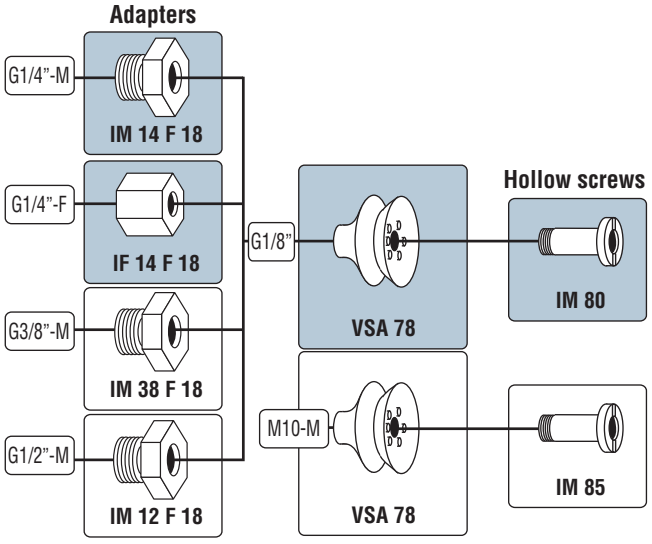
| Group 3 | | V | | | S | |
|---|---|---|---|---|---|---|
| Ø 78 mm | THREAD | G1/8"-M | G1/4"-M | G1/4"-F | G1/4"-M | G1/4"-F |
| | VSA78NBR | VSA78NBRIM18V | VSA78NBRIM14V | VSA78NBRIF14V | VSA78NBRIM14 | VSA78NBRIF14 |
| | VSA78NR | VSA78NRIM18V | VSA78NRIM14V | VSA78NRIF14V | VSA78NRIM14 | VSA78NRIF14 |
| | 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 seperate part numbers.

# Suction Cups

## The COVAL Range

1

### Standard Suction Cups

See chapter 2

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** | | |
| **VP** | ■ Ø 8 to 75 mm<br>■ 4 standard materials | ■ High tensile force and precise gripping and releasing<br>■ High resistance to lateral forces allowing vertical handling |
| **VPG** | ■ Extra-flat suction cups<br>■ Ø 2 to 200 mm<br>■ 3 standard materials | ■ Highly precise gripping and releasing of the load<br>■ High throughput rates |
| **VPU** | ■ Ø 6 to 50 mm<br>■ 3 standard materials | ■ Suitable for gripping rigid and flat products |
| **VPF** | ■ Flat suction cups with cleats<br>■ Ø 15 to 50 mm<br>■ 3 standard materials | ■ Suitable for gripping rigid and flat products<br>■ Cleats prevent the deformation of the product and provide excellent non-slip properties |
| **VPO** | ■ Flat oblong suction cuts<br>■ From 2x4 mm to 30x90 mm<br>■ 3 standard materials | ■ Used for handling elongated products such as pens, tubes, bottles, bulbs and flat or cylindrical objects etc. |
| **Suction Cups with 1.5 Bellows** | | |
| **VSA** | ■ Ø 5 to 78 mm<br>■ 5 standard materials | ■ Combines the advantages of flat suction cups with added angle, flexibility and precision<br>■ Used for gripping slightly concave or convex parts |
| **VSAB** | ■ Ø 5 to 50 mm<br>■ 3 standard materials | ■ Used for gripping slightly concave or convex parts<br>■ Suitable for gripping products of various heights |
| **VSAG** | ■ Ø 10 to 150 mm<br>■ 3 standard materials | ■ Recommended for gripping sensitive products due to the cushioning effect of the bellows<br>■ Used for gripping slightly concave or convex parts |
| **VSAJ** | ■ Ø 15 to 30 mm<br>■ 2 standard materials | ■ Used for gripping slightly concave or convex parts<br>■ Suitable for gripping products of various heights |
| **Suction Cups with 2.5 Bellows** | | |
| **VS** | ■ Ø 5 to 88 mm<br>■ 4 standard materials | ■ Recommended for gripping products on different planes (wide deflection) or cylindrical objects gripped at an angle (ball-joint effect). |
| **VSG** | ■ Ø 5 and 7mm<br>■ 3 standard materials | ■ Suitable for gripping small products, concave or convex<br>■ Ideal for handling sensitive products |
| **Long Stroke Suction Cups** | | |
| **VSD** | ■ Suction cups with 4.5 and 5.5 bellows<br>■ 2 standard materials | ■ Strongly recommended for handling spherical or cylindrical products requiring a large height adjustment. |
| **High-performance Suction Cups** | | |
| **C** | ■ Full range of shapes (flat, bellows, oblongs)<br>■ Ø 35 to 125mm and 25x65mm to 70x140mm<br>■ Integrated fittings<br>■ Structure and internal cleats | ■ Textured suction cups for gripping thin sheets<br>■ Non-slip cleats ensure optimum positioning of oily sheet metal<br>■ Extreme resistance to slipping,<br>■ Porous integrated fittings<br>■ Ideal for automated applications |
| **CTC** | ■ High-Performance Bell-type Suction Cups in Thermoplastic Polyurethane (TPU)<br>■ 4 models (Ø40 à 100 mm)<br>■ Integrated fittings<br>■ Structure and internal cleats | ■ Excellent adaptation to convex surfaces and angular shapes.<br>■ High deflection compared to standard flat suction cups due to the bell shape.<br>■ Anti-slip cleats ensure precise positioning of oily sheets.<br>■ Ideal for automated applications |
| **Suction Cups with Foam Rings** | | |
| **VSA-VS BM**<br>**VSA-VS BM-SIF**<br>**VSBM** | ■ Foam rings<br>■ Can be adapted to standard suction cups<br>■ 2 standard materials | ■ Bonded under a suction cup to allow products with an irregular or even-ridged surface to be gripped<br>■ Sawn wood, sheet metal, flat surfaces with bumps or hollows (all types of granular surface) |

# Suction Cups

## The COVAL Range

### Special Purpose Suction Cups

See chapter 3

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** | | | |
| **FPC**<br>**FPCX** | | ■ Flexible suction cups<br>■ 5 models<br>■ Food-safe materials<br>■ Silicone: FDA and CE standard | ■ Range specially designed for gripping flexible packaging<br>■ Thin and wavy lips mold perfectly to any shape of packaging<br>■ Gripping ability allows for high production rates |
| **Soft Suction Cups for High Speed Applications** | | | |
| **MVS** | | ■ Suction cups with 1.5 and 2.5 bellows<br>■ 9 models<br>■ Silicone: FDA and CE standard | ■ Used to grip delicate objects. Very flexible lip (opening bags, gripping tins and flexible aluminum or plastic bottles, etc.).<br>■ High throughput rate<br>■ Used to grip of flexible products |
| **Suction Cups with 4.5 Bellows** | | | |
| **MVP** | | ■ Suction cups with 4.5 bellows<br>■ 4 diameters available: 20 to 50 mm<br>■ Materials: nitrile and silicone (FDA and CE standards) | ■ The handling of raw food or flexible packaging<br>■ Thin and flexible shaped lip for a perfect handling at high production rates<br>■ The 4.5 bellows give a swivelling effect |
| **Suction Cups for Cheese** | | | |
| **VSAF** | | ■ Suction cup with 1.5 bellows<br>■ Ø 50 mm<br>■ Silicone: FDA and CE standard | ■ Suction cup specially designed for gripping fragile foods such as soft cheese<br>■ Accessory: Stainless steel grill prevents deformation of the food |
| **VSAOF** | | ■ Oval suction cup with 1.5 bellows<br>■ Dim. 65x150 mm<br>■ Silicone: FDA and CE standard | ■ Suction cup specially designed for gripping fragile foods such as soft cheese<br>■ Accessory: Stainless steel grill prevents deformation of the food |
| **Suction Cups for Bakery Applications** | | | |
| **VSD**<br>**VSE**<br>**VSP** |  | ■ Suction cups with 2.5 to 5.5 bellows<br>■ 11 models<br>■ Silicone: FDA and CE standard | ■ Range specially developed for gripping delicate objects such as cakes (buns, biscuits, etc.)<br>■ Specific shapes and shore A hardness depending on the applications<br>■ Resistance to temperature: - 40 °F to 428 °F |
| **Suction Cups for Egg-handling** | | | |
| **VSO** | | ■ Suction cups with 2.5 and 3.5 bellows<br>■ 3 models<br>■ Silicone: FDA and CE standard 1935/2004 | ■ Range specially designed to meet constraints involved when handling eggs.<br>■ Very flexible lip<br>■ Different shapes of suction cup |
| **Suction Cups for Bottle Handling** | | | |
| **VSBO**<br>**VSBO+**<br>**VSBO LM/BM** | | ■ Suction cups with 4.5 bellows<br>■ 8 models<br>■ High tensile force<br>■ Highly flexible and long stroke | ■ Used to grip 750 ml bottles, Magnums bottles and special bottles with textured surfaces<br>■ Bottles gripped from the side, vertical and horizontal handling<br>■ Suction cup with stainless steel reinforcement in the bellows<br>■ Available with integrated sensing valve |
| **VBO** | | ■ 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.<br>■ Excellent sealing when gripping different types of bottles. |
| **VPBO** | | ■ Coupler Plates for gripping bottles by the punt<br>■ 3 diameters: Ø65, 75 and 95 mm<br>■ Natural rubber | ■ The VPBO Coupler Plates are designed for gripping bottles by the punt on disgorging stations (1/2 bottles, 75cl bottles and Magnum) |

# Suction Cups

## The COVAL Range

### Special Purpose Suction Cups

See chapter 3

1

| | | | |
|---|---|---|---|
| **Suction Cups for Paper Applications** | | | |
| **VPA** | | ■ Flat suction cups<br>■ 9 models<br>■ Very flexible lip<br>■ Natural rubber and silicone (FDA and CE standard) | ■ Range of suction cups with very flexible lip used to handle very flexible materials<br>■ Very resistant to abrasion (for paper, cardboard)<br>■ Very flexible gripping lip which molds to the shape of the object to be handled |
| **VPAL** | | ■ Extra-flat shape suction cups<br>■ 3 models<br>■ Material: silicone (food compatibility) | ■ The VPAL suction cups are especially adapted for gripping and handling IML labels or flexible materials<br>■ Great lip flexibility |
| **VSAPL** | | ■ Suction cup with 1.5 bellows<br>■ Ø 11 mm<br>■ Silicone: FDA and CE standard | ■ The VSAPL suction cup is especially adapted for gripping and handling IML labels or flexible materials<br>■ Great lip flexibility |
| **VPR** | | ■ Flat suction cups<br>■ 4 models<br>■ Natural rubber | ■ Range of suction cups designed to meet the requirements of mailing applications.<br>■ Envelope stuffing, film-wrapping, mailing (picking)<br>■ Very resistant to abrasion |
| **VPAG** | | ■ Curved suction cups<br>■ 2 models<br>■ 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<br>■ Very resistant to abrasion |
| **Ultra-flat, Non-Marking Suction Cups** | | | |
| **VPSC** | | ■ Ultra-flat suction cups<br>■ Ø 40 and 80 mm<br>■ Materials : Polyurethane and silicone (FDA and CE standards) | ■ Suction cups specially designed not to deform the product being handled.<br>■ Vacuum distributed across the entire surface of the suction cup for an optimal gripping force.<br>■ Extra-thin sealing lip designed to contour to the shape of the product being handled |
| **Radial Ball-joint Suction Cups** | | | |
| **VPYR** | | ■ Flat suction cups with ball-joint system<br>■ 4 models (Ø 50 to 100mm)<br>■ 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 |
| **"Heavy-load" Suction Cups** | | | |
| **SPL** | | ■ "Heavy load" flat suction cups<br>■ 5 models (Ø 240 to 600mm)<br>■ 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) |
| **STEEL** | | ■ Flat suction cups with a bonded foam seal<br>■ 9 round models (Ø 150 to 580 mm)<br>■ 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.<br>■ Wide choice of dimensions |

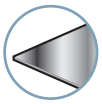
# Suction Cups

## Index of Symbols and Pictograms

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

**Plastic**

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

**Eggs**

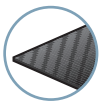
For handling requiring food compatibility, a very flexible lip and a specific shape of suction cup.

- Gripping eggs

**Bottles**

Gripping concave shapes and requiring strong vertical lifting force.

- For handling 750 ml bottles or Magnums



**Composite materials**

Gripping of raw composite materials.

- No material migration
- No marking of the composite product

**Packaging**

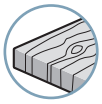
For handling wrapped products for packaging, cardboard products. Cardboard shaping, palletization, transfer, Pick & Place.

- Precision
- Abrasion

**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.



**Wood**

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

**Cakes**

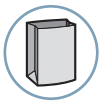
For handling requiring food compatibility, a very flexible lip and a specific shape of suction cup.

- Gripping buns, biscuits, etc.

**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



**Bags**

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

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

## 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 | $R_{min}$ Minimum convex curve radius | $R_{min}$ 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 2/3

### 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 2/9

### VPU

**Flat Suction Cups Ø 6 to 50 mm**

3 standard materials
- Nitrile
- Silicone
- SITON®

- Suitable for gripping smooth, rigid and flat products

P 2/17

### VPF

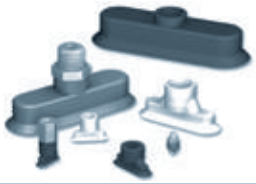
**Flat Suction Cups with Cleats Ø 15 to 50 mm**

3 standard materials
- Nitrile
- Silicone
- SITON®

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

P 2/20

### 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 2/23

### 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 2/27

### 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 2/33

### 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 2/37

# Standard Suction Cups

Chapter 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.

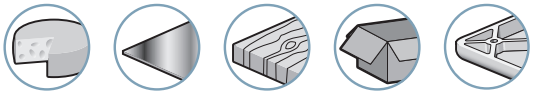
P 2/65

# VP
## Flat Suction Cups Ø 8 to 75 mm

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) | (lbf) (1) | (lbf) (1) | Rmin (mm) | NBR | SIT5 | NR | STN |
|---|---|---|---|---|---|---|---|---|---|
| **VP 8** | 7.5 | 0.04 | 0.24 | 0.12 | 10 | **VP8NBR** | **VP8SIT5** | - | **VP8STN** |
| **VP 10** | 10 | 0.05 | 0.36 | 0.18 | 13 | **VP10NBR** | **VP10SIT5** | - | - |
| **VP 15** | 15 | 0.18 | 0.83 | 0.41 | 13 | **VP15NBR** | **VP15SIT5** | - | **VP15STN** |
| **VP 20** | 20 | 0.44 | 1.38 | 0.68 | 20 | **VP20NBR** | **VP20SIT5** | - | **VP20STN** |
| **VP 25** | 25 | 0.7 | 2.11 | 1.06 | 25 | **VP25NBR** | **VP25SIT5** | - | **VP25STN** |
| **VP 26** | 26 | 1.5 | 2.52 | 1.25 | 35 | **VP26NBR** | **VP26SIT5** | - | - |
| **VP 30** | 30 | 2.9 | 3.57 | 1.79 | 40 | **VP30NBR** | **VP30SIT5** | - | **VP30STN** |
| **VP 35** | 35 | 2.7 | 5.20 | 2.60 | 50 | **VP35NBR** | **VP35SIT5** | - | - |
| **VP 40** | 40 | 4 | 6.01 | 3.00 | 50 | **VP40NBR** | **VP40SIT5** | **VP40NR** | **VP40STN** |
| **VP 50** | 52 | 7 | 8.60 | 4.30 | 75 | **VP50NBR** | **VP50SIT5** | - | **VP50STN** |
| **VP 60** | 60 | 7.3 | 12.99 | 6.49 | 100 | **VP60NBR** | **VP60SIT5** | - | - |
| **VP 75** | 75 | 16 | 22.73 | 11.36 | 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.

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

**S** **Version S:** Factory-crimped fitting

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

**E** **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**.

# VP

## Flat Suction Cups Ø 8 to 75 mm

References "Suction Cup + Fitting"

**Group 1** — C

| | THREAD | M5-M | M6-M | G1/8"-M | G1/8"-F |
|---|---|---|---|---|---|
| Ø 8 - 25 mm | **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

| | 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 |
|---|---|---|---|---|---|---|---|---|---|
| Ø 26 - 60 mm | **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

| | THREAD | G1/8"-M | G1/4"-M | G1/4"-F | G1/4"-M | G1/4"-F | G3/8"-M |
|---|---|---|---|---|---|---|---|
| Ø 75 mm | **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.

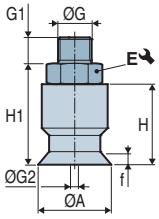
# VP

## Flat Suction Cups Ø 8 to 75 mm

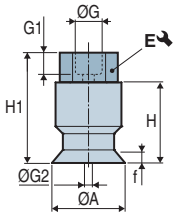
Dimensions "Suction Cup + Fitting"

### VP 8 - 10 | Group 1

1

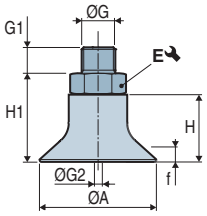



2

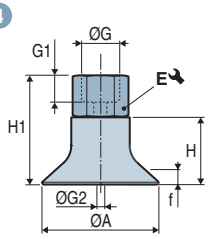



### VP 15 - 25 | Group 1

3

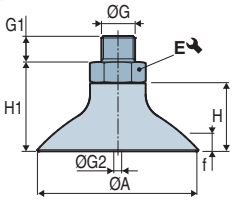



4

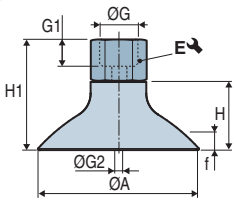



### VP 26 - 60 | Group 2

5

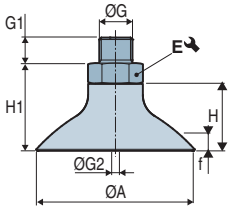



6

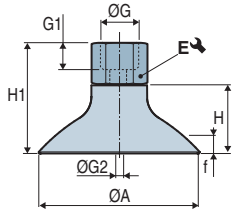



### VP 75 | Group 3

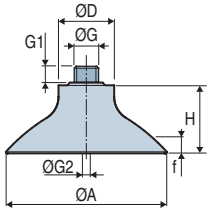
7




8




9




| Group 1 | | Diagram | ØA | ØD | f (1) | H | H1 | ØG | G1 | ØG2 (2) | 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.

# VP

## Flat Suction Cups Ø 8 to 75 mm

Dimensions "Suction Cup + Fitting"

| Group 2 | | Diagram | ØA | ØD | f (1) | H | H1 | ØG | G1 | ØG2 (2) | 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 |

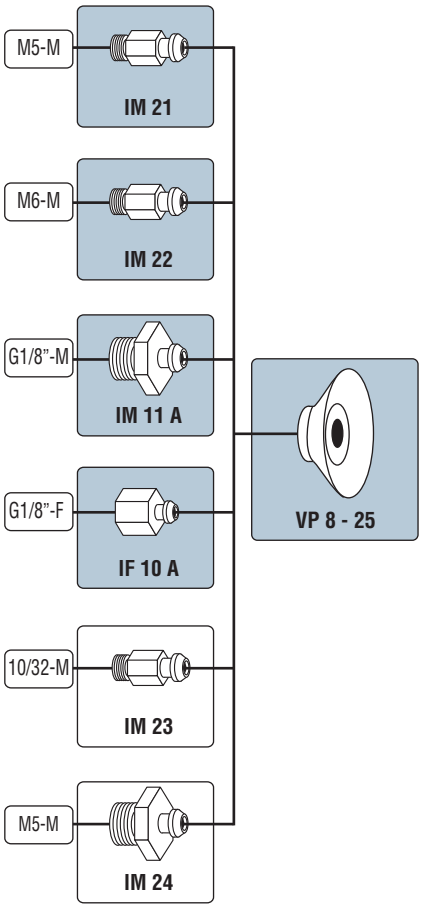
Note: All dimensions are in mm

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

# VP
## Flat Suction Cups Ø 8 to 75 mm
Assembly Diagrams

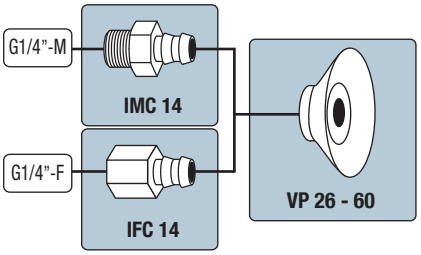
### VP 8 - 25 | Group 1

**Barbed fittings C**

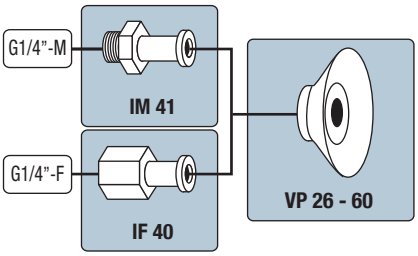



### VP 26 - 60 | Group 2

**Barbed fittings C**

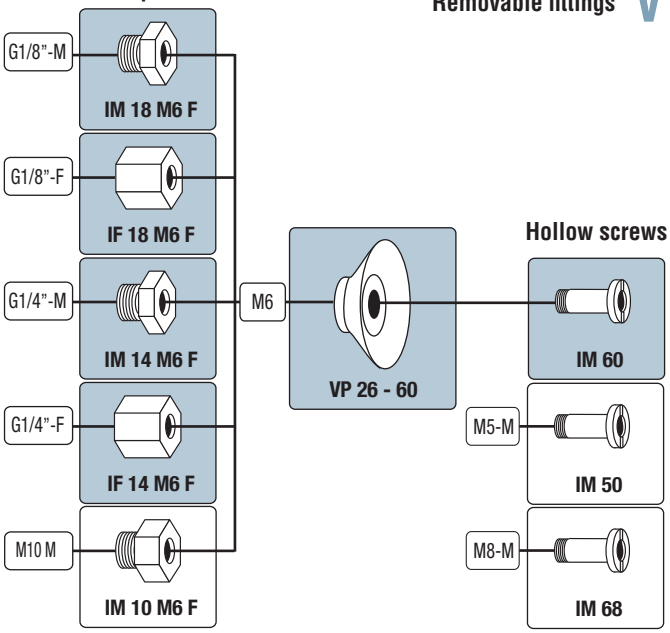



**Pressed fittings E**



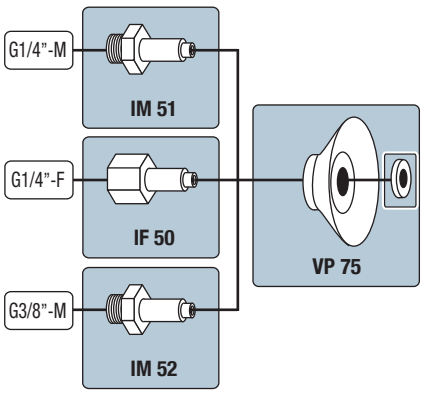

**Adapters**

**Removable fittings V**



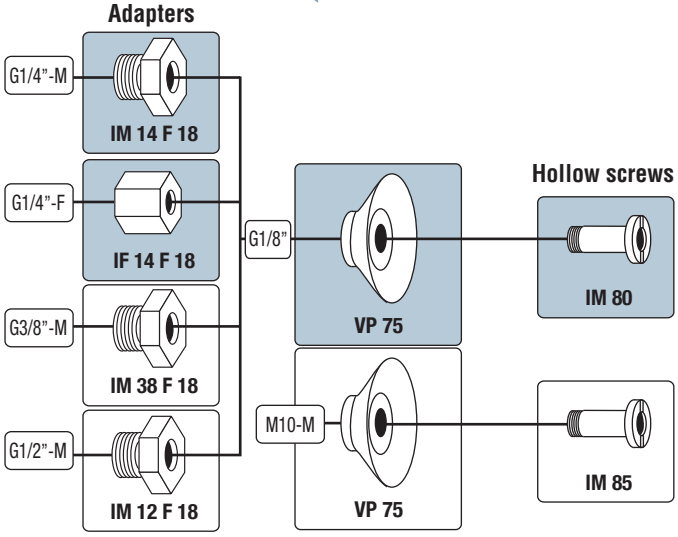

### VP 75 | Group 3

**Factory-crimped fittings S**




**Removable fittings V**

**Adapters**




Configurations (suction cup + fitting) refer to page 2/4

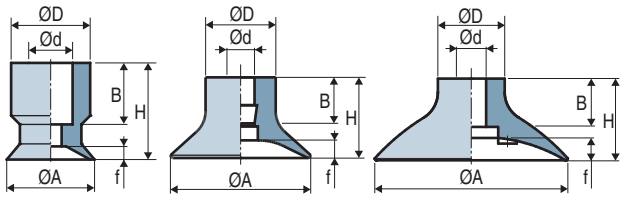
Non-standard configurations must be ordered in seperate part numbers.

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

# VP
## Flat Suction Cups Ø 8 to 75 mm
Dimensions

### Suction Cups

VP 8... 10 VP 15... 25 VP 26... 75

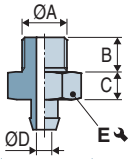



| | ØA | H | Ød | ØD | f (1) | B | (g) |
|---|---|---|---|---|---|---|---|
| VP 8 | 7.5 | 10 | 5 | 9 | 1.3 | 7 | 0.4 |
| VP 10 | 10 | 10.5 | 4.4 | 9 | 1.5 | 7 | 0.5 |
| VP 15 | 15 | 11 | 4 | 9 | 2.25 | 7 | 0.7 |
| VP 20 | 20 | 11.5 | 4 | 10 | 3 | 7 | 1.2 |
| VP 25 | 25 | 12 | 4 | 10 | 3 | 7 | 1.4 |
| 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 |

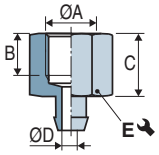
(1) f = Deflection of the suction cup.

### Barbed Fittings

Male - IM



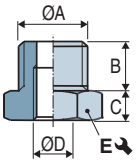

Female - IF



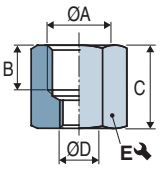

| | ØA | B | C | ØD | E | Material | (g) |
|---|---|---|---|---|---|---|---|
| IM 11 A | G1/8"-M | 7.5 | 6 | 3.5 | 14 | Aluminum | 4.1 |
| IMC 14 | G1/4"-M | 10 | 8 | 7 | 17 | Aluminum | 8.7 |
| IM 21 (2) | M5-M | 4.5 | 5 | 2.5 | 7 | Nickel-plated brass | 3.1 |
| IM 22 (2) | M6-M | 5 | 5 | 3.5 | 7 | 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



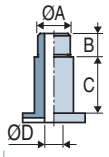

Female- IF

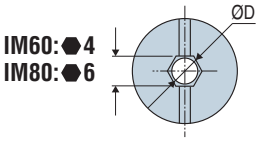



| | ØA | B | C | ØD | E | Material | (g) |
|---|---|---|---|---|---|---|---|
| IM 10 M6F | M10-M | 7 | 3.5 | M6-F | 13 | Brass | 5.9 |
| IM 12 F18 | G1/2"-M | 14 | 6 | G1/8"-F | 22 | Nickel-plated brass | 46.8 |
| IM 14 M6F | G1/4"-M | 8 | 5 | M6-F | 17 | Nickel-plated brass | 15.9 |
| IM 14 F18 | G1/4"-M | 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.

### Hollow Screws

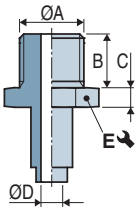


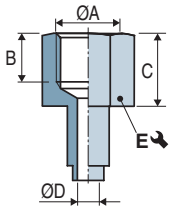

| | ØA | B | C | ØD | Material | (g) |
|---|---|---|---|---|---|---|
| IM 50 | M5-M | 5 | 11 | 2.8 | Brass | 7.4 |
| IM 60 (2) (3) | M6-M | 7 | 11 | 3.5 | Nickel-plated brass | 7.5 |
| IM 68 | M8-M | 8 | 11 | 5.2 | Nickel-plated brass | 6.4 |
| IM 80 | G1/8"-M | 8 | 18 | 6 | Nickel-plated brass | 23.7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

### Factory-crimped Fittings

Male - IM



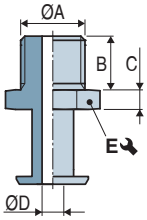

Female- IF



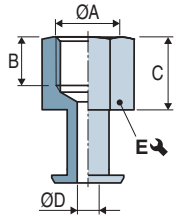

| | ØA | B | C | ØD | E | Material | (g) |
|---|---|---|---|---|---|---|---|
| IM 51 | G1/4"-M | 11 | 6 | 4.4 | 17 | Aluminum | 11.8 |
| IF 50 | G1/4"-F | 10 | 15 | 8 | 21 | Aluminum | 15.7 |
| IM 52 | G3/8"-M | 11 | 6 | 8 | 21 | Aluminum | 14 |

### Pressed Fitting

Male - IM



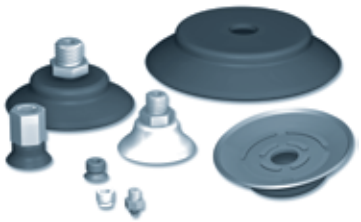

Female - IF




| | 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 |

# VPG

## 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.

Industry-specific applications

Types of use

**Materials**

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



### Suction Cup Properties

| | Ø (mm) | (cm³) | (lbf) (1) | (lbf) (1) | Rmin (mm) | NBR | SI | STN |
|---|---|---|---|---|---|---|---|---|
| VPG 2 | 2 | 0.00073 | 0.02 | 0.01 | 2 | VPG2NBR | VPG2SI | - |
| VPG 3.5 | 3.5 | 0.0022 | 0.06 | 0.03 | 8 | VPG3.5NBR | VPG3.5SI | - |
| VPG 5 | 5 | 0.005 | 0.11 | 0.06 | 8 | VPG5NBR | VPG5SI | VPG5STN |
| VPG 6 | 6 | 0.008 | 0.16 | 0.08 | 8 | VPG6NBR | VPG6SI | VPG6STN |
| VPG 8 | 8 | 0.03 | 0.28 | 0.14 | 10 | VPG8NBR | VPG8SI | VPG8STN |
| VPG 10 | 10 | 0.07 | 0.45 | 0.23 | 13 | VPG10NBR | VPG10SI | VPG10STN |
| VPG 15 | 15 | 0.2 | 1.06 | 0.54 | 13 | VPG15NBR | VPG15SI | VPG15STN |
| VPG 20 | 20 | 0.5 | 1.98 | 0.99 | 20 | VPG20NBR | VPG20SI | VPG20STN |
| VPG 25 | 25 | 1.1 | 2.71 | 1.36 | 25 | VPG25NBR | VPG25SI | VPG25STN |
| VPG 30 | 30 | 1.4 | 3.69 | 1.85 | 40 | VPG30NBR | VPG30SI | VPG30STN |
| VPG 35 | 35 | 2.9 | 5.36 | 2.68 | 50 | VPG35NBR | VPG35SI | - |
| VPG 40 | 40 | 3.8 | 7.79 | 3.90 | 50 | VPG40NBR | VPG40SI | VPG40STN |
| VPG 50 | 50 | 5.3 | 12.18 | 6.09 | 75 | VPG50NBR | VPG50SI | VPG50STN |
| VPG 60 | 60 | 12 | 19.97 | 9.98 | 100 | VPG60NBR | VPG60SI | VPG60STN |
| VPG 60S | 60 | 12 | 19.97 | 9.98 | 100 | VPG60SNBR | VPG60SSI | VPG60SSTN |
| VPG 80 | 80 | 26.9 | 32.15 | 16.07 | 150 | VPG80NBR | VPG80SI | VPG80STN |
| VPG 80S | 80 | 26.9 | 32.15 | 16.07 | 150 | VPG80SNBR | VPG80SSI | VPG80SSTN |
| VPG 95 | 95 | 41 | 45.46 | 22.73 | 200 | VPG95NBR | VPG95SI | VPG95STN |
| VPG 95S | 95 | 41 | 45.46 | 22.73 | 200 | VPG95SNBR | VPG95SSI | VPG95SSTN |
| VPG 120 | 120 | 141 | 59.26 | 29.63 | 365 | VPG120NBR | VPG120SI | VPG120STN |
| VPG 150 | 150 | 230 | 95.79 | 47.89 | 380 | VPG150NBR | VPG150SI | VPG150STN |
| VPG 200 | 200 | 384 | 170.47 | 85.24 | 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

| (Ø) | 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**

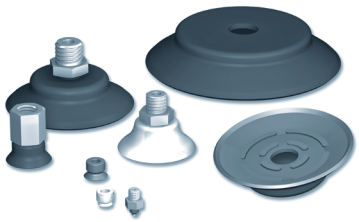
To optimize the use of your suction cups, Coval offers a comprehensive range of accessories (nozzle fittings,spring extensions, and feeder systems, etc.), see chapters **4** and **14**.

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

# VPG

## Extra-flat Su tion Cups Ø 2 to 200 mm

Suction Cup + Fitting References





### Ø 2 - 10 mm

| | C | | | | |
|---|---|---|---|---|---|
| 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

| | C | | V | | |
|---|---|---|---|---|---|
| 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

| | E | | V | | | | |
|---|---|---|---|---|---|---|---|
| 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 |
| 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

| | V | | | |
|---|---|---|---|---|
| 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

| | V | |
|---|---|---|
| THREAD | G1/2"-F * | G1/2"-F ** |
| VPG120NBR | VPG120NBRIFS12V | VPG120NBRIF12V |
| VPG120SI | VPG120SIIFS12V | VPG120SIIF12V |
| VPG120STN | VPG120STNIFS12V | VPG120STNIF12V |
| VPG150NBR | VPG150NBRIFS12V | VPG150NBRIF12V |
| VPG150SI | VPG150SIIFS12V | VPG150SIIF12V |
| VPG150STN | VPG150STNIFS12V | VPG150STNIF12V |
| VPG200NBR | VPG200NBRIFS12V | VPG200NBRIF12V |
| VPG200SI | VPG200SIIFS12V | VPG200SIIF12V |
| VPG200STN | VPG200STNIFS12V | VPG200STNIF12V |

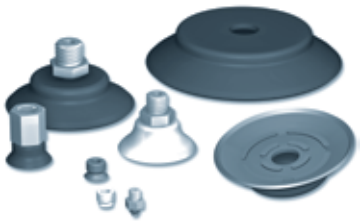
*Configured using fitting n° IFS12120
** Configured using fitting n° IF12120

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

# VPG

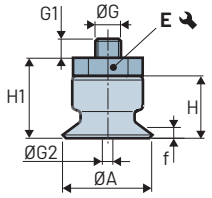
## Extra-flat Suction Cups Ø 2 to 200 mm

Dimensions "Suction Cup + Fitting"



### VPG 2 - 10

1

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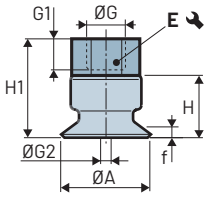
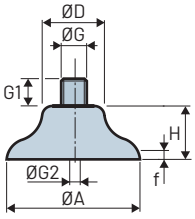
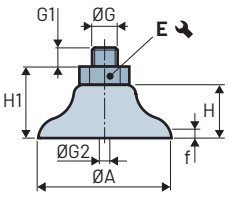



### VPG 15 - 50

3




4

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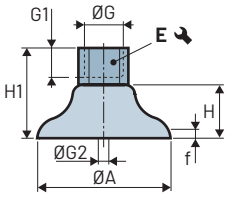
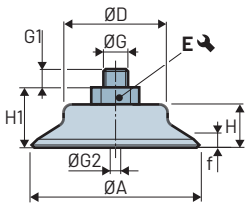



### VPG 60 - 95

6

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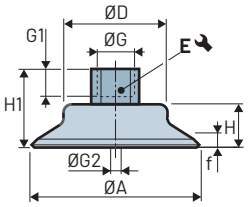
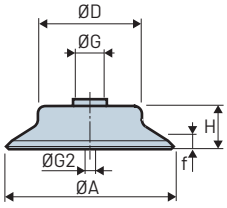
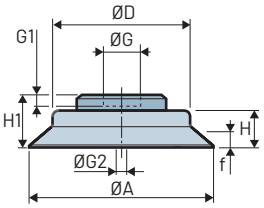



8

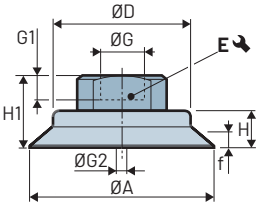



### VPG 120 - 200

9




10




| | | Diagram | Ø A | Ø D | f [1] | H | H1 | Ø G | G1 | Ø G2 [2] | 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 |
| | VGP3.5---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 |

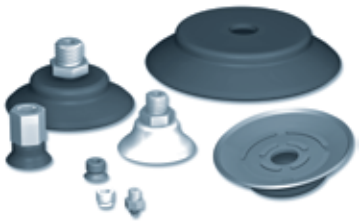
Note: All dimensions are in mm.

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

# VPG

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

Dimensions "Suction Cup + Fitting"





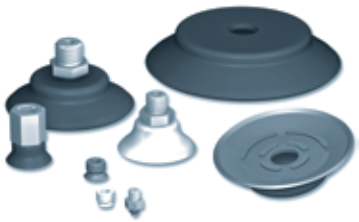
| | | Diagram | Ø A | Ø D | f [1] | H | H1 | Ø G | G1 | Ø G2 [2] | E | (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ø 25 - 50 mm | VPG25---IM18 | 4 | 25 | - | 3 | 14 | 19 | G1/8"-M | 8 | 4 | 14 | 6.9 |
| | VPG25---IF18 | 5 | 25 | - | 3 | 14 | 29 | G1/8"-F | 9 | 4 | 14 | 7.9 |
| | VPG25---IMM6V | 3 | 25 | - | 3 | 14 | - | M6-M | 6 | 3.5 | - | 5.5 |
| | VPG25---IM18V | 4 | 25 | - | 3 | 14 | 18.5 | G1/8"-M | 6 | 3.5 | 13 | 12.1 |
| | VPG25---IF18V | 5 | 25 | - | 3 | 14 | 27 | G1/8"-F | 7.5 | 3.5 | 13 | 15.4 |
| | VPG25---IM14V | 4 | 25 | - | 3 | 14 | 19 | G1/4"-M | 8 | 3.5 | 17 | 21.4 |
| | VPG25---IF14V | 5 | 25 | - | 3 | 14 | 30 | G1/4"-F | 11 | 3.5 | 17 | 26 |
| | VPG30---IM18 | 4 | 30 | - | 2 | 12 | 17 | G1/8"-M | 8 | 4 | 14 | 7.4 |
| | VPG30---IF18 | 5 | 30 | - | 2 | 12 | 27 | G1/8"-F | 9 | 4 | 14 | 8.4 |
| | VPG30---IMM6V | 3 | 30 | - | 2 | 12 | - | M6-M | 6 | 3.5 | - | 6 |
| | VPG30---IM18V | 4 | 30 | - | 2 | 12 | 16.5 | G1/8"-M | 6 | 3.5 | 13 | 12.6 |
| | VPG30---IF18V | 5 | 30 | - | 2 | 12 | 25 | G1/8"-F | 7.5 | 3.5 | 13 | 15.9 |
| | VPG30---IM14V | 4 | 30 | - | 2 | 12 | 17 | G1/4"-M | 8 | 3.5 | 17 | 21.9 |
| | VPG30---IF14V | 5 | 30 | - | 2 | 12 | 28 | G1/4"-F | 11 | 3.5 | 17 | 26.5 |
| | VPG35---IM18 | 4 | 35 | - | 3 | 14 | 19 | G1/8"-M | 8 | 4 | 14 | 9.9 |
| | VPG35---IF18 | 5 | 35 | - | 3 | 14 | 29 | G1/8"-F | 9 | 4 | 14 | 10.9 |
| | VPG35---IMM6V | 3 | 35 | - | 3 | 14 | - | M6-M | 6 | 3.5 | - | 8.5 |
| | VPG35---IM18V | 4 | 35 | - | 3 | 14 | 18.5 | G1/8"-M | 6 | 3.5 | 13 | 15.1 |
| | VPG35---IF18V | 5 | 35 | - | 3 | 14 | 27 | G1/8"-F | 7.5 | 3.5 | 13 | 18.4 |
| | VPG35---IM14V | 4 | 35 | - | 3 | 14 | 19 | G1/4"-M | 8 | 3.5 | 17 | 24.4 |
| | VPG35---IF14V | 5 | 35 | - | 3 | 14 | 30 | G1/4"-F | 11 | 3.5 | 17 | 29 |
| | VPG40---IM18 | 4 | 40 | - | 3.5 | 14 | 19 | G1/8"-M | 8 | 4 | 14 | 11.4 |
| | VPG40---IF18 | 5 | 40 | - | 3.5 | 14 | 29 | G1/8"-F | 9 | 4 | 14 | 12.4 |
| | VPG40---IMM6V | 3 | 40 | - | 3.5 | 14 | - | M6-M | 6 | 3.5 | - | 10 |
| | VPG40---IM18V | 4 | 40 | - | 3.5 | 14 | 18.5 | G1/8"-M | 6 | 3.5 | 13 | 16.6 |
| | VPG40---IF18V | 5 | 40 | - | 3.5 | 14 | 27 | G1/8"-F | 7.5 | 3.5 | 13 | 19.9 |
| | VPG40---IM14V | 4 | 40 | - | 3.5 | 14 | 19 | G1/4"-M | 8 | 3.5 | 17 | 25.9 |
| | VPG40---IF14V | 5 | 40 | - | 3.5 | 14 | 30 | G1/4"-F | 11 | 3.5 | 17 | 30.5 |
| | VPG50---IMM6V | 3 | 50 | - | 4 | 15 | - | M6-M | 6 | 3.5 | - | 18.6 |
| | VPG50---IM18V | 4 | 50 | - | 4 | 15 | 19.5 | G1/8"-M | 6 | 3.5 | 13 | 25.2 |
| | VPG50---IF18V | 5 | 50 | - | 4 | 15 | 28 | G1/8"-F | 7.5 | 3.5 | 13 | 28.5 |
| | VPG50---IM14V | 4 | 50 | - | 4 | 15 | 20 | G1/4"-M | 8 | 3.5 | 17 | 34.5 |
| | VPG50---IF14V | 5 | 50 | - | 4 | 15 | 31 | G1/4"-F | 11 | 3.5 | 17 | 39.1 |
| Ø 60 - 95 mm | VPG60--- | 8 | 60 | 38 | 5 | 16 | - | M10x125-F | - | - | - | 25.4 |
| | VPG60---IM14V | 6 | 60 | 38 | 5 | 16 | 21 | G1/4"-M | 10 | 5 | 17 | 32.4 |
| | VPG60---IF14V | 7 | 60 | 38 | 5 | 16 | 33 | G1/4"-F | 10 | 5 | 17 | 33.7 |
| | VPG60S--- | 8 | 60 | 38 | 5 | 16 | - | G1/4"-F | - | - | - | 25.4 |
| | VPG80--- | 8 | 80 | 53 | 6 | 18 | - | M10x125-F | - | - | - | 53 |
| | VPG80---IM14V | 6 | 80 | 53 | 6 | 18 | 23 | G1/4"-M | 10 | 5 | 17 | 60 |
| | VPG80---IF14V | 7 | 80 | 53 | 6 | 18 | 35 | G1/4"-F | 10 | 5 | 17 | 61.3 |
| | VPG80S--- | 8 | 80 | 53 | 6 | 18 | - | G1/4"-F | - | - | - | 53 |
| | VPG95--- | 8 | 95 | 68 | 6 | 19 | - | M10x125-F | - | - | - | 93.2 |
| | VPG95---IM14V | 6 | 95 | 68 | 6 | 19 | 24 | G1/4"-M | 10 | 5 | 17 | 100.2 |
| | VPG95---IF14V | 7 | 95 | 68 | 6 | 19 | 36 | G1/4"-F | 10 | 5 | 17 | 101.5 |
| | VPG95S--- | 8 | 95 | 68 | 6 | 19 | - | G1/4"-F | - | - | - | 93.2 |
| Ø 120 - 200 mm | VPG120---IF12V | 10 | 120 | 89.5 | 6 | 24.5 | 54.5 | G1/2"-F | 24 | 19 | 48 | 454.8 |
| | VPG120---IFS12V | 9 | 120 | 89.5 | 6 | 24.5 | 37.5 | G1/2"-F | 13 | - | - | 373.5 |
| | VPG150---IF12V | 10 | 150 | 105 | 9 | 30.5 | 60.5 | G1/2"-F | 24 | 19 | 48 | 624.8 |
| | VPG150---IFS12V | 9 | 150 | 105 | 9 | 30.5 | 43.5 | G1/2"-F | 13 | - | - | 543.5 |
| | VPG200---IF12V | 10 | 200 | 143 | 12.5 | 35.5 | 65.5 | G1/2"-F | 24 | 19 | 48 | 914.8 |
| | VPG200---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.

# Extra-flat Suction Cups Ø 2 to 200 mm

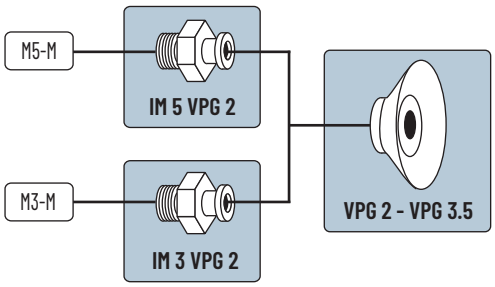
## Assembly Diagrams

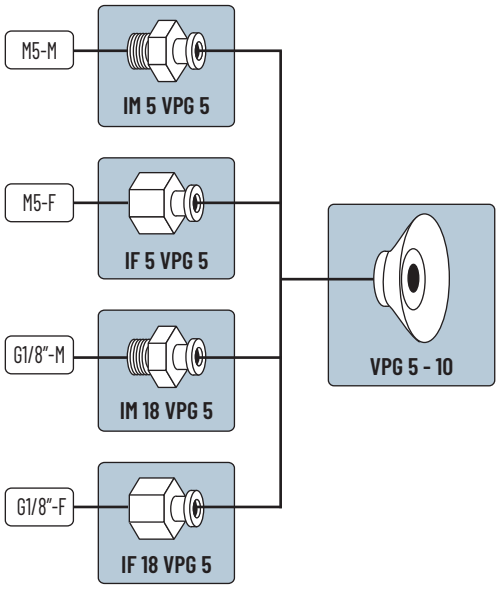




### VPG 2 - 10

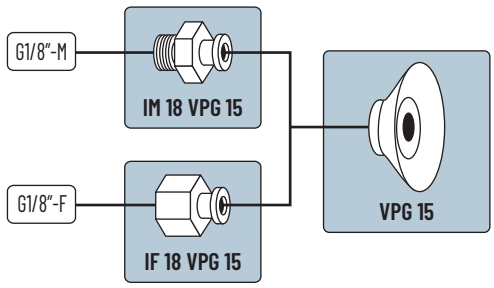
**Barbed fittings** C



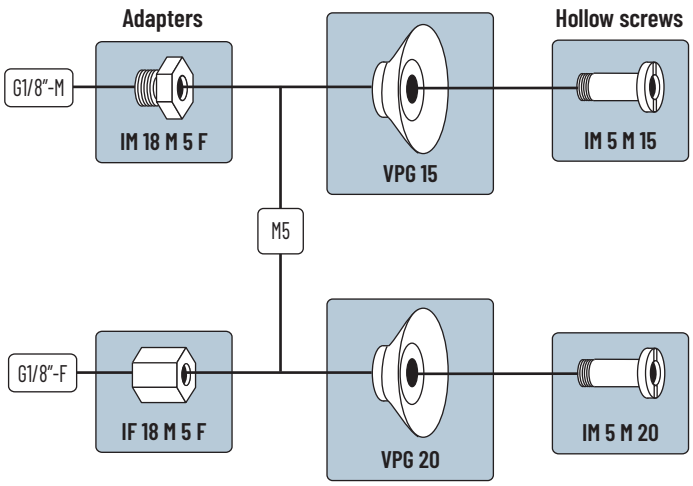




### VPG 15 - 20

**Barbed fittings** C




**Removable fittings** V

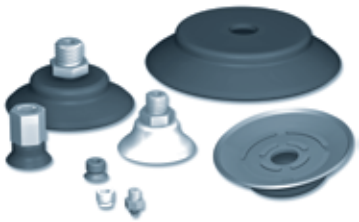



Configurations (suction cup + fitting) refer to page 2/10

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

# Extra-flat Suction Cups Ø 2 to 200 mm

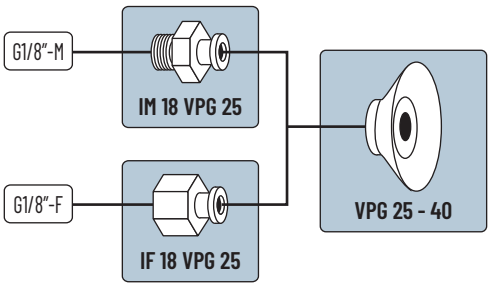
## Assembly Diagrams



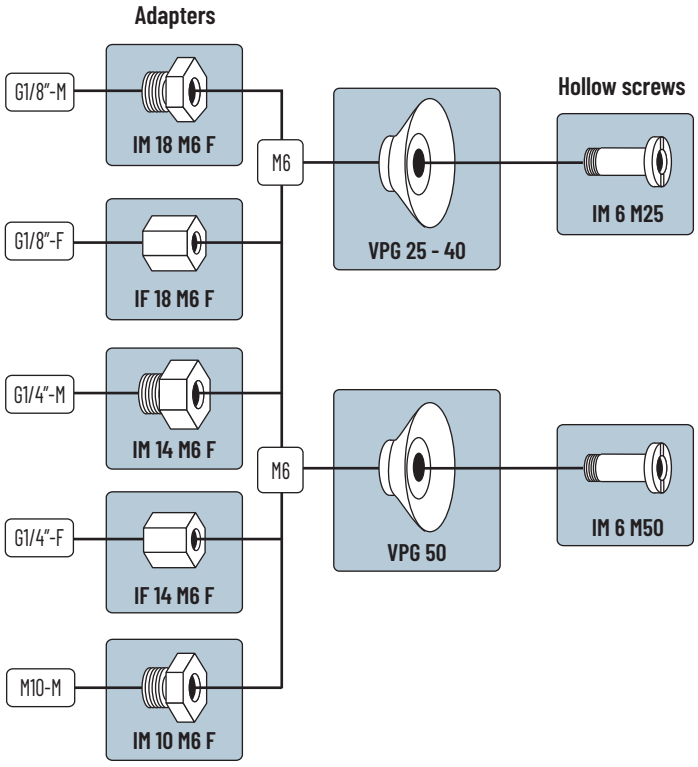


## VPG 25 - 50

**Pressed fittings** E

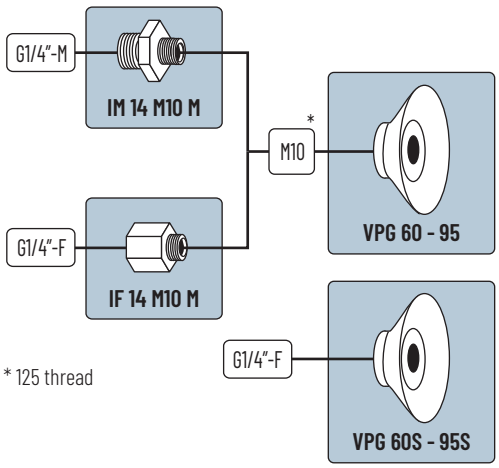



**Removable fittings** V




## VPG 60 - 95

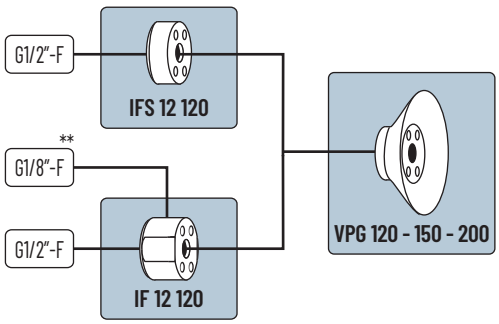
**Removable fittings** V




* 125 thread

## VPG 120 - 200

**Removable fittings** V




** Female auxiliary radial output

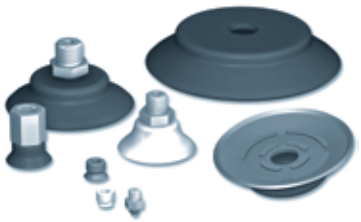
Configurations (suction cup + fitting) refer to page 2/10.

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

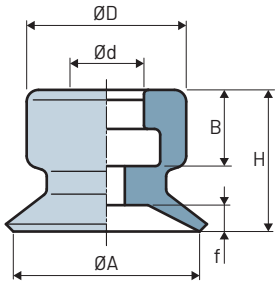
# VPG

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

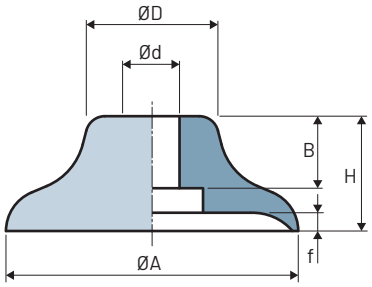
Dimensions - Suction Cups



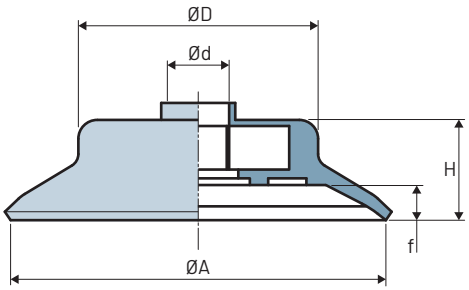
### VPG 2 - 10



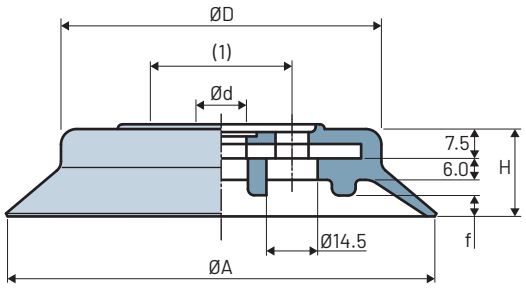

### VPG 15 - 50




### VPG 60 - 95




### VPG 120 - 200




(1) 4 holes Ø 9 on Ø 40

| (Ø) | ØA | H | Ød | ØD | f (1) | 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 |

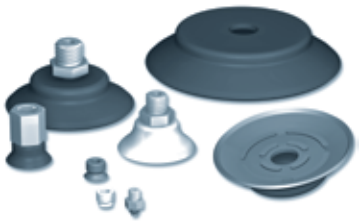
The values represent the average characteristics of our products.
Note: All dimensions are in mm.

(1) f = Deflection of the suction cup.

# VPG

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

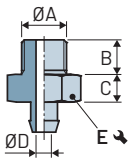
Dimensions - Fittings



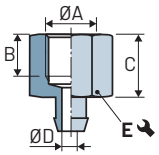


### Barbed Fittings

**Male - IM**



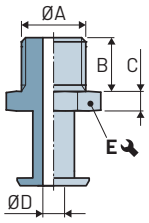

**Female - IF**



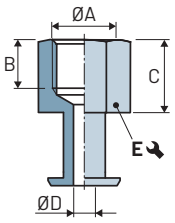

| | ØA | B | C | ØD | E | Material | (g) |
|---|---|---|---|---|---|---|---|
| **IM 3 VPG2** | M3-M | 3 | 2 | 1 | 5 | Aluminum | 0.18 |
| **IM 5 VPG2** | M5-M | 4.5 | 3.5 | 1 | 7 | Aluminum | 0.61 |
| **IM 5 VPG5** | M5-M | 4.5 | 3.5 | 2.2 | 7 | Aluminum | 0.7 |
| **IM 18 VPG5** | G1/8"-M | 8 | 5 | 2.2 | 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**

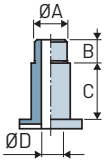



**Female - IF**




| | 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 |

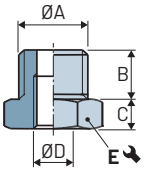
### Hollow Screws



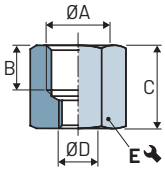

| | ØA | B | C | ØD | Material | (g) |
|---|---|---|---|---|---|---|
| **IM 5 M15** | M5-M | 5 | 2 | 2.5 | Nickel-plated brass | 1.3 |
| **IM 5 M20** | M5-M | 5 | 4 | 2.5 | Nickel-plated brass | 2.2 |
| **IM 6 M25** | M6-M | 6 | 6 | 3.5 | Nickel-plated brass | 2.7 |
| **IM 6 M50** | M6-M | 6 | 6 | 3.5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

### Adapters for Hollow Screws

**Male - IM**



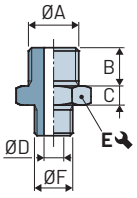

**Female - IF**



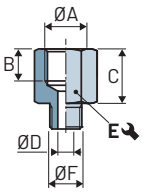

| | ØA | B | C | ØD | E | Material | (g) |
|---|---|---|---|---|---|---|---|
| **IM 10 M6F** | M10-M | 7 | 3.5 | M6-F | 13 | Brass | 5.9 |
| **IM 14 M6F** | G1/4"-M | 8 | 5 | M6-F | 17 | Nickel-plated brass | 15.9 |
| **IM 18 M5F** | G1/8"-M | 6 | 4.5 | M5-F | 13 | Nickel-plated brass | 7.3 |
| **IM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

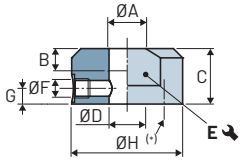
**Male - IM**



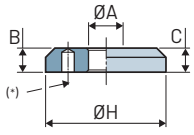

**Female - IF**




**Female - IF 12120**




**Female - IFS 12120**




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

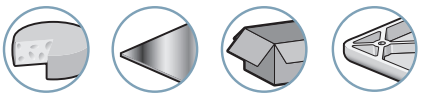
| | ØA | B | C | ØD | E | ØF | G | H | Material | (g) |
|---|---|---|---|---|---|---|---|---|---|---|
| **IM 14 M10M** | G1/4"-M | 10 | 5 | 5 | 17 | M10x125-M | - | - | Aluminum | 7 |
| **IF 14 M10M** | G1/4"-F | 10 | 17 | 5 | 17 | M10x125-M | - | - | Aluminum | 8.3 |
| **IF 12120** | G1/2"-F | 24 | 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.

Industry-specific applications



Types of use

### Materials

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

### Suction Cup Properties

| | Ø (mm) | (cm³) | (lbf) (1) | (lbf) (1) | Rmin (mm) | NBR | SI | STN |
|---|---|---|---|---|---|---|---|---|
| **VPU 6** | 7 | 0.05 | 0.21 | 0.10 | 5 | **VPU6NBR** | **VPU6SI** | **VPU6STN(*)** |
| **VPU 8** | 9 | 0.1 | 0.32 | 0.16 | 6 | **VPU8NBR** | **VPU8SI** | **VPU8STN(*)** |
| **VPU 10** | 11 | 0.018 | 0.57 | 0.28 | 8 | **VPU10NBR** | **VPU10SI** | **VPU10STN(*)** |
| **VPU 15** | 16.5 | 0.5 | 0.97 | 0.49 | 8 | **VPU15NBR** | **VPU15SI** | **VPU15STN(*)** |
| **VPU 20** | 22 | 1 | 1.46 | 0.73 | 13 | **VPU20NBR** | **VPU20SI** | **VPU20STN(*)** |
| **VPU 30** | 32 | 2 | 2.92 | 1.46 | 20 | **VPU30NBR** | **VPU30SI** | **VPU30STN(*)** |
| **VPU 40** | 41 | 5.5 | 4.22 | 2.11 | 30 | **VPU40NBR** | **VPU40SI** | **VPU40STN(*)** |
| **VPU 50** | 51.4 | 12 | 7.47 | 3.73 | 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 | C M5-M |
|---|---|
| **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 | E G1/8"-M | |
|---|---|---|
| | 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 | E G1/4"-M | | G3/8"-M | |
|---|---|---|---|---|
| | 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

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

**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**.

# VPU

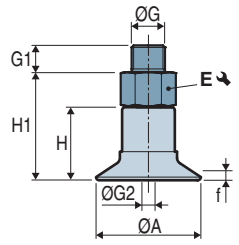
## Flat Suction Cups Ø 6 to 50 mm

Assembly Diagrams

### Suction Cups + Fittings

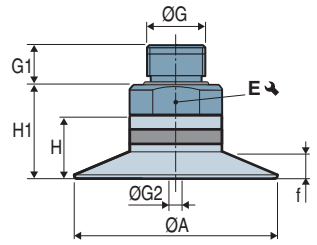
**VPU 6 - 15**

1



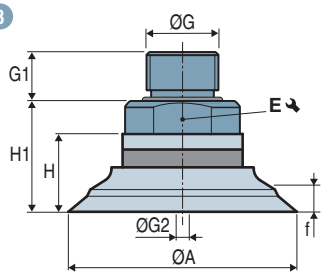

**VPU 20 - 30**

2




**VPU 40 - 50**

3

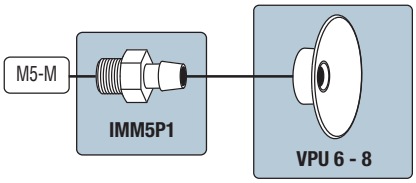


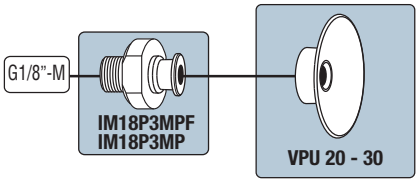

| | Diagram | ØA | f (1) | H | H1 | ØG | G1 | ØG2 (2) | E | (g) |
|---|---|---|---|---|---|---|---|---|---|---|
| **VPU6---IMM5C** | **1** | 7 | 0.3 | 6.5 | 10 | M5-M | 4 | 1.5 | 7 | 1.8 |
| **VPU8---IMM5C** | **1** | 9 | 0.5 | 7 | 10.5 | M5-M | 4 | 1.5 | 7 | 1.9 |
| **VPU10---IMM5C** | **1** | 11 | 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 |

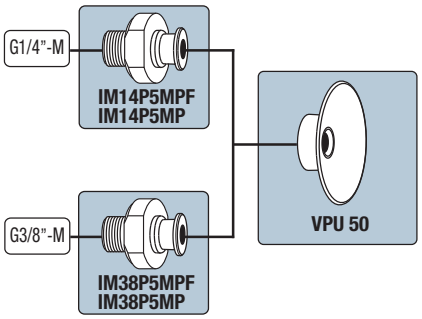
(1) f = Deflection of the suction cup.

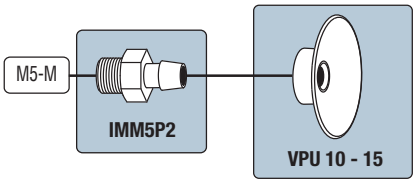
(2) Ø G2 = Ø internal orifice of the fitting.

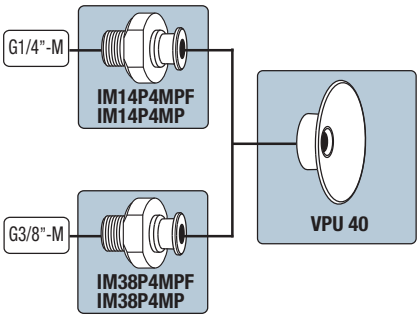
### Assembly Diagrams



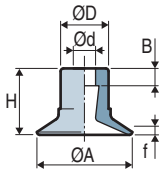




Note: All dimensions are in mm.

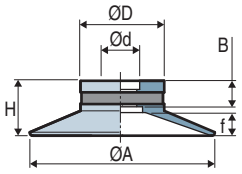
# VPU
## Flat Suction Cups Ø 6 to 50 mm
Dimensions

### Suction Cups

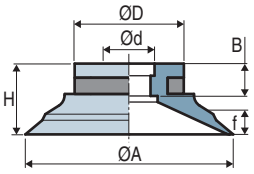
VPU 6 - 15




VPU 20 - 30




VPU 40 - 50

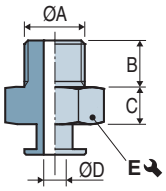



| | ØA | H | Ød | ØD | f (1) | B | (g) |
|---|---|---|---|---|---|---|---|
| **VPU 6** | 7 | 6.5 | 2 | 5 | 0.3 | 3.5 | 0.12 |
| **VPU 8** | 9 | 7 | 2 | 5 | 0.5 | 3.5 | 0.15 |
| **VPU 10** | 11 | 10.5 | 3.8 | 9 | 0.5 | 3 | 0.51 |
| **VPU 15** | 16.5 | 11.5 | 3.8 | 8.3 | 1.5 | 3 | 0.75 |
| **VPU 20** | 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

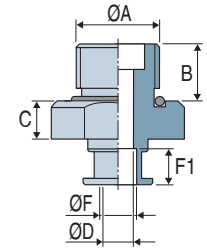
IMM5P1 - IMM5P2

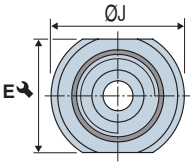



| | ØA | B | C | ØD | E | Material | (g) |
|---|---|---|---|---|---|---|---|
| **IMM5P1** | M5-M | 4 | 3.5 | 1.5 | 7 | Brass | 1.7 |
| **IMM5P2** | M5-M | 4 | 4.5 | 2.7 | 7 | Aluminum | 0.8 |

### 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 |

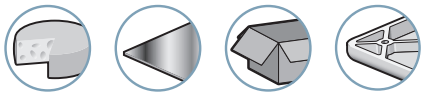
*Male fittings (IM) equiped with O-ring sealing

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

# VPF
## 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.

Industry-specific applications



Types of use

**Materials**

**NBR** Nitrile
**SIT5** Translucent Silicone
**STN** SITON®

### Suction Cup Properties

| | Ø (mm) | (cm³) | (lbf) (1) | (lbf) (1) | $R_{min}$ (mm) | NBR | SI | STN |
|---|---|---|---|---|---|---|---|---|
| **VPF 15** | 15.7 | 0.37 | 0.81 | 0.41 | 13 | **VPF15NBR** | **VPF15SI** | **VPF15STN(*)** |
| **VPF 20** | 22 | 1.00 | 1.62 | 0.81 | 18 | **VPF20NBR** | **VPF20SI** | **VPF20STN(*)** |
| **VPF 25** | 26.8 | 1.10 | 2.11 | 1.06 | 22 | **VPF25NBR** | **VPF25SI** | **VPF25STN(*)** |
| **VPF 30** | 32 | 2.00 | 2.60 | 1.30 | 25 | **VPF30NBR** | **VPF30SI** | **VPF30STN(*)** |
| **VPF 40** | 42.5 | 1.80 | 4.06 | 2.03 | 52 | **VPF40NBR** | **VPF40SI** | **VPF40STN(*)** |
| **VPF 50** | 53 | 10.00 | 7.79 | 3.90 | 55 | **VPF50NBR** | **VPF50SI** | **VPF50STN(*)** |

(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 |
|---|---|---|---|---|
| **15** | ■ | - | - | - |
| **20 - 30** | - | ■ | - | - |
| **40 - 50** | - | - | ■ | ■ |

■ 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"

**C**

| | THREAD | M5-M |
|---|---|---|
| **Ø 15 mm** | **VPF15NBR** | VPF15NBRIMM5C |
| | **VPF15SI** | VPF15SIIMM5C |
| | **VPF15STN** | VPF15STNIMM5C |

**E**

| | THREAD | G1/8"-M | |
|---|---|---|---|
| | | Fitting with filter | Fitting without filter |
| **Ø 20 - 30 mm** | **VPF20NBR** | VPF20NBRIM18MPF | VPF20NBRIM18MP |
| | **VPF20SI** | VPF20SIIM18MPF | VPF20SIIM18MP |
| | **VPF20STN(*)** | VPF20STNIM18MPF | VPF20STNIM18MP |
| | **VPF25NBR** | VPF25NBRIM18MPF | VPF25NBRIM18MP |
| | **VPF25SI** | VPF25SIIM18MPF | VPF25SIIM18MP |
| | **VPF25STN(*)** | VPF25STNIM18MPF | VPF25STNIM18MP |
| | **VPF30NBR** | VPF30NBRIM18MPF | VPF30NBRIM18MP |
| | **VPF30SI** | VPF30SIIM18MPF | VPF30SIIM18MP |
| | **VPF30STN(*)** | VPF30STNIM18MPF | VPF30STNIM18MP |

**E**

| | THREAD | G1/4"-M | | G3/8"-M | |
|---|---|---|---|---|---|
| | | Fitting with filter | Fitting without filter | Fitting with filter | Fitting without filter |
| **Ø 40 - 50 mm** | **VPF40NBR** | VPF40NBRIM14MPF | VPF40NBRIM14MP | VPF40NBRIM38MPF | VPF40NBRIM38MP |
| | **VPF40SI** | VPF40SIIM14MPF | VPF40SIIM14MP | VPF40SIIM38MPF | VPF40SIIM38MP |
| | **VPF40STN(*)** | VPF40STNIM14MPF | VPF40STNIM14MP | VPF40STNIM38MPF | VPF40STNIM38MP |
| | **VPF50NBR** | VPF50NBRIM14MPF | VPF50NBRIM14MP | VPF50NBRIM38MPF | VPF50NBRIM38MP |
| | **VPF50SI** | VPF50SIIM14MPF | VPF50SIIM14MP | VPF50SIIM38MPF | VPF50SIIM38MP |
| | **VPF50STN(*)** | VPF50STNIM14MPF | VPF50STNIM14MP | VPF50STNIM38MPF | VPF50STNIM38MP |

(*) On request

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

**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**.

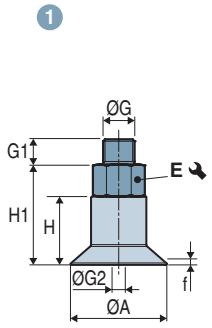
# VPF

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

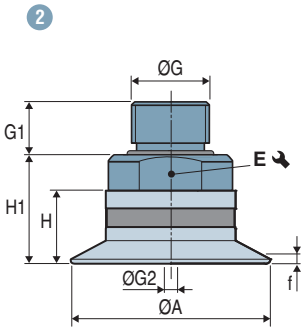
Assembly Diagrams

### Suction Cup + Fitting

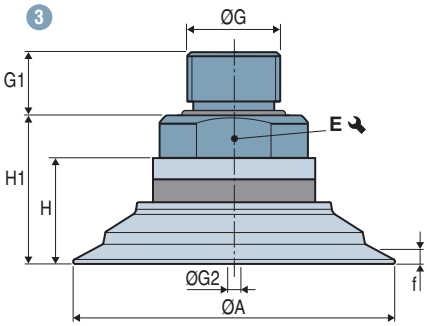
**VPF 15**




**VPF 20…30**



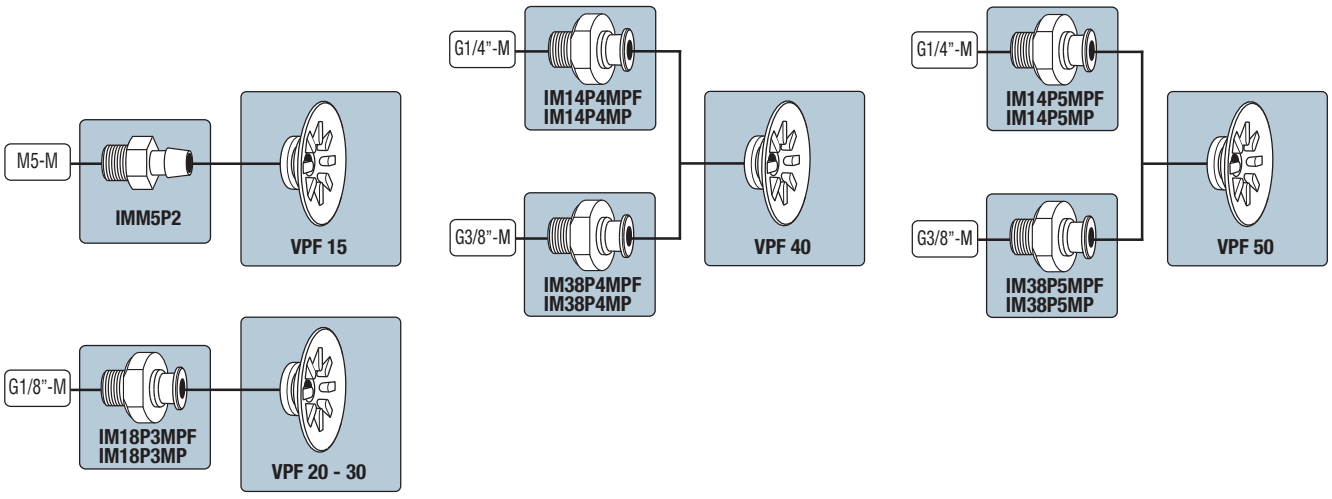

**VPF 40…50**




| | Diagram | ØA | f (1) | H | H1 | ØG | G1 | ØG2 (2) | E | (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.

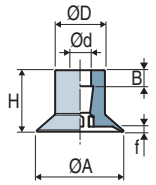
# VPF

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

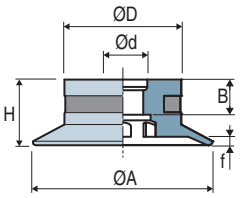
Assembly Diagrams

### Suction Cups

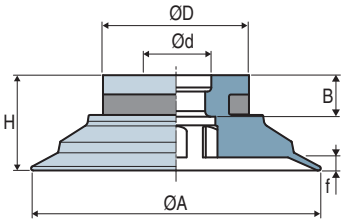
**VPF 15**




**VPF 20…30**




**VPF 40…50**

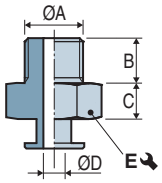



| | Ø A | H | Ø d | Ø D | f (1) | B | (g) |
|---|---|---|---|---|---|---|---|
| **VPF 15** | 15.7 | 11 | 4 | 9 | 1 | 3 | 0.7 |
| **VPF 20** | 22 | 8 | 5 | 14.3 | 1 | 4.5 | 1.2 |
| **VPF 25** | 26.8 | 9 | 5 | 14.3 | 1.3 | 4.5 | 1.7 |
| **VPF 30** | 32 | 10 | 5 | 14.3 | 1.8 | 4.5 | 2.2 |
| **VPF 40** |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

(1) f = Deflection of the suction cup.

### Barbed Fittings

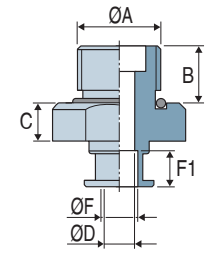
**IMM5P2**

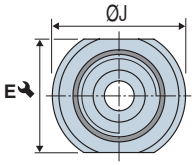



| | ØA | B | C | ØD | E | Material | (g) |
|---|---|---|---|---|---|---|---|
| **IMM5P2** | M5-M | 4 | 4.5 | 2.7 | 7 | Aluminum | 0.8 |

### Pressed fittings

**Male fittings**



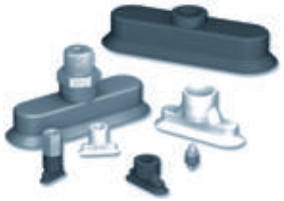




| Fitting with stainless steel filter 200 µm | Fitting without filter | ØA | B | C | ØD | E | ØJ | ØF | F1 | Materials Fitting* | (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **IM18P3MPF** | **IM18P3MP** | G1/8"-M | 7 | 5 | 4 | 13 | 15 | 5 | 4.7 | Aluminum | 3.2 |
| **IM14P4MPF** | **IM14P4MP** | 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) equiped with O-ring sealing

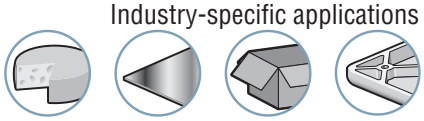
Note: All dimensions are in mm.
The values represent the average characteristics of our products.

# 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.

Industry-specific applications



Types of use

**Materials**

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



### Suction Cup Properties

| | l x L (mm) | (cm³) | (lbf) (1) | $R_{min}$ (mm) | NBR | SI | STN |
|---|---|---|---|---|---|---|---|
| **VPO 24** | 2x4 | 0.004 | 0.05 | 1 | **VPO24NBR** | **VPO24SI** | **VPO24STN** |
| **VPO 357** | 3.5x7 | 0.019 | 0.12 | 3 | **VPO357NBR** | **VPO357SI** | **VPO357STN** |
| **VPO 515** | 5x15 | 0.036 | 0.38 | 4 | **VPO515NBR** | **VPO515SI** | **VPO515STN** |
| **VPO 618** | 6x18 | 0.058 | 0.55 | 4 | **VPO618NBR** | **VPO618SI** | **VPO618STN** |
| **VPO 824** | 8x24 | 0.138 | 0.97 | 8 | **VPO824NBR** | **VPO824SI** | **VPO824STN** |
| **VPO 1030** | 10x30 | 0.28 | 1.49 | 8 | **VPO1030NBR** | **VPO1030SI** | **VPO1030STN** |
| **VPO 1545** | 15x45 | 0.98 | 3.43 | 10 | **VPO1545NBR** | **VPO1545SI** | **VPO1545STN** |
| **VPO 2060** | 20x60 | 2.3 | 6.10 | 20 | **VPO2060NBR** | **VPO2060SI** | **VPO2060STN** |
| **VPO 2575** | 25x75 | 4.7 | 9.53 | 30 | **VPO2575NBR** | **VPO2575SI** | **VPO2575STN** |
| **VPO 3090** | 30x90 | 8.5 | 13.72 | 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

C

**Version C:** Barbed fitting

### References - "Suction Cup + Fitting"

**2x4, 3.5x7**

| THREAD | C M3-M |
|---|---|
| **VPO24NBR** | VPO24NBRIMM3C |
| **VPO24SI** | VPO24SIIMM3C |
| **VPO24STN** | VPO24STNIMM3C |
| **VPO357NBR** | VPO357NBRIMM3C |
| **VPO357SI** | VPO357SIIMM3C |
| **VPO357STN** | VPO357STNIMM3C |

**5x15 - 6x18**

| THREAD | C M5-M | M5-F |
|---|---|---|
| **VPO515NBR** | VPO515NBRIMM5C | VPO515NBRIFM5C |
| **VPO515SI** | VPO515SIIMM5C | VPO515SIIFM5C |
| **VPO515STN** | VPO515STNIMM5C | VPO515STNIFM5C |
| **VPO618NBR** | VPO618NBRIMM5C | VPO618NBRIFM5C |
| **VPO618SI** | VPO618SIIMM5C | VPO618SIIFM5C |
| **VPO618STN** | VPO618STNIMM5C | VPO618STNIFM5C |

**8x24 - 10x30**

| THREAD | C G1/8"-M | G1/8"-F |
|---|---|---|
| **VPO824NBR** | VPO824NBRIM18C | VPO824NBRIF18C |
| **VPO824SI** | VPO824SIIM18C | VPO824SIIF18C |
| **VPO824STN** | VPO824STNIM18C | VPO824STNIF18C |
| **VPO1030NBR** | VPO1030NBRIM18C | VPO1030NBRIF18C |
| **VPO1030SI** | VPO1030SIIM18C | VPO1030SIIF18C |
| **VPO1030STN** | VPO1030STNIM18C | VPO1030STNIF18C |

**15x45 - 30x90**

| THREAD | C G1/4"-M | G1/4"-F |
|---|---|---|
| **VPO1545NBR** | VPO1545NBRIM14C | VPO1545NBRIF14C |
| **VPO1545SI** | VPO1545SIIM14C | VPO1545SIIF14C |
| **VPO1545STN** | VPO1545STNIM14C | VPO1545STNIF14C |
| **VPO2060NBR** | VPO2060NBRIM14C | VPO2060NBRIF14C |
| **VPO2060SI** | VPO2060SIIM14C | VPO2060SIIF14C |
| **VPO2060STN** | VPO2060STNIM14C | VPO2060STNIF14C |
| **VPO2575NBR** | VPO2575NBRIM14C | VPO2575NBRIF14C |
| **VPO2575SI** | VPO2575SIIM14C | VPO2575SIIF14C |
| **VPO2575STN** | VPO2575STNIM14C | VPO2575STNIF14C |
| **VPO3090NBR** | VPO3090NBRIM14C | VPO3090NBRIF14C |
| **VPO3090SI** | VPO3090SIIM14C | VPO3090SIIF14C |
| **VPO3090STN** | VPO3090STNIM14C | VPO3090STNIF14C |

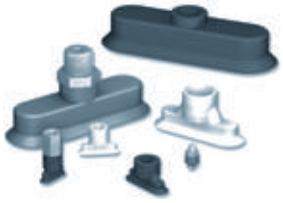
**Accessories**
Anti-rotation spring system, see page 4/6

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



COVAL vacuum managers

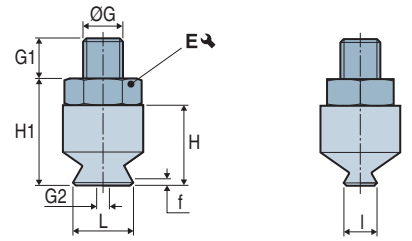
# VPO
## Oblong Flat Suction Cups
Dimensions - "Suction Cup + Fitting"





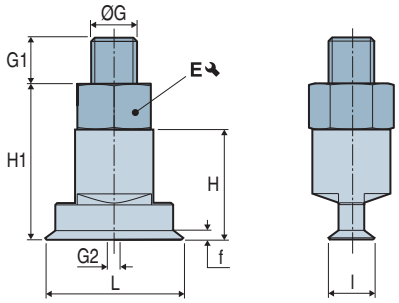
### VPO 2x4 - 3.5x7

1

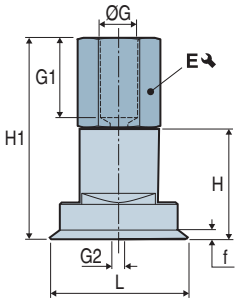



### VPO 5x15 - 6x18

2

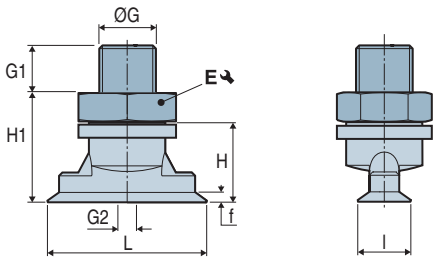



3

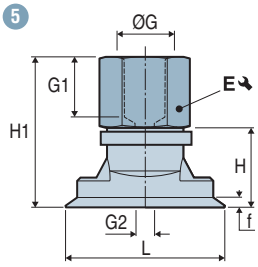



### VPO 8x24 - 10x30

4

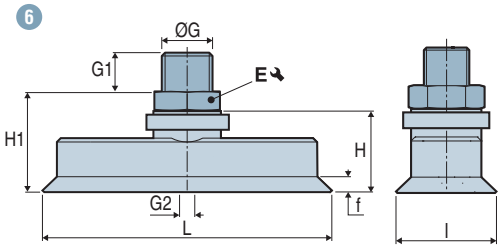



5

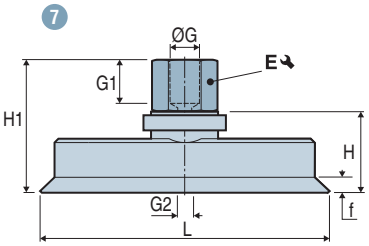



### VPO 15x45 - 20x60 - 25x75 - 30x90

6




7



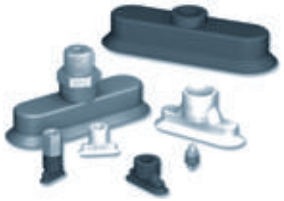

| | Diagram | L | l | f (1) | H | H1 | ØG | G1 | ØG2 (2) | E | (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| VPO24---IMM3C | 1 | 4 | 2 | 0.5 | 6 | 8 | M3-M | 3 | 1 | 5 | 0.4 |
| VPO357---IMM3C | 1 | 7 | 3.5 | 0.8 | 6 | 8 | M3-M | 3 | 1 | 5 | 0.3 |
| VPO515---IMM5C | 2 | 15 | 5 | 0.7 | 12 | 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.

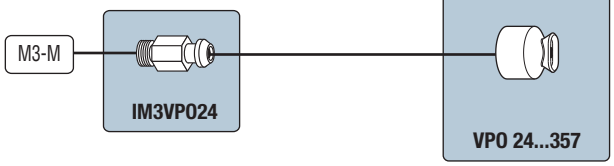
# VPO
## Oblong Flat Suction Cups
Assembly Diagrams





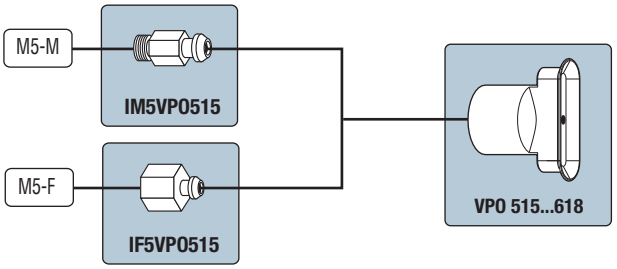
### VPO 24 - 357

**Barbed fittings** C



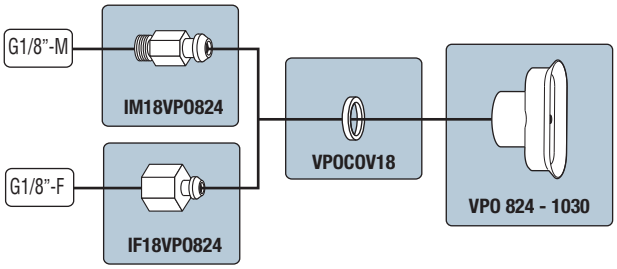

### VPO 515 - 618

**Barbed fittings** C



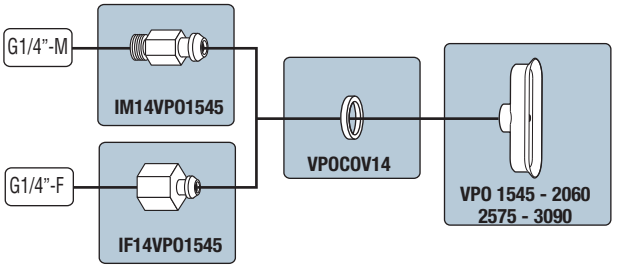

### VPO 824 - 1030

**Barbed fittings** C

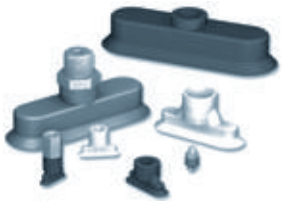



### VPO 1545 - 2060 - 2575 - 3090

**Barbed fittings** C



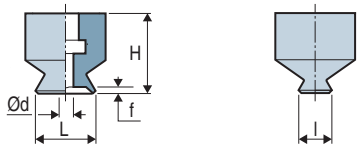
# VPO
## Oblong Flat Suction Cups
Dimensions



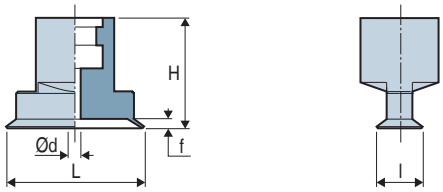


## Dimensions Suction Cups

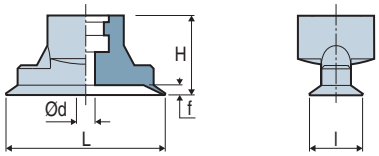
**VPO 24 - 357**



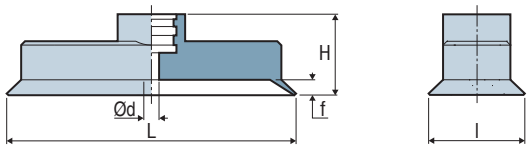

**VPO 515 - 618**




**VPO 824 - 1030**




**VPO 1545 - 2060 - 2575 - 3090**



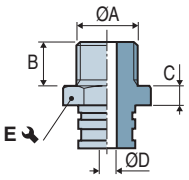

## Suction Cups

| | L | l | Ø d | H | f (1) | (g) |
|---|---|---|---|---|---|---|
| **VPO24** | 4 | 2 | 0.7 | 6 | 0.5 | 0.12 |
| **VPO357** | 7 | 3.5 | 1 | 6 | 0.8 | 0.15 |
| **VPO515** | 15 | 5 | 1.2 | 12 | 0.7 | 0.51 |
| **VPO618** | 18 | 6 | 1.5 | 12 | 0.8 | 0.53 |
| **VPO824** | 24 | 8 | 1.5 | 12 | 1 | 1.1 |
| **VPO1030** | 30 | 10 | 2.5 | 12 | 1.5 | 1.3 |
| **VPO1545** | 45 | 15 | 3 | 21 | 2 | 4.1 |
| **VPO2060** | 60 | 20 | 4 | 21 | 2.5 | 7.3 |
| **VPO2575** | 75 | 25 | 4 | 21 | 2.8 | 15.5 |
| **VPO3090** | 90 | 30 | 4 | 21 | 3.5 | 23.9 |

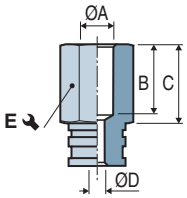
(1) f = Deflection of the suction cup.

## Barbed Fitting

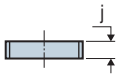
**Male - IM**




**Female - IF**




**Collar**




| | ØA | B | C | ØD | E | j | Matierial | (g) |
|---|---|---|---|---|---|---|---|---|
| **IM3VPO24** | M3-M | 3 | 2 | 1 | 5 | - | Aluminum | 0.2 |
| **IM5VPO515** | M5-M | 5 | 5 | 2 | 8 | - | Aluminum | 1.3 |
| **IM18VPO824** | G1/8"-M | 8 | 5 | 3.5 | 14 | - | Aluminum | 3.9 |
| **IM14VPO1545** | G1/4"-M | 10 | 5 | 3.5 | 17 | - | Aluminum | 9.7 |
| **IF5VPO515** | M5-F | 8.5 | 10 | 2 | 8 | - | Aluminum | 1.3 |
| **IF18VPO824** | G1/8"-F | 9 | 13 | 3.5 | 14 | - | Aluminum | 4.6 |
| **IF14VPO1545** | 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.

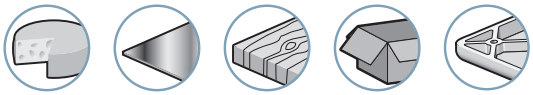
# VSA
## Suction Cups with 1.5 Bellows Ø 5 to 78 mm

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.

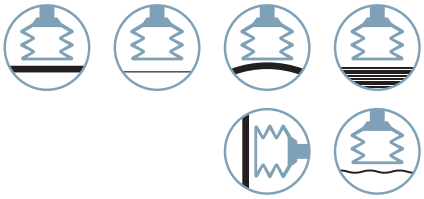
■ Flexibility ■ Precision ■ Deflection

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.

Industry-specific applications



Types of use





### Materials

| | | | |
|---|---|---|---|
| **NBR** | Nitrile | **SIT5** | Translucent silicone |
| **NR** | Natural rubber | **SIB** | 35 shore A white silicone |
| **STN** | SITON® 60 ShoreA | **STN5** | SITON® 50 ShoreA (on request) |

### Suction Cup Properties

| | Ø (mm) | (cm³) | (lbf) (1) | (lbf) (1) | $R_{min}$ (mm) | NBR | SIT5 | SIB | NR | STN (2) |
|---|---|---|---|---|---|---|---|---|---|---|
| **VSA 5** | 5.5 | 0.04 | 0.11 | 0.06 | 10 | **VSA5NBR** | **VSA5SIT5** | - | - | **VSA5STN** |
| **VSA 11** | 11 | 0.225 | 0.39 | 0.19 | 10 | **VSA11NBR** | **VSA11SIT5** | - | **VSA11NR** | **VSA11STN** |
| **VSA 14** | 13 | 0.42 | 0.57 | 0.28 | 13 | **VSA14NBR** | **VSA14SIT5** | - | **VSA14NR** | **VSA14STN** |
| **VSA 16** | 16 | 0.75 | 0.60 | 0.30 | 20 | **VSA16NBR** | **VSA16SIT5** | **VSA16SIB** | **VSA16NR** | **VSA16STN** |
| **VSA 18** | 18 | 0.76 | 0.99 | 0.50 | 25 | **VSA18NBR** | **VSA18SIT5** | **VSA18SIB** | **VSA18NR** | **VSA18STN** |
| **VSA 20** | 19 | 1.15 | 1.25 | 0.63 | 30 | **VSA20NBR** | **VSA20SIT5** | **VSA20SIB** | **VSA20NR** | **VSA20STN** |
| **VSA 22** | 22 | 1.4 | 1.38 | 0.69 | 25 | **VSA22NBR** | **VSA22SIT5** | **VSA22SIB** | **VSA22NR** | **VSA22STN** |
| **VSA 25** | 24 | 3.15 | 1.79 | 0.89 | 20 | **VSA25NBR** | **VSA25SIT5** | **VSA25SIB** | **VSA25NR** | **VSA25STN** |
| **VSA 26** | 25 | 3.9 | 2.44 | 1.22 | 30 | **VSA26NBR** | **VSA26SIT5** | - | **VSA26NR** | **VSA26STN** |
| **VSA 33** | 33 | 4.75 | 3.12 | 1.56 | 40 | **VSA33NBR** | **VSA33SIT5** | - | **VSA33NR** | **VSA33STN** |
| **VSA 43** | 43 | 9.25 | 4.55 | 2.27 | 60 | **VSA43NBR** | **VSA43SIT5** | - | **VSA43NR** | **VSA43STN** |
| **VSA 53** | 53 | 26.25 | 9.58 | 4.79 | 75 | **VSA53NBR** | **VSA53SIT5** | - | **VSA53NR** | **VSA53STN** |
| **VSA 63** | 63 | 39.0 | 13.31 | 6.66 | 75 | **VSA63NBR** | **VSA63SIT5** | - | **VSA63NR** | **VSA63STN** |
| **VSA 78** | 78 | 76.0 | 24.68 | 12.34 | 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

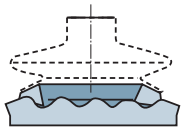
**S** **Version S**
Factory-crimped fitting

**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).



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

**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**.

# VSA

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

Reference - "Suction Cup + Fitting"

**Group 1** — C

| | THREAD | M3-M | M5-M | M6-M | G1/8"-M | G1/8"-F |
|---|---|---|---|---|---|---|
| Ø 5 - 25 mm | **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** — C / E / V

| | 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 |
|---|---|---|---|---|---|---|---|---|---|
| Ø 26 - 63 mm | **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 |
| | **VSA63SIT5** | VSA63SIT5IM14C | VSA63SIT5IF14C | VSA63SIT5IM14 | VSA63SIT5IF14 | VSA63SIT5IM18V | VSA63SIT5IF18V | VSA63SIT5IM14V | VSA63SIT5IF14V |
| | **VSA63STN** | VSA63STNIM14C | VSA63STNIF14C | VSA63STNIM14 | VSA63STNIF14 | VSA63STNIM18V | VSA63STNIF18V | VSA63STNIM14V | VSA63STNIF14V |

**Group 3** — V / S

| | THREAD | G1/8"-M | G1/4"-M | G1/4"-F | G1/4"-M | G1/4"-F | G3/8"-M |
|---|---|---|---|---|---|---|---|
| Ø 78 mm | **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 |

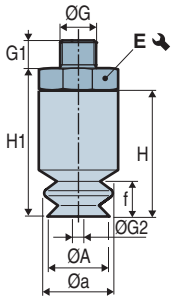
# VSA

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

Dimensions - "Suction Cup + Fitting"

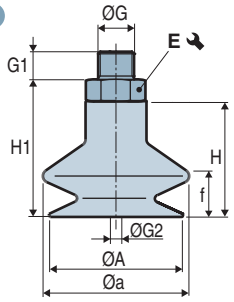
**VSA 5** | **Group 1**

1

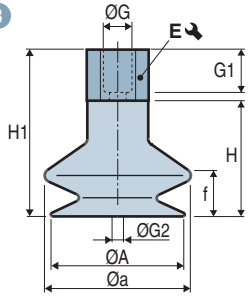



**VSA 11 - 25** | **Group 1**

2

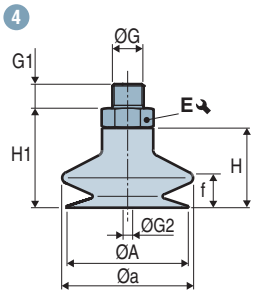



3

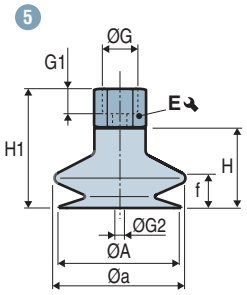



**VSA 26 - 43** | **Group 2**

4

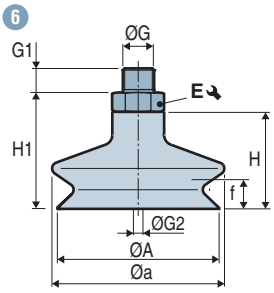



5

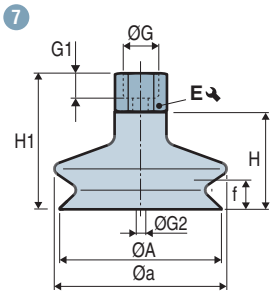



**VSA 53 - 63 Group 2 / VSA 78 Group 3**

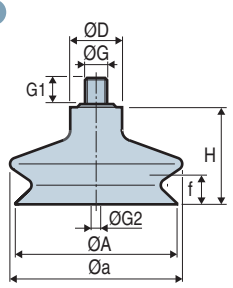
6




7




8




| Group 1 | | Diagram | ØA | Øa | ØD | f (1) | H | H1 | ØG | G1 | ØG2 (2) | 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.

# VSA

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

Dimensions - "Suction Cup + Fitting"

| Group 2 | | Diagram | ØA | Øa | ØD | f [1] | H | H1 | ØG | G1 | ØG2 [2] | 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.

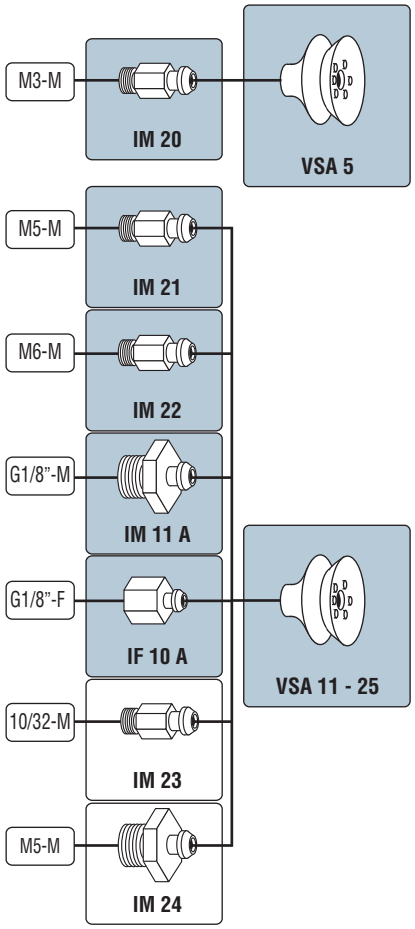
# VSA

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

Assembly Diagrams

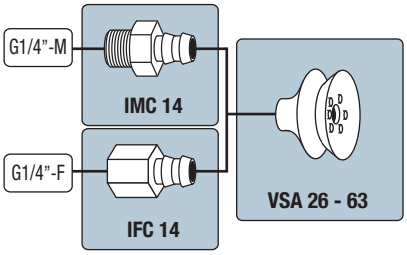
### VSA 5 - 25 | Group 1

**Barbed fittings** C

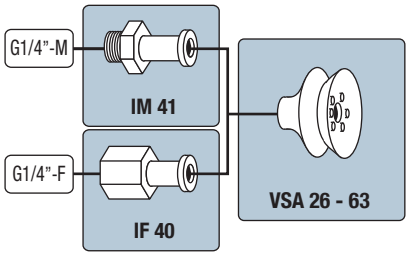



### VSA 26 - 63 | Group 2

**Barbed fittings** C

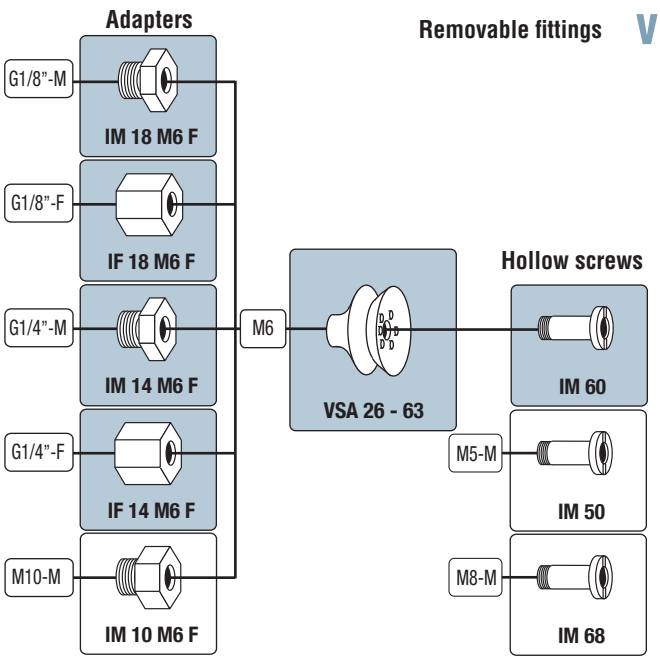



**Pressed fittings** E



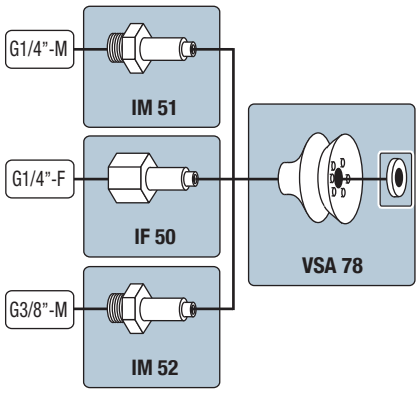

**Adapters**

**Removable fittings** V



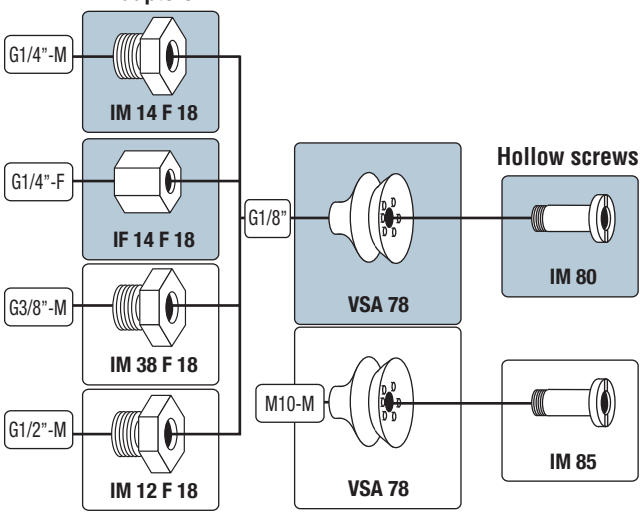

### VSA 78 | Group 3

**Factory-crimped fittings** S




**Removable fittings** V

**Adapters**




Configurations (suction cup + fitting) refer to pages 2/28

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

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

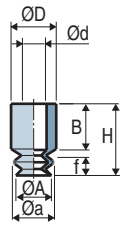
# VSA

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

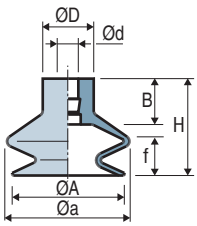
Dimensions

### Suction Cups

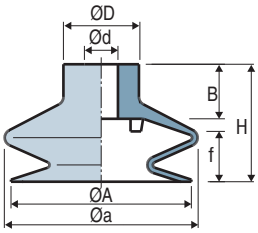
VSA 5




VSA 11 - 25




VSA 26 - 78

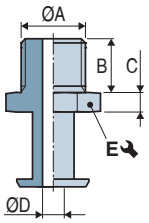



| | Ø A | H | Ø a | Ø d | Ø D | f (1) | B | (g) |
|---|---|---|---|---|---|---|---|---|
| VSA 5 | 5.5 | 11 | 6 | 4 | 7 | 2 | 7 | 0.3 |
| VSA 11 | 11 | 16 | 12.2 | 4 | 10 | 5.5 | 9 | 0.9 |
| VSA 14 | 13 | 16 | 14 | 4 | 10 | 5 | 9 | 1.1 |
| VSA 16 | 16 | 19 | 17.3 | 4 | 10 | 8.5 | 9 | 1.3 |
| VSA 18 | 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 |

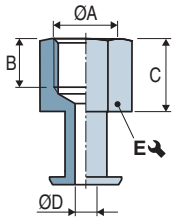
(1) f = Deflection of the suction cup.

### Pressed Fittings

Male - IM



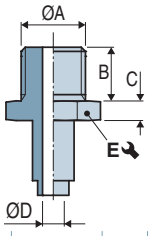

Female - IF



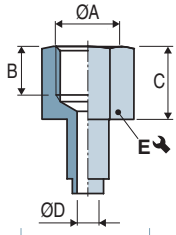

| | ØA | B | C | ØD | E | Material | (g) |
|---|---|---|---|---|---|---|---|
| IM41 | G1/4"-M | 11 | 4 | 4.4 | 17 | Aluminum | 7.8 |
| IF40 | G1/4"-F | 10 | 15 | 4.4 | 17 | Aluminum | 8.4 |

### Factory-Crimped Fittings

Male - IM

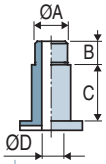



Female - IF

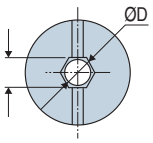



| | ØA | B | C | ØD | E | Material | (g) |
|---|---|---|---|---|---|---|---|
| IM 51 | G1/4"-M | 11 | 6 | 4.4 | 17 | Aluminum | 11.8 |
| IF 50 | G1/4"-F | 10 | 15 | 8 | 21 | Aluminum | 15.7 |
| IM 52 | G3/8"-M | 11 | 6 | 8 | 21 | Aluminum | 14 |

### Hollow Screws




IM60: ⬢4
IM80: ⬢6

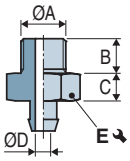



| | ØA | B | C | ØD | Material | (g) |
|---|---|---|---|---|---|---|
| IM 50 | M5-M | 5 | 11 | 2.8 | Brass | 7.4 |
| IM 60 (2) (3) | M6-M | 7 | 11 | 3.5 | Nickel-plated brass | 7.5 |
| IM 68 | M8-M | 8 | 11 | 5.2 | Nickel-plated brass | 6.4 |
| IM 80 | G1/8"-M | 8 | 18 | 6 | Nickel-plated brass | 23.7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

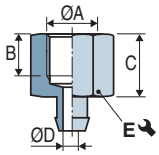
The values represent the average characteristics of our products.
(2) Flow restrictor version available: orifice calibrated to reduce leaks when used with a multi-cup gripper (see page 4/10)
(3) Available in stainless steel

### Barbed Fittings

Male - IM



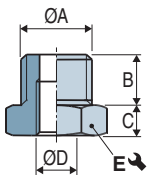

Female - IF



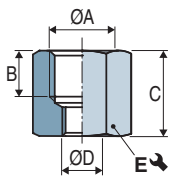

| | ØA | B | C | ØD | E | Material | (g) |
|---|---|---|---|---|---|---|---|
| IM 11 A | G1/8"-M | 7.5 | 6 | 3.5 | 14 | Aluminum | 4.1 |
| IMC 14 | G1/4"-M | 10 | 8 | 7 | 17 | Aluminum | 8.7 |
| IM20 | M3-M | 3 | 2 | 1.4 | 5 | Aluminum | 0.4 |
| IM 21 (2) | M5-M | 4.5 | 5 | 2.5 | 7 | Nickel-plated brass | 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



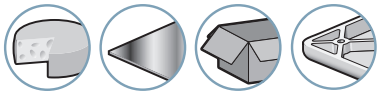

| | ØA | B | C | ØD | E | Material | (g) |
|---|---|---|---|---|---|---|---|
| IM 10 M6F | M10-M | 7 | 3.5 | M6-F | 13 | Brass | 5.9 |
| IM 12 F18 | G1/2"-M | 14 | 6 | M6-F | 22 | Nickel-plated brass | 46.5 |
| IM 14 M6F | G1/4"-M | 8 | 5 | M6-F | 17 | Nickel-plated brass | 15.9 |
| IM 14 F18 | G1/4"-M | 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.

# VSAB
## Suction Cups with 1.5 Bellows Ø 5 to 50 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) | (cm³) | (lbf) (1) | (lbf) (1) | Rmin (mm) | NBR | SI | STN |
|---|---|---|---|---|---|---|---|---|
| **VSAB 5** | 5.6 | 0.05 | 0.08 | 0.03 | 1.5 | **VSAB5NBR** | **VSAB5SI** | **VSAB5STN** |
| **VSAB 8** | 8.8 | 0.15 | 0.21 | 0.10 | 1.9 | **VSAB8NBR** | **VSAB8SI** | **VSAB8STN** |
| **VSAB 10** | 11 | 0.48 | 0.39 | 0.19 | 4 | **VSAB10NBR** | **VSAB10SI** | **VSAB10STN** |
| **VSAB 15** | 15.7 | 1.1 | 0.68 | 0.34 | 5 | **VSAB15NBR** | **VSAB15SI** | **VSAB15STN** |
| **VSAB 20** | 22 | 2.7 | 1.14 | 0.57 | 10 | **VSAB20NBR** | **VSAB20SI** | **VSAB20STN** |
| **VSAB 30** | 34 | 10 | 2.60 | 1.30 | 15 | **VSAB30NBR** | **VSAB30SI** | **VSAB30STN** |
| **VSAB 40** | 43 | 15 | 4.22 | 2.11 | 20 | **VSAB40NBR** | **VSAB40SI** | **VSAB40STN** |
| **VSAB 50** | 53 | 32 | 7.14 | 3.57 | 30 | **VSAB50NBR** | **VSAB50SI** | **VSAB50STN** |

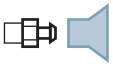
(1) Actual force of the suction cup in use with a 65% vacuum and including a safety factor of 2 for horizontal handling and a factor of 4 for vertical handling.

### 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 | C M5-M |
|---|---|
| **VSAB5NBR** | VSAB5NBRIMM5C |
| **VSAB5SI** | VSAB5SIIMM5C |
| **VSAB5STN** | VSAB5STNIMM5C |
| **VSAB8NBR** | VSAB8NBRIMM5C |
| **VSAB8SI** | VSAB8SIIMM5C |
| **VSAB8STN** | VSAB8STNIMM5C |
| **VSAB10NBR** | VSAB10NBRIMM5C |
| **VSAB10SI** | VSAB10SIIMM5C |
| **VSAB10STN** | VSAB10STNIMM5C |
| **VSAB15NBR** | VSAB15NBRIMM5C |
| **VSAB15SI** | VSAB15SIIMM5C |
| **VSAB15STN** | VSAB15STNIMM5C |

**Ø 20 mm**

| THREAD | E G1/8"-M | |
|---|---|---|
| | Fitting with filter | Fitting without filter |
| **VSAB20NBR** | VSAB20NBRIM18MPF | VSAB20NBRIM18MP |
| **VSAB20SI** | VSAB20SIIM18MPF | VSAB20SIIM18MP |
| **VSAB20STN** | VSAB20STNIM18MPF | VSAB20STNIM18MP |

**Ø 30 - 50 mm**

| THREAD | E G1/4"-M | | G3/8"-M | |
|---|---|---|---|---|
| | Fitting with filter | Fitting without filter | Fitting with filter | Fitting without filter |
| **VSAB30NBR** | VSAB30NBRIM14MPF | VSAB30NBRIM14MP | VSAB30NBRIM38MPF | VSAB30NBRIM38MP |
| **VSAB30SI** | VSAB30SIIM14MPF | VSAB30SIIM14MP | VSAB30SIIM38MPF | VSAB30SIIM38MP |
| **VSAB30STN** | VSAB30STNIM14MPF | VSAB30STNIM14MP | VSAB30STNIM38MPF | VSAB30STNIM38MP |
| **VSAB40NBR** | VSAB40NBRIM14MPF | VSAB40NBRIM14MP | VSAB40NBRIM38MPF | VSAB40NBRIM38MP |
| **VSAB40SI** | VSAB40SIIM14MPF | VSAB40SIIM14MP | VSAB40SIIM38MPF | VSAB40SIIM38MP |
| **VSAB40STN** | VSAB40STNIM14MPF | VSAB40STNIM14MP | VSAB40STNIM38MPF | VSAB40STNIM38MP |
| **VSAB50NBR** | VSAB50NBRIM14MPF | VSAB50NBRIM14MP | VSAB50NBRIM38MPF | VSAB50NBRIM38MP |
| **VSAB50SI** | VSAB50SIIM14MPF | VSAB50SIIM14MP | VSAB50SIIM38MPF | VSAB50SIIM38MP |
| **VSAB50STN** | VSAB50STNIM14MPF | VSAB50STNIM14MP | VSAB50STNIM38MPF | VSAB50STNIM38MP |

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

**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**.

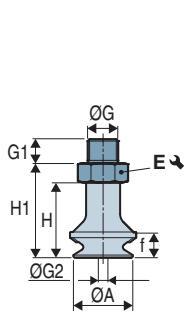
# VSAB

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

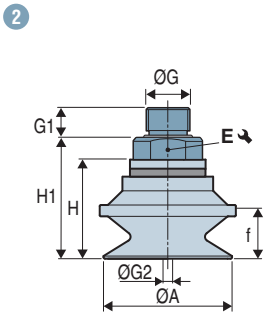
Dimensions

### Suction Cup + Fitting

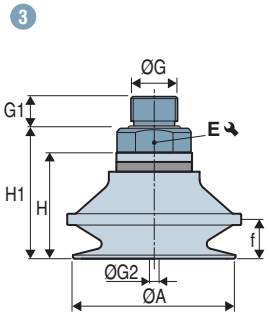
VSAB 5…15



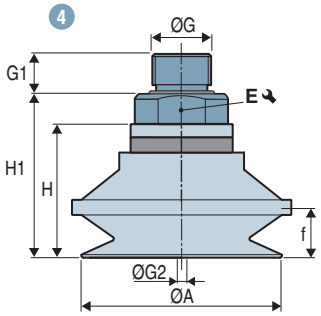

VSAB 20…30




VSAB 40



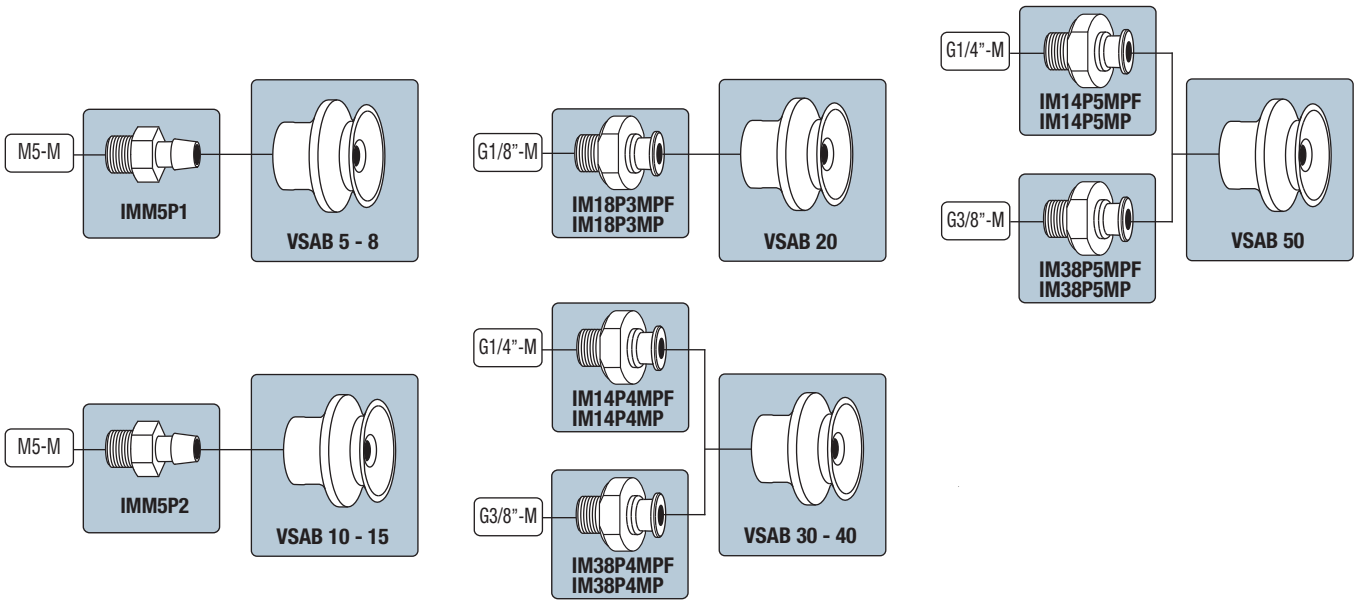

VSAB 50




| | Diagrams | ØA | f (1) | H | H1 | ØG | G1 | ØG2 (2) | 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.

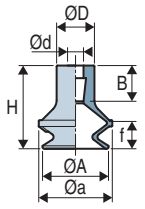
# VSAB

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

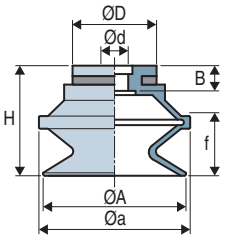
Dimensions

### Suction Cups

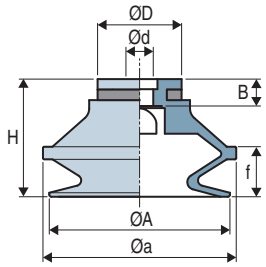
VSAB 5…15



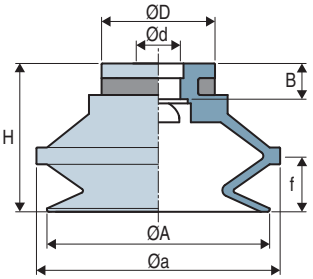

VSAB 20…30




VSAB 40



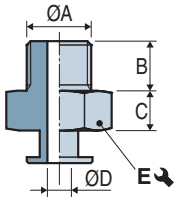

VSAB 50




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

(1) f = Deflection of the suction cup.

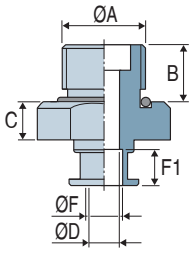
### Barbed Fittings

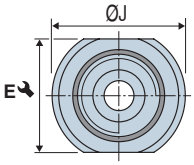



| | ØA | B | C | ØD | E | Material | (g) |
|---|---|---|---|---|---|---|---|
| **IMM5P1** | M5-M | 4 | 3.5 | 1.5 | 7 | Brass | 1.7 |
| **IMM5P2** | M5-M | 4 | 4.5 | 2.7 | 7 | Aluminum | 0.8 |

### Pressed fittings

**Male fittings**



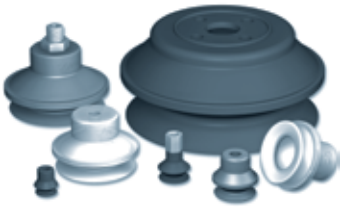

| Fitting with stainless steel filter 200 µm | Fitting without filter | ØA | B | C | ØD | E | ØJ | ØF | F1 | Materials Fitting* | (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **IM18P3MPF** | **IM18P3MP** | G1/8"-M | 7 | 5 | 4 | 13 | 15 | 5 | 4.7 | Aluminum | 3.2 |
| **IM14P4MPF** | **IM14P4MP** | 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) equiped with O-ring sealing

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

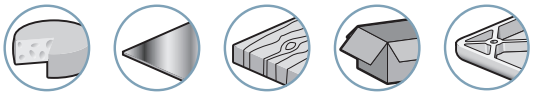
# VSAG

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



The VSAG series 1.5 bellows suction cups are recommended for gripping concave of 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.

Industry-specific applications



Types of use

### Materials

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

### Suction Cup Properties

| | Ø (mm) | (cm³) | (lbf) (1) | (lbf) (1) | $R_{min}$ (mm) | NBR | SI | STN |
|---|---|---|---|---|---|---|---|---|
| **VSAG 10** | 10.7 | 0.2 | 0.41 | 0.21 | 4 | **VSAG10NBR** | **VSAG10SI** | **VSAG10STN** |
| **VSAG 15** | 15 | 0.7 | 0.57 | 0.29 | 6 | **VSAG15NBR** | **VSAG15SI** | **VSAG15STN** |
| **VSAG 20B** | 20 | 1 | 1.07 | 0.54 | 8 | **VSAG20BNBR** | **VSAG20BSI** | **VSAG20BSTN** |
| **VSAG 30** | 30 | 4 | 3.41 | 1.70 | 15 | **VSAG30NBR** | **VSAG30SI** | - |
| **VSAG 40** | 40 | 9 | 5.20 | 2.60 | 30 | **VSAG40NBR** | **VSAG40SI** | - |
| **VSAG 50** | 50 | 26 | 8.60 | 4.22 | 40 | **VSAG50NBR** | **VSAG50SI** | - |
| **VSAG 75** | 75 | 76 | 20.29 | 10.07 | 70 | **VSAG75NBR** | **VSAG75SI** | **VSAG75STN** |
| **VSAG 110** | 110 | 280 | 43.02 | 21.11 | 100 | **VSAG110NBR** | **VSAG110SI** | **VSAG110STN** |
| **VSAG 150** | 150 | 640 | 84.91 | 42.21 | 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

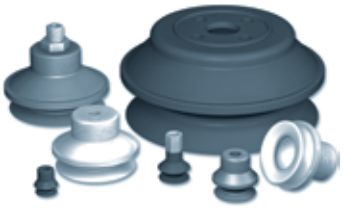
**Please specify the part n°. e.g. VSAG10NBRIM18C**
**Refer to page 2/38**

**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**.

# VSAG

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

References - "Suction Cup + Fitting"





| | | C | | | |
|---|---|---|---|---|---|
| | THREAD | M5-M | M5-F | G1/8"-M | G1/8"-F |
| Ø 10 - 15 mm | 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 |

| | | E | | V | | | | |
|---|---|---|---|---|---|---|---|---|
| | THREAD | G1/8"-M | G1/8"-F | M6-M | G1/8"-M | G1/8"-F | G1/4"-M | G1/4"-F |
| Ø 20 - 50 mm | 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 |

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

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

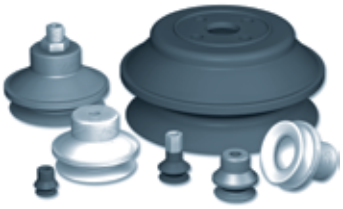
*Configured using fitting n° IFS12120
** Configured using fitting n° IF12120

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

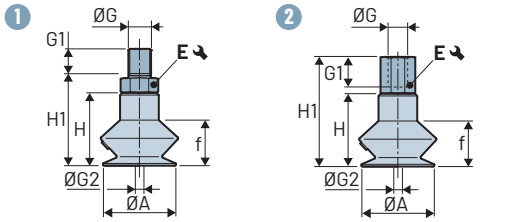
# VSAG

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

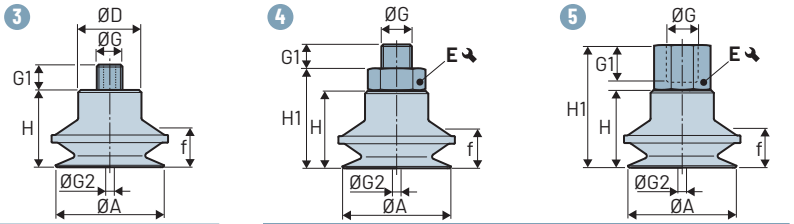
Dimensions - "Suction Cup + Fitting"



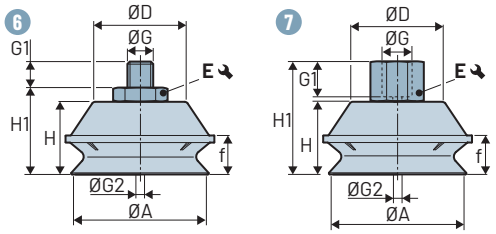
### VSAG 10 - 15



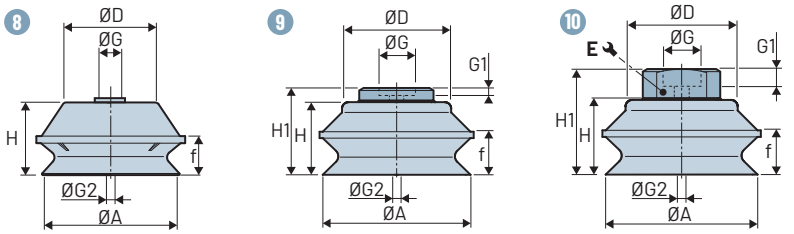

### VSAG 20B - 50




### VSAG 75




### VSAG 110 - 150




| | | Diagrams | Ø A | Ø D | f (1) | H | H1 | Ø G | G1 | Ø G2 (2) | 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 |

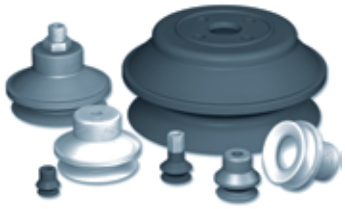
Note: All dimensions are in mm.

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

# VSAG

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

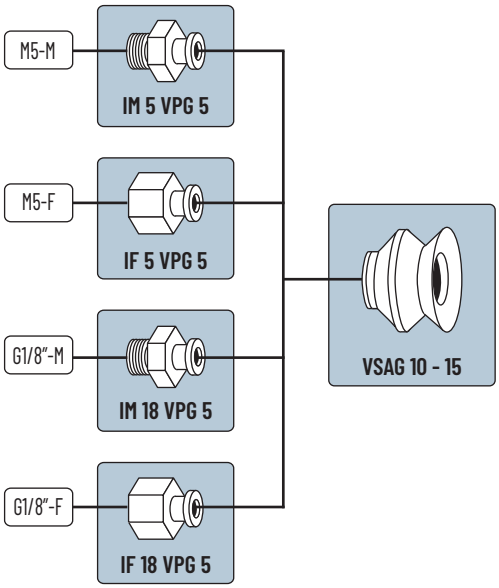
Assembly Diagrams





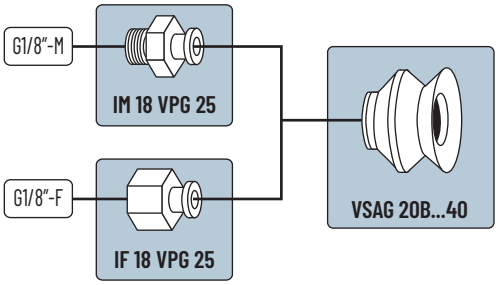
### VSAG 10 - 15

**Barbed fittings** C



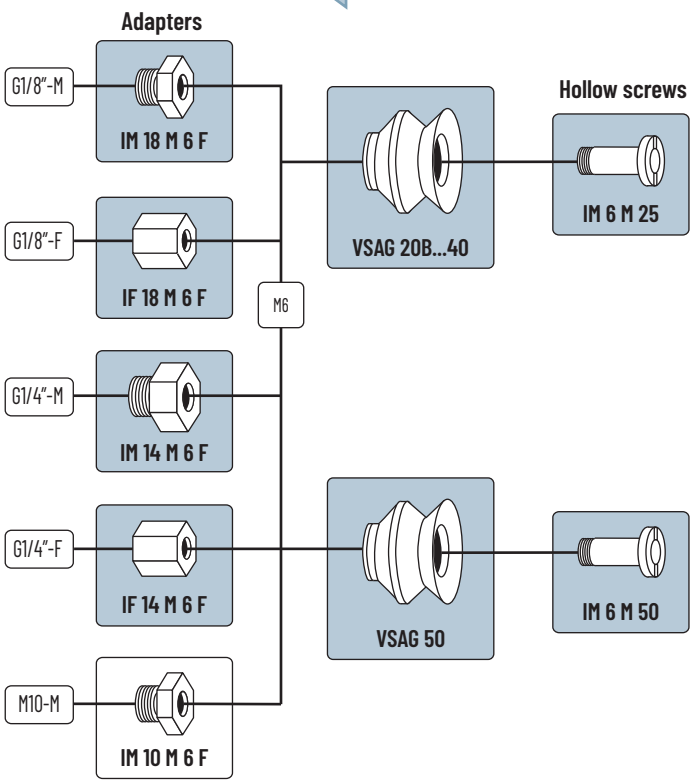

### VSAG 20B - 40

**Pressed fittings** E



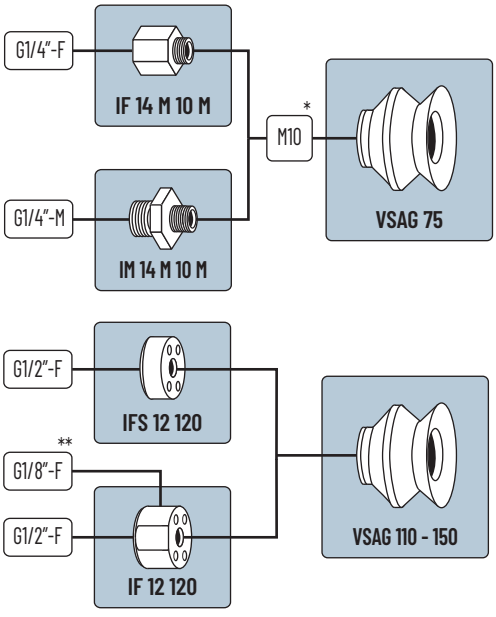

### VSAG 20B - 50

**Removable fittings** V




### VSAG 75 - 150

**Removable fittings** V




* 125 thread

** Female auxiliary radial output

Configurations (suction cup + fitting) refer to page 2/38

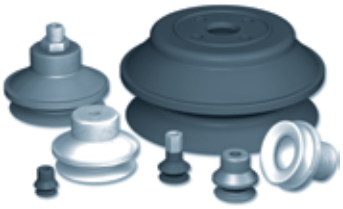
Non-standard configurations must be ordered in seperate part numbers.

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

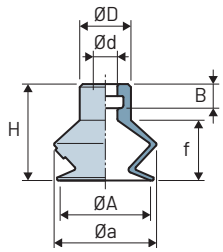
# VSAG

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

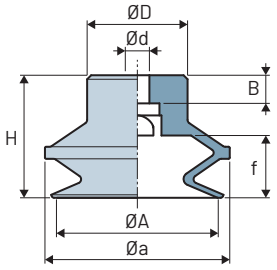
Dimensions - Suction Cups



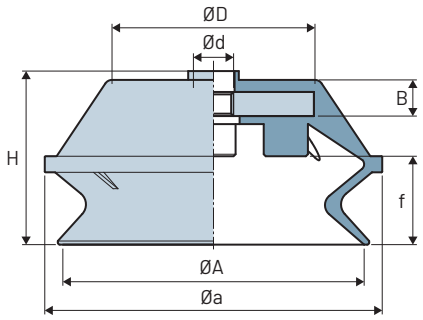
### VSAG 10 - 15



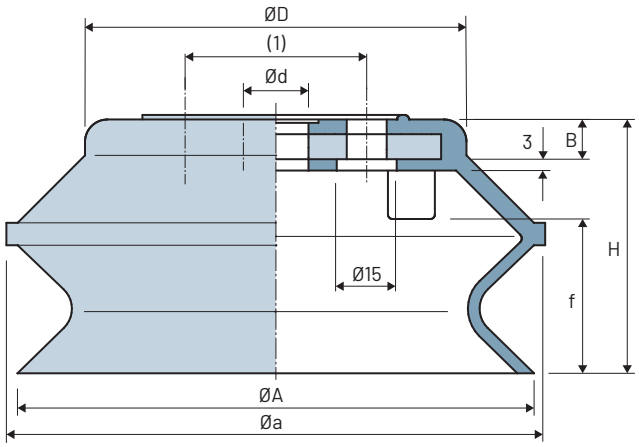

### VSAG 20 - 50




### VSAG 75




### VSAG 110 - 150




(1) 4 holes Ø 9 on Ø 40

| (Ø) | ØA | H | Øa | Ød | ØD | f (1) | 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 |

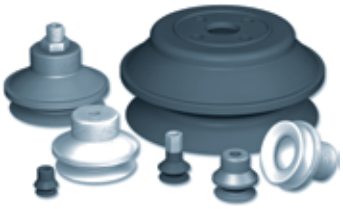
The values represent the average characteristics of our products.
Note: All dimensions are in mm.

(1) f = Deflection of the suction cup.

# VSAG

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

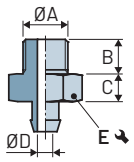
Dimensions - Fittings



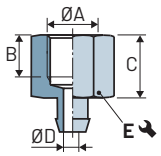


### Barbed fittings

**Male - IM**



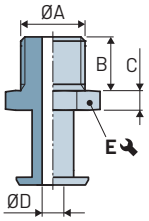

**Female - IF**



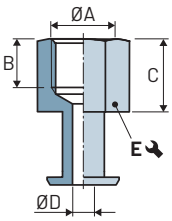

| | ØA | B | C | ØD | E | Material | (g) |
|---|---|---|---|---|---|---|---|
| **IM 5 VPG5** | M5-M | 4.5 | 3.5 | 2.2 | 7 | Aluminum | 0.7 |
| **IM 18 VPG5** | G1/8"-M | 8 | 5 | 2.2 | 14 | Aluminum | 3.9 |
| **IF 5 VPG5** | M5-F | 6 | 9 | 2.2 | 8 | Aluminum | 1.2 |
| **IF 18 VPG5** | G1/8"-F | 9 | 15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

### Pressed Fittings

**Male - IM**

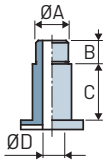



**Female - IF**




| | 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 |

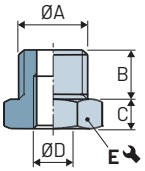
### Hollow Screws



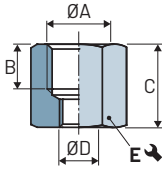

| | ØA | B | C | ØD | Material | (g) |
|---|---|---|---|---|---|---|
| **IM 6 M25** | M6-M | 6 | 6 | 3.5 | Nickel-plated brass | 2.7 |
| **IM 6 M50** | M6-M | 6 | 6 | 3.5 | Nickel-plated brass | 7.5 |

### Adapters for Hollow Screws

**Male - IM**



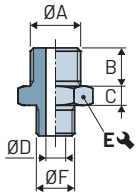

**Female - IF**



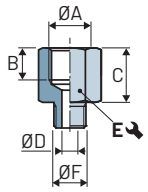

| | ØA | B | C | ØD | E | Material | (g) |
|---|---|---|---|---|---|---|---|
| **IM 10 M6F** | M10-M | 7 | 3.5 | M6 | 13 | Brass | 5.9 |
| **IM 14 M6F** | G1/4"-M | 8 | 5 | M6-F | 17 | Nickel-plated brass | 15.9 |
| **IM 18 M6F** | G1/8"-M | 6 | 4.5 | M6-F | 13 | Nickel-plated brass | 6.6 |
| **IF 14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

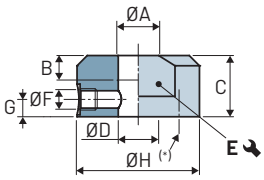
**Male - IM**



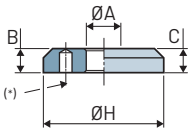

**Female - IF**




**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 |

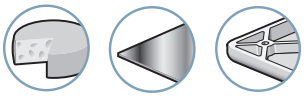
The values represent the average characteristics of our products.
Note: All dimensions are in mm.

# VSAJ

## 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.

Industry-specific applications



Types of use

### Materials

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

### Suction Cup Properties

| | Ø (mm) | (cm³) | (lbf) (1) | (lbf) (1) | $R_{min}$ (mm) | NBR | SI |
|---|---|---|---|---|---|---|---|
| **VSAJ 15** | 15 | 0.5 | 0.81 | 0.41 | 10 | **VSAJ15NBR** | **VSAJ15SI** |
| **VSAJ 20** | 20 | 1.2 | 1.54 | 0.76 | 13 | **VSAJ20NBR** | **VSAJ20SI** |
| **VSAJ 30** | 30 | 3 | 3.00 | 1.49 | 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) refer to page 2/44

□ Additional mounting configurations see page 2/45

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

**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**.

# VSAJ

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

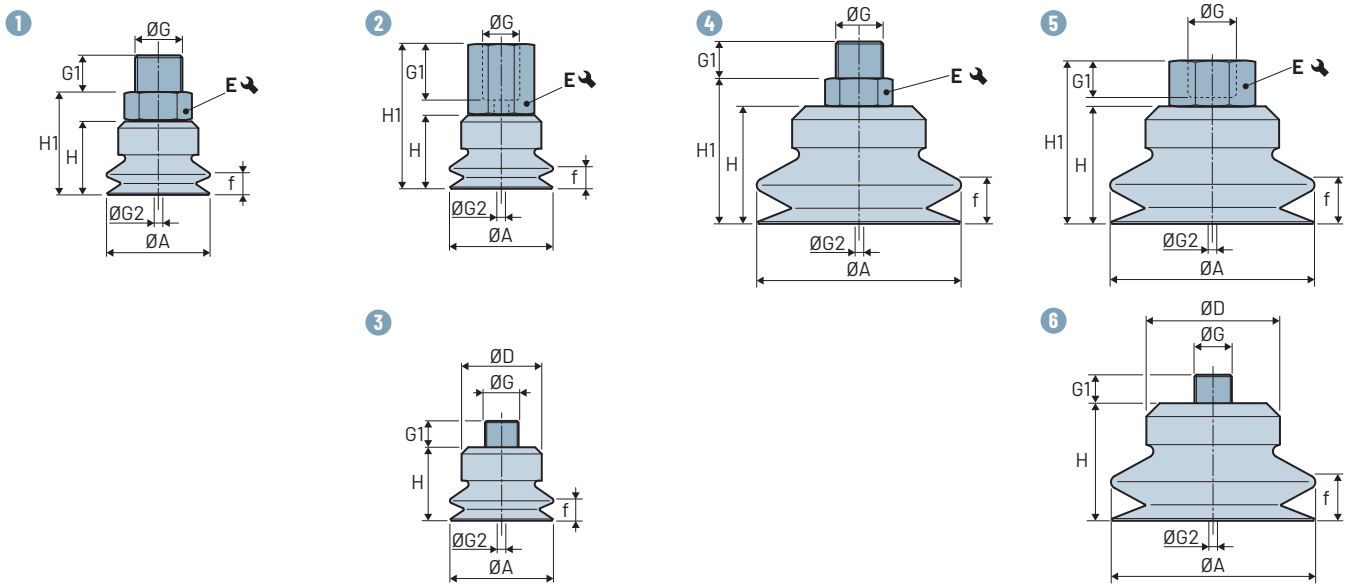
Suction cups with 1.5 bellows Ø 15 to 30 mm References and Dimensions - "Suction Cup + Fitting"

## References - "Suction Cup + Fitting"

| | | C | | V | | | | |
|---|---|---|---|---|---|---|---|---|
| Ø 15 - 20 mm | THREAD | G1/8"-M | G1/8"-F | M5-M | G1/8"-M | G1/8"-F | | |
| | VSAJ15NBR | VSAJ15NBRIM18C | VSAJ15NBRIF18C | VSAJ15NBRIMM5V | VSAJ15NBRIM18V | VSAJ15NBRIF18V | | |
| | VSAJ15SI | VSAJ15SIIM18C | VSAJ15SIIF18C | VSAJ15SIIMM5V | VSAJ15SIIM18V | VSAJ15SIIF18V | | |
| | VSAJ20NBR | - | - | VSAJ20NBRIMM5V | VSAJ20NBRIM18V | VSAJ20NBRIF18V | | |
| | VSAJ20SI | - | - | VSAJ20SIIMM5V | VSAJ20SIIM18V | VSAJ20SIIF18V | | |
| | | E | | V | | | | |
| Ø 30 mm | THREAD | G1/8"-M | G1/8"-F | M5-M | G1/8"-M | G1/8"-F | G1/4"-M | G1/4"-F |
| | VSAJ30NBR | VSAJ30NBRIM18 | VSAJ30NBRIF18 | VSAJ30NBRIMM6V | VSAJ30NBRIM18V | VSAJ30NBRIF18V | VSAJ30NBRIM14V | VSAJ30NBRIF14V |
| | VSAJ30SI | VSAJ30SIIM18 | VSAJ30SIIF18 | VSAJ30SIIMM6V | VSAJ30SIIM18V | VSAJ30SIIF18V | VSAJ30SIIM14V | VSAJ30SIIF14V |

## VSAJ 15 -20

## VSAJ 30




| | | Diagrams | Ø A | Ø D | f (1) | H | H1 | Ø G | G1 | Ø G2 (2) | 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) Ø G2 = Ø 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.

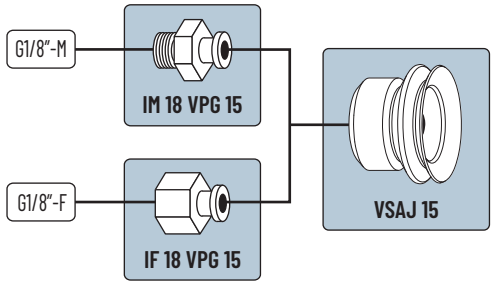
# VSAJ

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

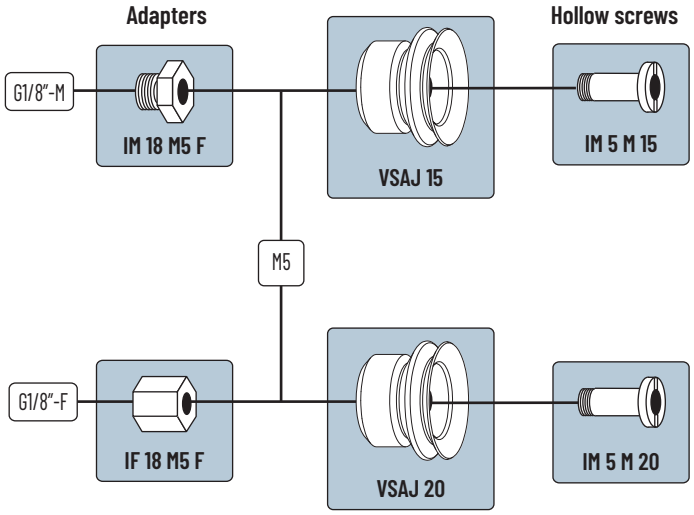
Assembly Diagrams

### VSAJ 15 - 20

**Barbed fittings** C

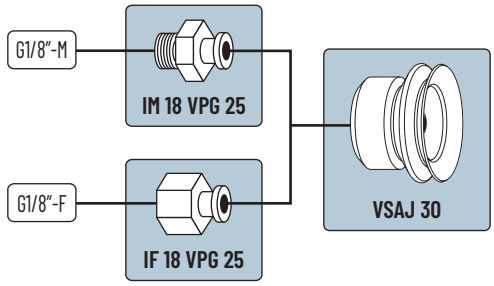



**Removable fittings** V

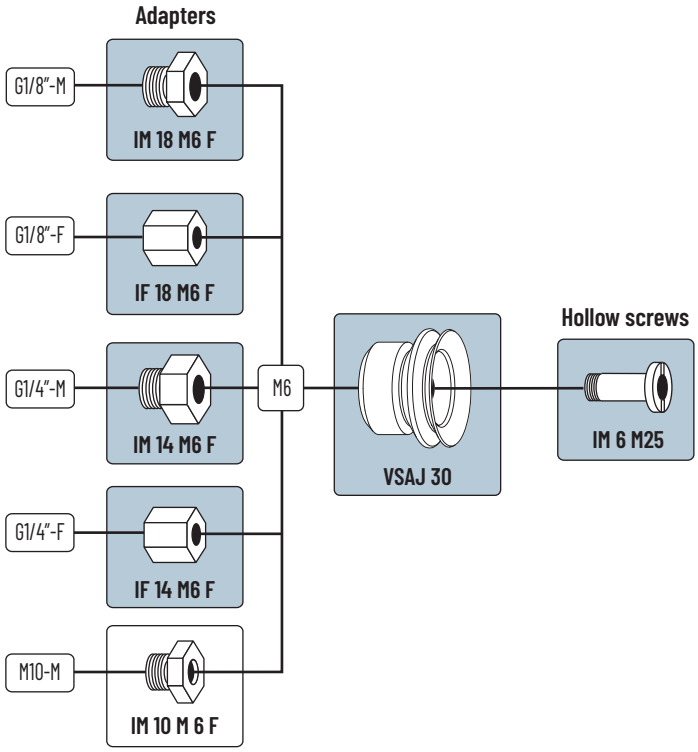



### VSAJ 30

**Pressed fittings** E




**Removable fittings** V




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

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

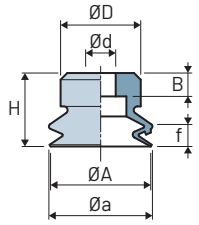
# VSAJ

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

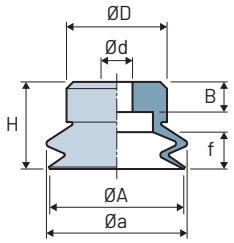
Dimensions

## Suction Cups

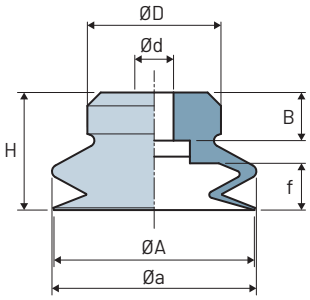
**VSAJ 15**




**VSAJ 20**




**VSAJ 30**

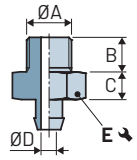



| | Ø A | H | Ø a | Ø d | Ø D | f (1) | B | (g) |
|---|---|---|---|---|---|---|---|---|
| **VSAJ 15** | 15 | 11 | 15.5 | 4.5 | 12 | 3.3 | 3.5 | 9 |
| **VSAJ 20** | 20 | 13 | 21 | 4.7 | 15 | 5.5 | 4.5 | 8.4 |
| **VSAJ 30** | 30 | 17 | 30.6 | 5.8 | 20 | 7 | 7.2 | 7.6 |

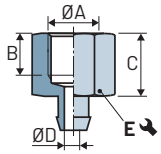
(1) f = Deflection of the suction cup.

## Barbed Fittings

**Male - IM**



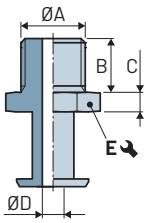

**Female - IF**



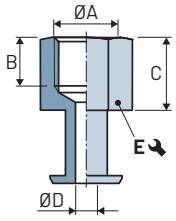

| | Ø A | B | C | Ø D | E | Material | (g) |
|---|---|---|---|---|---|---|---|
| **IM 18 VPG15** | G1/8"-M | 8 | 5 | 2.2 | 14 | Aluminum | 4 |
| **IF 18 VPG15** | G1/8"-F | 9 | 15 | 2.5 | 14 | Aluminum | 5.2 |

## Pressed Fittings

**Male - IM**

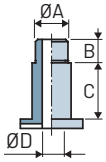



**Female - IF**




| | 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 |

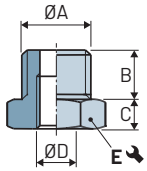
## Hollow Screws



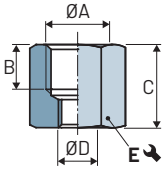

| | Ø A | B | C | Ø D | Material | (g) |
|---|---|---|---|---|---|---|
| **IM 5 M15** | M5-M | 5 | 2 | 2.5 | Nickel-plated brass | 1.3 |
| **IM 5 M20** | M5-M | 5 | 4 | 2.5 | Nickel-plated brass | 2.2 |
| **IM 6 M25** | M6-M | 6 | 6 | 3.5 | Nickel-plated brass | 2.7 |

## 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 |

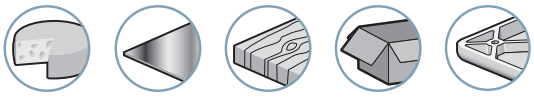
The values represent the average characteristics of our products.
Note: All dimensions are in mm.

# VS
## 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

Industry-specific applications



Types of use

### Materials

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

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

### Suction Cup Properties

| | Ø (mm) | (cm³) | (lbf) (1) | Rmin (mm) | NBR | SIT5 | NR | STN (2) |
|---|---|---|---|---|---|---|---|---|
| **VS 5** | 5 | 0.04 | 0.11 | 8 | **VS5NBR** | **VS5SIT5** | - | **VS5STN** |
| **VS 6** | 6 | 0.04 | 0.11 | 8 | **VS6NBR** | **VS6SIT5** | - | - |
| **VS 7** | 7 | 0.0425 | 0.21 | 8 | **VS7NBR** | **VS7SIT5** | - | **VS7STN** |
| **VS 9** | 9 | 0.15 | 0.24 | 10 | **VS9NBR** | **VS9SIT5** | **VS9NR** | **VS9STN** |
| **VS 12** | 12 | 0.54 | 0.63 | 13 | **VS12NBR** | **VS12SIT5** | **VS12NR** | **VS12STN** |
| **VS 14** | 14 | 0.975 | 0.67 | 15 | **VS14NBR** | **VS14SIT5** | **VS14NR** | **VS14STN** |
| **VS 18** | 17.5 | 1.35 | 0.99 | 20 | **VS18NBR** | **VS18SIT5** | **VS18NR** | **VS18STN** |
| **VS 20** | 20 | 2 | 1.04 | 30 | **VS20NBR** | **VS20SIT5** | **VS20NR** | **VS20STN** |
| **VS 25** | 25 | 5.4 | 1.46 | 30 | **VS25NBR** | **VS25SIT5** | **VS25NR** | **VS25STN** |
| **VS 26** | 25 | 6.1 | 2.44 | 30 | **VS26NBR** | **VS26SIT5** | **VS26NR** | **VS26STN** |
| **VS 32** | 32 | 10 | 2.73 | 35 | **VS32NBR** | **VS32SIT5** | **VS32NR** | **VS32STN** |
| **VS 42** | 42 | 19.5 | 4.71 | 75 | **VS42NBR** | **VS42SIT5** | **VS42NR** | **VS42STN** |
| **VS 52** | 52 | 36 | 6.49 | 75 | **VS52NBR** | **VS52SIT5** | **VS52NR** | **VS52STN** |
| **VS 62** | 62 | 72.5 | 9.25 | 75 | **VS62NBR** | **VS62SIT5** | **VS62NR** | **VS62STN** |
| **VS 88** | 88 | 165 | 29.87 | 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.

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

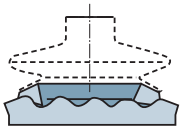
**S** **Version S**
Factory-crimped fitting

**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 VS suction cups with the VSBM foam strip option (see page 2/65).



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

**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**.

# VS

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

References - "Suction Cup + Fitting"

### Group 1

| Ø 5 -25 mm | THREAD | C M3M | C M5M | C M6M | C G1/8"-M | C G1/8"-F |
|---|---|---|---|---|---|---|
| | **VS5NBR** | VS5NBRIMM3C | - | - | - | - |
| | **VS5SIT5** | VS5SIT5IMM3C | - | - | - | - |
| | **VS5STN** | VS5STNIMM3C | - | - | - | - |
| | **VS6NBR** | VS6NBRIMM3C | - | - | - | - |
| | **VS6SIT5** | VS6SIT5IMM3C | - | - | - | - |
| | **VS7NBR** | - | VS7NBRIMM5C | VS7NBRIMM6C | VS7NBRIM18C | VS7NBRIF18C |
| | **VS7SIT5** | - | VS7SIT5IMM5C | VS7SIT5IMM6C | VS7SIT5IM18C | VS7SIT5IF18C |
| | **VS7STN** | - | VS7STNIMM5C | VS7STNIMM6C | VS7STNIM18C | VS7STNIF18C |
| | **VS9NBR** | - | VS9NBRIMM5C | VS9NBRIMM6C | VS9NBRIM18C | VS9NBRIF18C |
| | **VS9SIT5** | - | VS9SIT5IMM5C | VS9SIT5IMM6C | VS9SIT5IM18C | VS9SIT5IF18C |
| | **VS9NR** | - | VS9NRIMM5C | VS9NRIMM6C | VS9NRIM18C | VS9NRIF18C |
| | **VS9STN** | - | VS9STNIMM5C | VS9STNIMM6C | VS9STNIM18C | VS9STNIF18C |
| | **VS12NBR** | - | VS12NBRIMM5C | VS12NBRIMM6C | VS12NBRIM18C | VS12NBRIF18C |
| | **VS12SIT5** | - | VS12SIT5IMM5C | VS12SIT5IMM6C | VS12SIT5IM18C | VS12SIT5IF18C |
| | **VS12NR** | - | VS12NRIMM5C | VS12NRIMM6C | VS12NRIM18C | VS12NRIF18C |
| | **VS12STN** | - | VS12STNIMM5C | VS12STNIMM6C | VS12STNIM18C | VS12STNIF18C |
| | **VS14NBR** | - | VS14NBRIMM5C | VS14NBRIMM6C | VS14NBRIM18C | VS14NBRIF18C |
| | **VS14SIT5** | - | VS14SIT5IMM5C | VS14SIT5IMM6C | VS14SIT5IM18C | VS14SIT5IF18C |
| | **VS14NR** | - | VS14NRIMM5C | VS14NRIMM6C | VS14NRIM18C | VS14NRIF18C |
| | **VS14STN** | - | VS14STNIMM5C | VS14STNIMM6C | VS14STNIM18C | VS14STNIF18C |
| | **VS18NBR** | - | VS18NBRIMM5C | VS18NBRIMM6C | VS18NBRIM18C | VS18NBRIF18C |
| | **VS18SIT5** | - | VS18SIT5IMM5C | VS18SIT5IMM6C | VS18SIT5IM18C | VS18SIT5IF18C |
| | **VS18NR** | - | VS18NRIMM5C | VS18NRIMM6C | VS18NRIM18C | VS18NRIF18C |
| | **VS18STN** | - | VS18STNIMM5C | VS18STNIMM6C | VS18STNIM18C | VS18STNIF18C |
| | **VS20NBR** | - | VS20NBRIMM5C | VS20NBRIMM6C | VS20NBRIM18C | VS20NBRIF18C |
| | **VS20SIT5** | - | VS20SIT5IMM5C | VS20SIT5IMM6C | VS20SIT5IM18C | VS20SIT5IF18C |
| | **VS20NR** | - | VS20NRIMM5C | VS20NRIMM6C | VS20NRIM18C | VS20NRIF18C |
| | **VS20STN** | - | VS20STNIMM5C | VS20STNIMM6C | VS20STNIM18C | VS20STNIF18C |
| | **VS25NBR** | - | VS25NBRIMM5C | VS25NBRIMM6C | VS25NBRIM18C | VS25NBRIF18C |
| | **VS25SIT5** | - | VS25SIT5IMM5C | VS25SIT5IMM6C | VS25SIT5IM18C | VS25SIT5IF18C |
| | **VS25NR** | - | VS25NRIMM5C | VS25NRIMM6C | VS25NRIM18C | VS25NRIF18C |
| | **VS25STN** | - | 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

| Ø 26 - 62 mm | THREAD | C G1/4"-M | C G1/4"-F | E G1/4"-M | E G1/4"-F | V G1/8"-M | V G1/8"-F | V G1/4"-M | V G1/4"-F |
|---|---|---|---|---|---|---|---|---|---|
| | **VS26NBR** | VS26NBRIM14C | VS26NBRIF14C | VS26NBRIM14 | VS26NBRIF14 | VS26NBRIM18V | VS26NBRIF18V | VS26NBRIM14V | VS26NBRIF14V |
| | **VS26SIT5** | VS26SIT5IM14C | VS26SIT5IF14C | VS26SIT5IM14 | VS26SIT5IF14 | VS26SIT5IM18V | VS26SIT5IF18V | VS26SIT5IM14V | VS26SIT5IF14V |
| | **VS26NR** | VS26NRIM14C | VS26NRIF14C | VS26NRIM14 | VS26NRIF14 | VS26NRIM18V | VS26NRIF18V | VS26NRIM14V | VS26NRIF14V |
| | **VS26STN** | VS26STNIM14C | VS26STNIF14C | VS26STNIM14 | VS26STNIF14 | VS26STNIM18V | VS26STNIF18V | VS26STNIM14V | VS26STNIF14V |
| | **VS32NBR** | VS32NBRIM14C | VS32NBRIF14C | VS32NBRIM14 | VS32NBRIF14 | VS32NBRIM18V | VS32NBRIF18V | VS32NBRIM14V | VS32NBRIF14V |
| | **VS32SIT5** | VS32SIT5IM14C | VS32SIT5IF14C | VS32SIT5IM14 | VS32SIT5IF14 | VS32SIT5IM18V | VS32SIT5IF18V | VS32SIT5IM14V | VS32SIT5IF14V |
| | **VS32NR** | VS32NRIM14C | VS32NRIF14C | VS32NRIM14 | VS32NRIF14 | VS32NRIM18V | VS32NRIF18V | VS32NRIM14V | VS32NRIF14V |
| | **VS32STN** | VS32STNIM14C | VS32STNIF14C | VS32STNIM14 | VS32STNIF14 | VS32STNIM18V | VS32STNIF18V | VS32STNIM14V | VS32STNIF14V |
| | **VS42NBR** | VS42NBRIM14C | VS42NBRIF14C | VS42NBRIM14 | VS42NBRIF14 | VS42NBRIM18V | VS42NBRIF18V | VS42NBRIM14V | VS42NBRIF14V |
| | **VS42SIT5** | VS42SIT5IM14C | VS42SIT5IF14C | VS42SIT5IM14 | VS42SIT5IF14 | VS42SIT5IM18V | VS42SIT5IF18V | VS42SIT5IM14V | VS42SIT5IF14V |
| | **VS42NR** | VS42NRIM14C | VS42NRIF14C | VS42NRIM14 | VS42NRIF14 | VS42NRIM18V | VS42NRIF18V | VS42NRIM14V | VS42NRIF14V |
| | **VS42STN** | VS42STNIM14C | VS42STNIF14C | VS42STNIM14 | VS42STNIF14 | VS42STNIM18V | VS42STNIF18V | VS42STNIM14V | VS42STNIF14V |
| | **VS52NBR** | VS52NBRIM14C | VS52NBRIF14C | VS52NBRIM14 | VS52NBRIF14 | VS52NBRIM18V | VS52NBRIF18V | VS52NBRIM14V | VS52NBRIF14V |
| | **VS52SIT5** | VS52SIT5IM14C | VS52SIT5IF14C | VS52SIT5IM14 | VS52SIT5IF14 | VS52SIT5IM18V | VS52SIT5IF18V | VS52SIT5IM14V | VS52SIT5IF14V |
| | **VS52NR** | VS52NRIM14C | VS52NRIF14C | VS52NRIM14 | VS52NRIF14 | VS52NRIM18V | VS52NRIF18V | VS52NRIM14V | VS52NRIF14V |
| | **VS52STN** | VS52STNIM14C | VS52STNIF14C | VS52STNIM14 | VS52STNIF14 | VS52STNIM18V | VS52STNIF18V | VS52STNIM14V | VS52STNIF14V |
| | **VS62NBR** | VS62NBRIM14C | VS62NBRIF14C | VS62NBRIM14 | VS62NBRIF14 | VS62NBRIM18V | VS62NBRIF18V | VS62NBRIM14V | VS62NBRIF14V |
| | **VS62SIT5** | VS62SIT5IM14C | VS62SIT5IF14C | VS62SIT5IM14 | VS62SIT5IF14 | VS62SIT5IM18V | VS62SIT5IF18V | VS62SIT5IM14V | VS62SIT5IF14V |
| | **VS62NR** | VS62NRIM14C | VS62NRIF14C | VS62NRIM14 | VS62NRIF14 | VS62NRIM18V | VS62NRIF18V | VS62NRIM14V | VS62NRIF14V |
| | **VS62STN** | VS62STNIM14C | VS62STNIF14C | VS62STNIM14 | VS62STNIF14 | VS62STNIM18V | VS62STNIF18V | VS62STNIM14V | VS62STNIF14V |

### Group 3

| Ø 88 mm | THREAD | V G1/8"-M | V G1/4"-M | V G1/4"-F | S G1/4"-M | S G1/4"-F | S G3/8"-M |
|---|---|---|---|---|---|---|---|
| | **VS88NBR** | VS88NBRIM18V | VS88NBRIM14V | VS88NBRIF14V | VS88NBRIM14 | VS88NBRIF14 | VS88NBRIM38 |
| | **VS88SIT5** | VS88SIT5IM18V | VS88SIT5IM14V | VS88SIT5IF14V | VS88SIT5IM14 | VS88SIT5IF14 | VS88SIT5IM38 |
| | **VS88NR** | VS88NRIM18V | VS88NRIM14V | VS88NRIF14V | VS88NRIM14 | VS88NRIF14 | VS88NRIM38 |

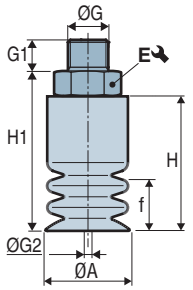
# VS

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

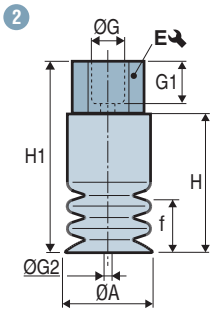
Dimensions - "Suction Cup + Fitting"

**VS 5 - 9** | **Group 1**

1

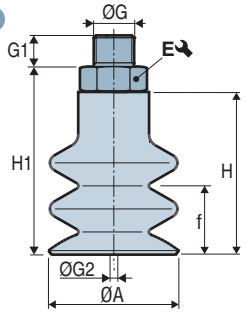



2

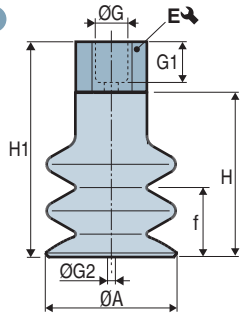



**VS 12 - 25** | **Group 1**

3

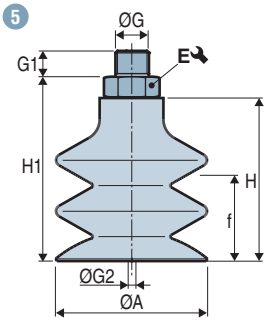



4

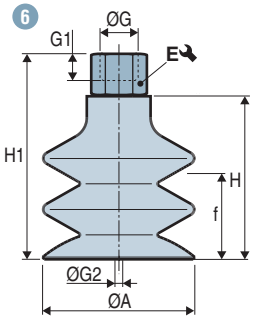



**VS 26 - 62** | **Group 2**

5

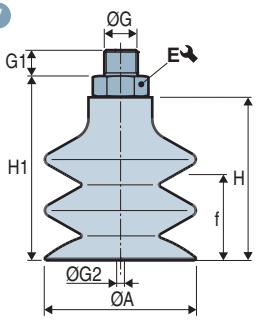



6

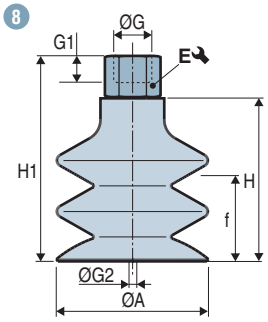



**VS 88** | **Group 3**

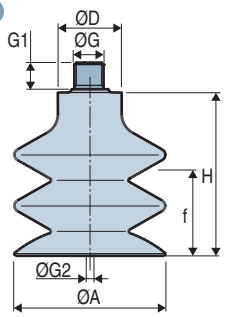
7




8




9




| | Group 1 | Diagram | ØA | ØD | f (1) | H | H1 | ØG | G1 | ØG2 (2) | 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 (1) | H | H1 | ØG | G1 | ØG2 (2) | E | (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ø 26 - 62 mm | 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.

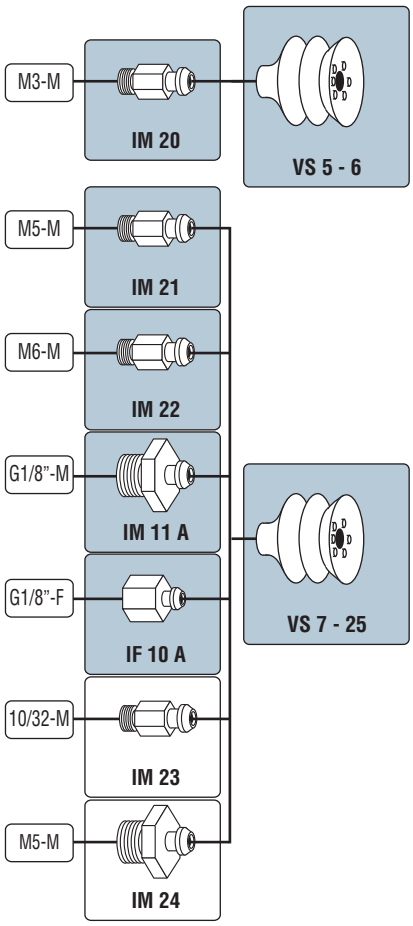
# VS

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

Assembly Diagrams

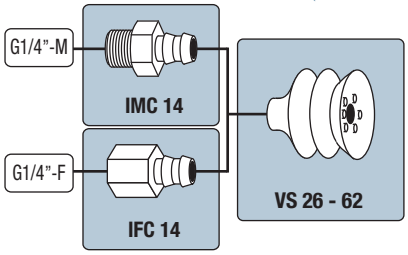
### VS 5 - 25 | Group 1

**Barbed fittings** C

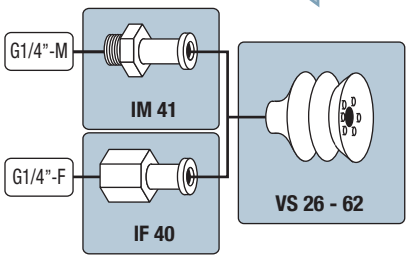



### VS 26 - 62 | Group 2

**Barbed fittings** C

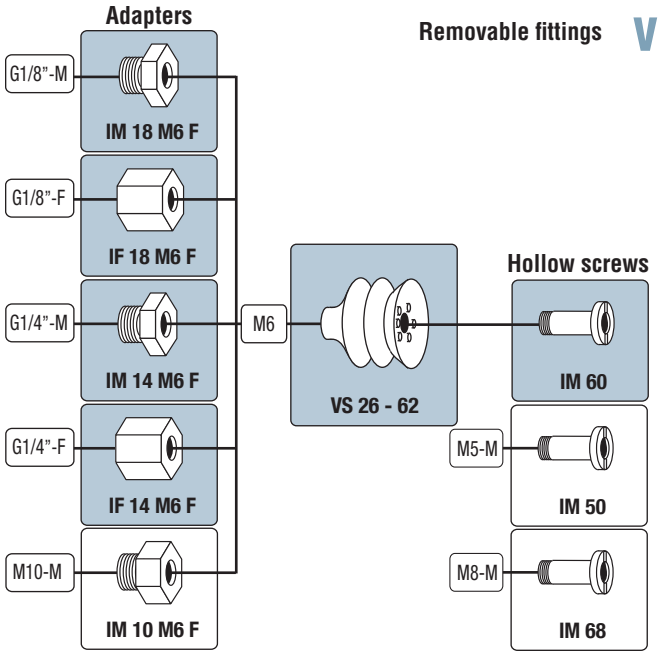



**Pressed fittings** E



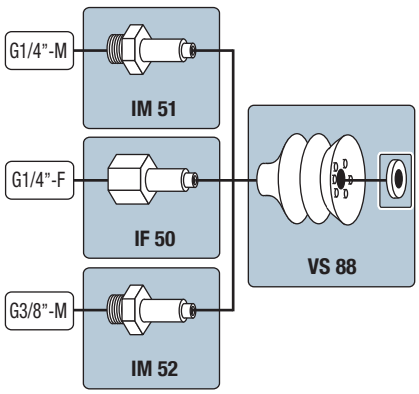

**Adapters**

**Removable fittings** V



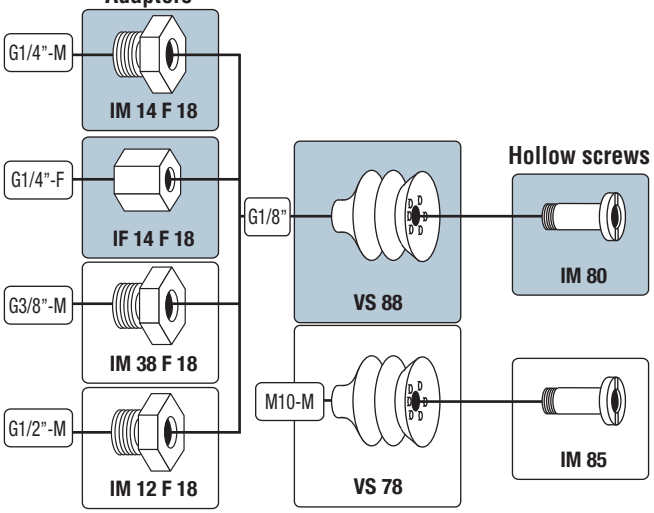

### VS 88 | Group 3

**Factory-crimped fittings** S




**Removable fittings** V

**Adapters**




Configurations (suction cup + fitting) refer to page 2/48

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

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

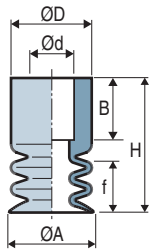
# VS

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

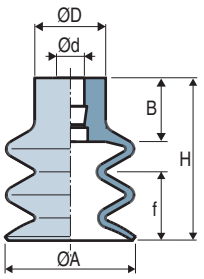
Dimensions

### Suction Cups

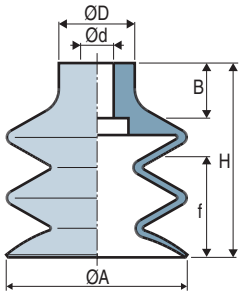
VS 5 - 25




VS 26 - 62



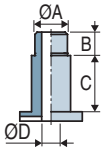

VS 88



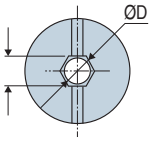

(1) f = Deflection of the suction cup.

| | ØA | H | Ød | ØD | f (1) | 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 |

### Hollow Screws



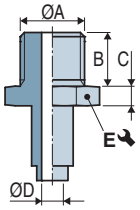

IM60: ⬢4
IM80: ⬢6



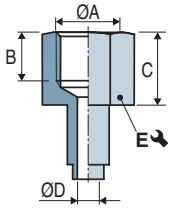

| | ØA | B | C | ØD | Material | (g) |
|---|---|---|---|---|---|---|
| IM 50 | M5-M | 5 | 11 | 2.8 | Brass | 7.4 |
| IM 60 (2) (3) | M6-M | 7 | 11 | 3.5 | Nickel-plated brass | 7.3 |
| IM 68 | M8-M | 8 | 11 | 5.2 | Nickel-plated brass | 6.5 |
| IM 80 | G1/8"-M | 8 | 18 | 6 | Nickel-plated brass | 23.8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

### Factory-Crimped Fittings

Male - IM



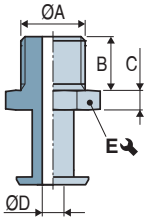

Female- IF



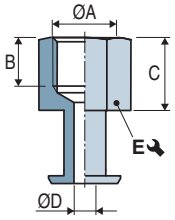

| | ØA | B | C | ØD | E | Material | (g) |
|---|---|---|---|---|---|---|---|
| IM 51 | G1/4"-M | 11 | 6 | 8 | 21 | Aluminum | 11.8 |
| IF 50 | G1/4"-F | 10 | 15 | 8 | 21 | Aluminum | 15.7 |
| IM 52 | G3/8"-M | 11 | 6 | 8 | 21 | Aluminum | 14 |

### Pressed Fittings

Male - IM



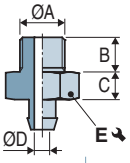

Female - IF



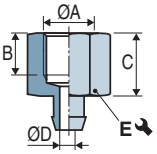

| | ØA | B | C | ØD | E | Material | (g) |
|---|---|---|---|---|---|---|---|
| IM 41 | G1/4"-M | 11 | 4 | 4.4 | 17 | Aluminum | 7.8 |
| IF 40 | G1/4"-F | 10 | 15 | 4.4 | 17 | Aluminum | 8.4 |

### Barbed Fittings

Male - IM



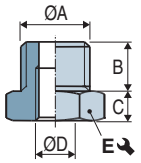

Female - IF



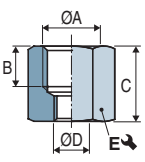

| | ØA | B | C | ØD | E | Material | (g) |
|---|---|---|---|---|---|---|---|
| IM 11 A | G1/8"-M | 7.5 | 6 | 3.5 | 14 | Aluminum | 4.1 |
| IMC 14 | G1/4"-M | 10 | 8 | 7 | 17 | Aluminum | 8.7 |
| IM 20 | M3-M | 3 | 2 | 1.4 | 5 | Aluminum | 0.4 |
| IM 21 (2) | M5-M | 4.5 | 5 | 2.5 | 7 | Nickel-plated brass | 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 | 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.

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

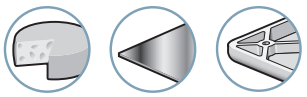
(3) Available in stainless steel

Note: All dimensions are in mm.

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

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.

Industry-specific applications



Types of use

### Materials

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

2

VSG

### Suction Cup Properties

| | Ø (mm) | (cm³) | (lbf) (1) | $R_{min}$ (mm) | NBR | SI | STN |
|---|---|---|---|---|---|---|---|
| **VSG 5** | 5 | 0.03 | 0.08 | 3.5 | **VSG5NBR** | **VSG5SI** | **VSG5STN** |
| **VSG 7** | 7 | 0.04 | 0.23 | 4 | **VSG7NBR** | **VSG7SI** | **VSG7STN** |

(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)
See part n° table below

Fitting: M = male
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 |
|---|---|---|---|---|---|
| Ø 5 -7 mm | **VSG5NBR** | VSG5NBRIMM5C | VSG5NBRIFM5C | VSG5NBRIM18C | VSG5NBRIF18C |
| | **VSG5SI** | VSG5SIIMM5C | VSG5SIIFM5C | VSG5SIIM18C | VSG5SIIF18C |
| | **VSG5STN** | VSG5STNIMM5C | VSG5STNIFM5C | VSG5STNIM18C | VSG5STNIF18C |
| | **VSG7NBR** | VSG7NBRIMM5C | VSG7NBRIFM5C | VSG7NBRIM18C | VSG7NBRIF18C |
| | **VSG7SI** | VSG7SIIMM5C | VSG7SIIFM5C | VSG7SIIM18C | VSG7SIIF18C |
| | **VSG7STN** | 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**.

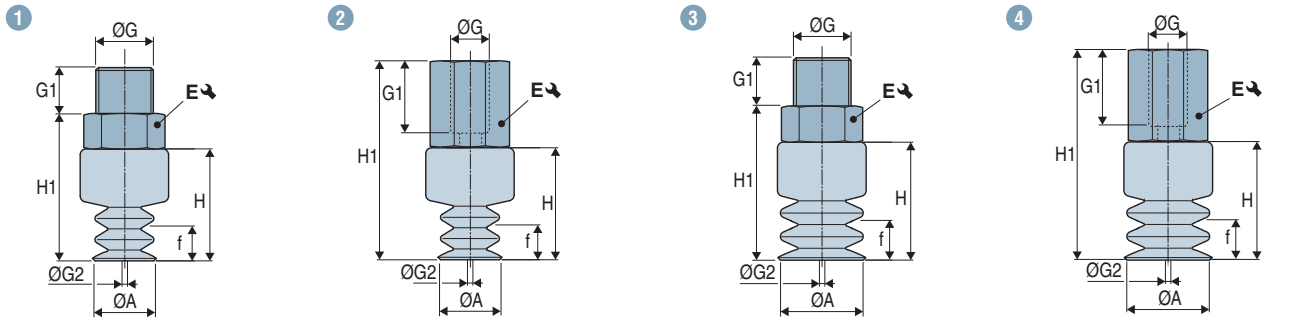
# VSG

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

Dimensions

## Suction Cups + Fittings

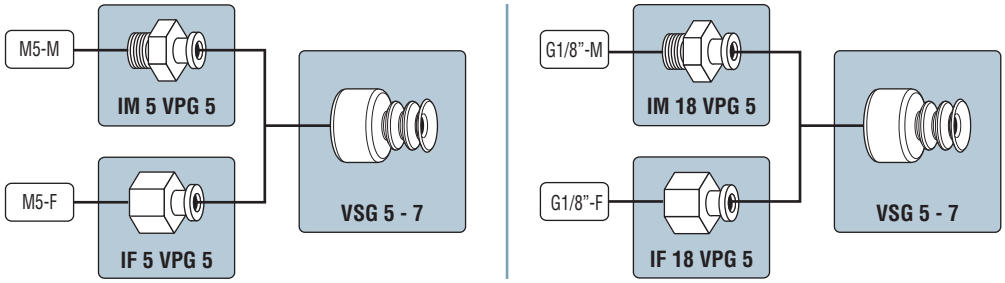
VSG 5 VSG 7




| | Diagram | ØA | f (1) | H | H1 | ØG | G1 | ØG2 (2) | 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 |

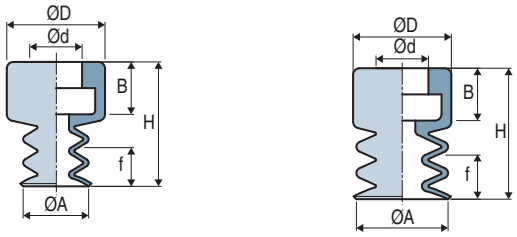
(1) f = Deflection of the suction cup. (2) Ø G2 = Ø internal orifice of the fitting.

## Assembly Diagrams




## Suction Cups

VSG 5 VSG 7




| | ØA | H | Ød | ØD | f (1) | 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 |

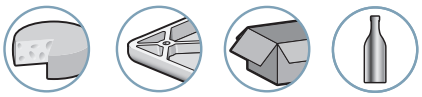
The values represent the average characteristics of our products.

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

**NBR** Nitrile
**SIT3** 30 Shore A translucent
**SIT5** 50 Shore A translucent silicone

### Suction Cup Properties

| | Ø (mm) | (cm³) | (lbf) (1) | Rmin (mm) | NBR | SIT3 | SIT5 |
|---|---|---|---|---|---|---|---|
| **VSD 18** | 17.5 | 2.5 | 1 | 20 | - | - | **VSD18SIT5** |
| **VSD 32** | 32 | 21.7 | 2.35 | 35 | **VSD32NBR** | **VSD32SIT3** | - |
| **VSD 62** | 62 | 111 | 11.24 | 75 | **VSD62NBR** | - | - |

(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) | Group | M5-M | M6-M | M8-M | M10-M | G1/8"-F | G1/8"-M | 10/32-M | G1/4"-F | G1/4"-M |
|---|---|---|---|---|---|---|---|---|---|---|
| **VSD 18** | 1 | ■ | ■ | - | - | ■ | ■ | □ | - | - |
| **VSD 32-62** | 2 | □ | □ | □ | □ | ■ | ■ | - | ■ | ■ |

■ Standard available configurations (suction cup + fitting) See part n° below
□ Additional mounting configurations see page 2/57
Fitting: M = male F = female

### Types of Assembly

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

**C** **Version C:** Factory-crimped fitting

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

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

### References - "Suction Cup + Fitting"

**Group 1**

| | THREAD | C M5-M | C M6-M | C G1/8"-M | C G1/8"-F |
|---|---|---|---|---|---|
| **Ø 18** | **VSD18SIT5** | VSD18SIT5IMM5C | VSD18SIT5IMM6C | VSD18SIT5IM18C | VSD18SIT5IF18C |

**Group 2**

| | THREAD | C G1/4"-M | C G1/4"-F | E G1/4"-M | E G1/4"-F | V G1/8"-M | V G1/8"-F | V G1/4"-M | V G1/4"-F |
|---|---|---|---|---|---|---|---|---|---|
| **Ø 32-62** | **VSD32NBR** | VSD32NBRIM14C | VSD32NBRIF14C | VSD32NBRIM14 | VSD32NBRIF14 | VSD32NBRIM18V | VSD32NBRIF18V | VSD32NBRIM14V | VSD32NBRIF14V |
| | **VSD32SIT3** | VSD32SIT3IM14C | VSD32SIT3IF14C | VSD32SIT3IM14 | VSD32SIT3IF14 | VSD32SIT3IM18V | VSD32SIT3IF18V | VSD32SIT3IM14V | VSD32SIT3IF14V |
| | **VSD62NBR** | VSD62NBRIM14C | VSD62NBRIF14C | VSD62NBRIM14 | VSD62NBRIF14 | VSD62NBRIM18V | VSD62NBRIF18V | VSD62NBRIM14V | VSD62NBRIF14V |

**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**.

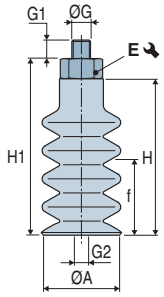
# VSD

## Long Stroke Suction Cups

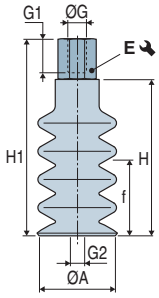
Dimensions - "Suction Cup + Fitting"

### VSD 18 | Group 1

1

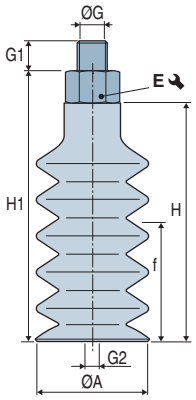



2

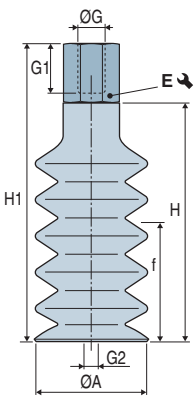



### VSD 32 | Group 2

3

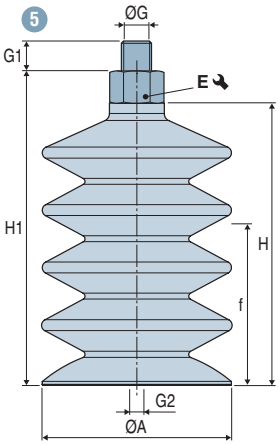



4

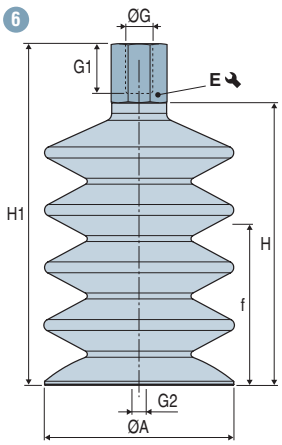



### VSD 62 | Group 2

5




6




| Group 1 | | Diagram | ØA | f (1) | H | H1 | ØG | G1 | ØG2(2) | E | (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ø 18 mm | VSD18-IMM5C | 1 | 17.5 | 18 | 36 | 41 | M5-M | 4.5 | 2.5 | 7 | 6.2 |
| | VSD18-IMM6C | 1 | 17.5 | 18 | 36 | 41 | M6-M | 5 | 3.5 | 7 | 5.8 |
| | VSD18-IM18C | 1 | 17.5 | 18 | 36 | 42 | G1/8"-M | 7.5 | 3.5 | 14 | 7.2 |
| | VSD18-IF18C | 2 | 17.5 | 18 | 36 | 48 | G1/8"-F | 8 | 3.5 | 14 | 7.1 |

| Group 2 | | Diagram | ØA | f (1) | H | H1 | G | G1 | ØG2(2) | E | (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ø 32 - 62 mm | VSD32-IM18V | 3 | 32 | 34 | 65 | 69,5 | G1/8"-M | 6 | 3.5 | 13 | 29.2 |
| | VSD32-IF18V | 4 | 32 | 34 | 65 | 78 | G1/8"-F | 7.5 | 3.5 | 13 | 32.5 |
| | VSD32-IM14 | 3 | 32 | 34 | 65 | 69 | G1/4"-M | 11 | 4.4 | 17 | 22.9 |
| | VSD32-IM14C | 3 | 32 | 34 | 65 | 73 | G1/4"-M | 10 | 7 | 17 | 23.8 |
| | VSD32-IM14V | 3 | 32 | 34 | 65 | 70 | G1/4"-M | 8 | 3.5 | 17 | 38.5 |
| | VSD32-IF14 | 4 | 32 | 34 | 65 | 80 | G1/4"-F | 10 | 4.4 | 17 | 23.7 |
| | VSD32-IF14C | 4 | 32 | 34 | 65 | 80 | G1/4"-F | 12 | 6.9 | 17 | 23.1 |
| | VSD32-IF14V | 4 | 32 | 34 | 65 | 81 | G1/4"-F | 11 | 3.5 | 17 | 43.5 |
| | VSD62-IM18V | 5 | 62 | 55 | 92.5 | 97 | G1/8"-M | 6 | 3.5 | 13 | 76.7 |
| | VSD62-IF18V | 6 | 62 | 55 | 92.5 | 105.5 | G1/8"-F | 7.5 | 3.5 | 13 | 80 |
| | VSD62-IM14 | 5 | 62 | 55 | 92.5 | 96.5 | G1/4"-M | 11 | 4.4 | 17 | 70.4 |
| | VSD62-IM14C | 5 | 62 | 55 | 92.5 | 100.5 | G1/4"-M | 10 | 7 | 17 | 71.3 |
| | VSD62-IM14V | 5 | 62 | 55 | 92.5 | 97.5 | G1/4"-M | 8 | 3.5 | 17 | 86 |
| | VSD62-IF14 | 6 | 62 | 55 | 92.5 | 107.5 | G1/4"-F | 10 | 4.4 | 17 | 71.2 |
| | VSD62-IF14C | 6 | 62 | 55 | 92.5 | 107.5 | G1/4"-F | 12 | 6.9 | 17 | 70.6 |
| | VSD62-IF14V | 6 | 62 | 55 | 92.5 | 108.5 | G1/4"-F | 11 | 3.5 | 17 | 90.6 |

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

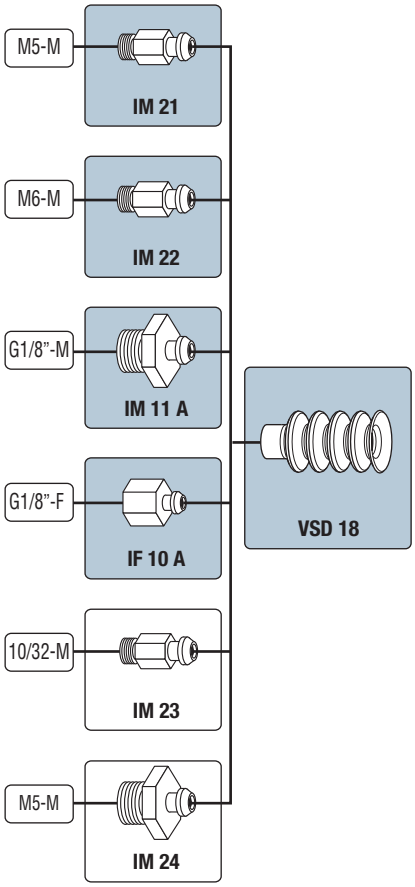
Note: All dimensions are in mm.

**Assembly diagrams**
See page 2/57.

# VSD
## Long Stroke Suction Cups
Assembly Diagrams

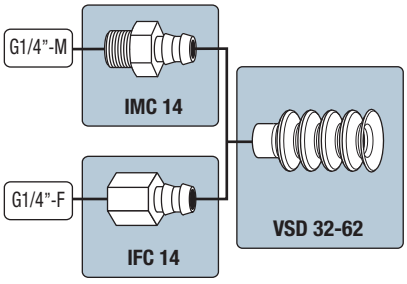
### VSD 18 | Group 1

**Barbed fittings** C

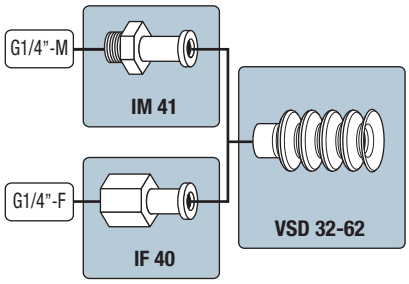



### VSD 32-62 | Group 2

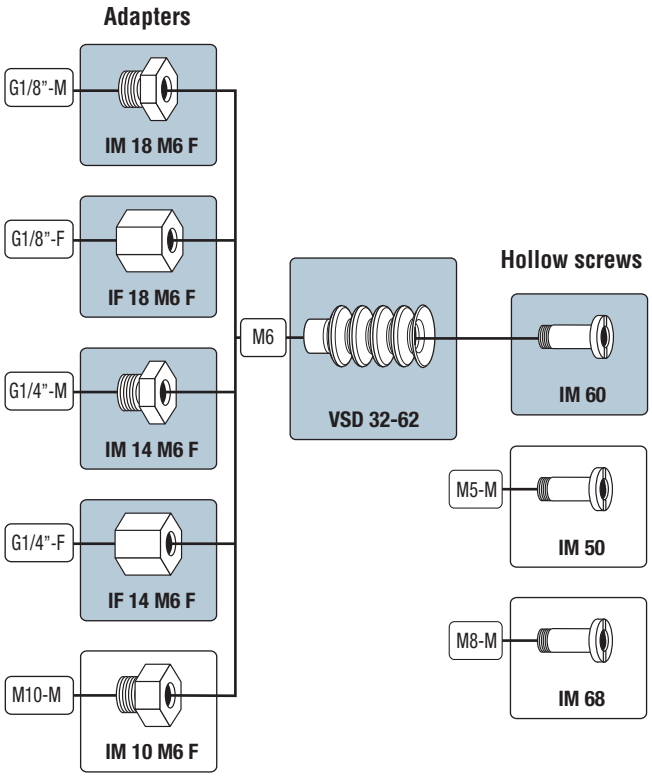
**Barbed fittings** C




**Pressed fittings** E




**Removable fittings** V



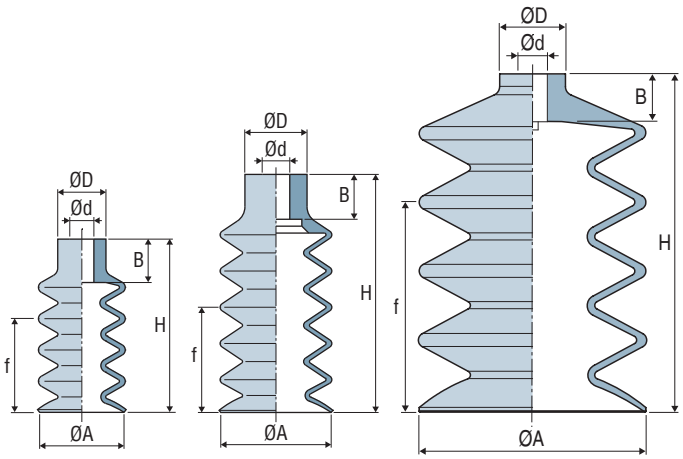

Configurations (suction cup + fitting) refer to page 2/55

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

# VSD
## Long Stroke Suction Cups
Dimensions

## Suction Cups

VSD 18 VSD 32 VSD 62

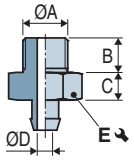



| | ØA | f (1) | H | Ød | ØD | B | (g) |
|---|---|---|---|---|---|---|---|
| VSD 18 | 17.5 | 18 | 36 | 4 | 10 | 9 | 3.1 |
| VSD 32 | 32 | 34 | 65 | 8 | 18 | 13 | 15.1 |
| VSD 62 | 62 | 55 | 92.5 | 8 | 18 | 13 | 62.6 |

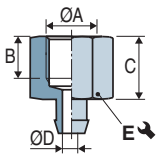
(1) f = Deflection of the suction cup.

## Barbed Fittings

Male - IM

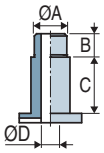


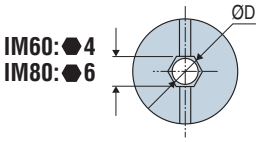

Female - IF




| | 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 (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 | 3.0 |
| 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

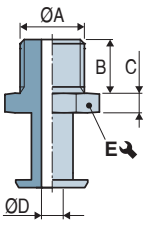


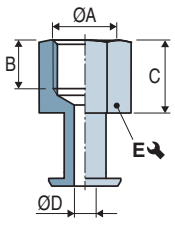

| | ØA | B | C | ØD | Material | (g) |
|---|---|---|---|---|---|---|
| IM 50 | M5-M | 5 | 11 | 2.8 | Brass | 7.4 |
| IM 60 (2) (3) | M6-M | 7 | 11 | 3.5 | Nickel-plated brass | 7.5 |
| IM 68 | M8-M | 8 | 11 | 5.2 | Nickel-plated brass | 6.4 |

## Pressed Fittings

Male - IM



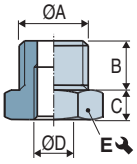

Female - IF



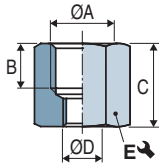

| | ØA | B | C | ØD | E | Material | (g) |
|---|---|---|---|---|---|---|---|
| IM 41 | G1/4"-M | 11 | 4 | 4.4 | 17 | Aluminum | 7.8 |
| IF 40 | G1/4"-F | 10 | 15 | 4.4 | 17 | Aluminum | 8.6 |

## 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 |

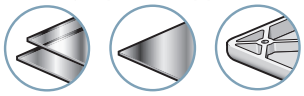
The values represent the average characteristics of our products.
Note: All dimensions are in mm.
(2) Flow restrictor version available: orifice calibrated to reduce leaks when used with a multi-cup gripper (see page 4/10).
(3) Available in stainless steel.

# High-performance Suction Cups

The **C Series high-performance suction cup** range has been designed to meet the requirements of the automotive sector.
The improved characteristics of the **C Series** range optimizes production tools in all branches of activity.

- A full range of shapes and sizes to meet every requirement.
- Non-slip cleats ensure optimum positioning of oily metal sheets.
- Textured suction cups for gripping thin sheets without deforming them.
- Ideal for automated applications.
- Specifically for use in the fields of stamping and welding.

Industry-specific applications



Types of use

## 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 212°F (100°C).
  - 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 320°F (160°C) 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

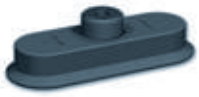
The COVAL **C Series** high performance vacuum cups are available in a complete range of shapes, sizes, materials, and connection types in order to meet all your needs in the most appropriate way.

**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**.

# High-performance Suction Cups

## References - Suction Cups

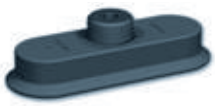
### CFC Flat Suction Cup

| | References for nitrile (NBR) suction cups according to the type of fitting | | | | | Part No. for SITON® (STNV6) suction cups according to the type of fitting | |
|---|---|---|---|---|---|---|---|
| | M38G | F38G | M38GA | F38GA | C32 | M38G | F38G |
| CFC35 | CFC35M38G | CFC35F38G | CFC35M38GA | CFC35F38GA | CFC35C32 | on request | on request |
| CFC50 | CFC50M38G | CFC50F38G | CFC50M38GA | CFC50F38GA | CFC50C32 | on request | on request |
| CFC75 | CFC75M38G | CFC75F38G | CFC75M38GA | CFC75F38GA | CFC75C32 | CFC75STNV6M38G | CFC75STNV6F38G |
| CFC100 | CFC100M38G | CFC100F38G | CFC100M38GA | CFC100F38GA | CFC100C32 | CFC100STNV6M38G | CFC100STNV6F38G |
| CFC125 | CFC125M38G | CFC125F38G | CFC125M38GA | CFC125F38GA | CFC125C32 | on request | on request |

### CBC Suction Cup with 1.5 Bellows

| | References for nitrile (NBR) suction cups according to the type of fitting | | | | | Part No. for SITON® (STNV6) suction cups according to the type of fitting | |
|---|---|---|---|---|---|---|---|
| | M38G | F38G | M38GA | F38GA | C32 | M38G | F38G |
| CBC22 | CBC22M38G | CBC22F38G | CBC22M38GA | CBC22F38GA | CBC22C32 | on request | on request |
| CBC30 | CBC30M38G | CBC30F38G | CBC30M38GA | CBC30F38GA | CBC30C32 | on request | on request |
| CBC45 | CBC45M38G | CBC45F38G | CBC45M38GA | CBC45F38GA | CBC45C32 | CBC45STNV6M38G | CBC45STNV6F38G |
| CBC60 | CBC60M38G | CBC60F38G | CBC60M38GA | CBC60F38GA | CBC60C32 | CBC60STNV6M38G | CBC60STNV6F38G |
| CBC85 | CBC85M38G | CBC85F38G | CBC85M38GA | CBC85F38GA | CBC85C32 | CBC85STNV6M38G | CBC85STNV6F38G |
| CBC115 | CBC115M38G | CBC115F38G | CBC115M38GA | CBC115F38GA | CBC115C32 | CBC115STNV6M38G | CBC115STNV6F38G |
| CBC125 | CBC125M38G | CBC125F38G | on request | on request | CBC125C32 | on request | on request |

### COFC Flat Oblong Suction Cup



| | References for nitrile (NBR) suction cups according to the type of fitting | | | | | Part No. for SITON® (STNV6) suction cups according to the type of fitting | |
|---|---|---|---|---|---|---|---|
| | M38G | F38G | M38GA | F38GA | C32 | M38G | F38G |
| COFC2565 | COFC2565M38G | COFC2565F38G | COFC2565M38GA | COFC2565F38GA | COFC2565C32 | on request | on request |
| COFC3080 | COFC3080M38G | COFC3080F38G | COFC3080M38GA | COFC3080F38GA | COFC3080C32 | on request | on request |
| COFC4080 | COFC4080M38G | COFC4080F38G | COFC4080M38GA | COFC4080F38GA | COFC4080C32 | on request | on request |
| COFC50100 | COFC50100M38G | COFC50100F38G | COFC50100M38GA | COFC50100F38GA | COFC50100C32 | on request | on request |

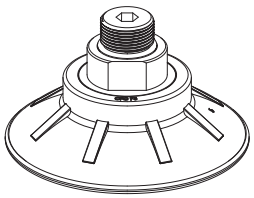
### COBC Oblong Suction Cup with 1.5 Bellows

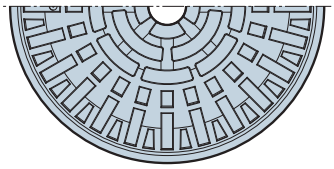
| | References for nitrile (NBR) suction cups according to the type of fitting | | | | | Part No. for SITON® (STNV6) suction cups according to the type of fitting | |
|---|---|---|---|---|---|---|---|
| | M38G | F38G | M38GA | F38GA | C32 | M38G | F38G |
| COBC3065 | COBC3065M38G | COBC3065F38G | COBC3065M38GA | COBC3065F38GA | COBC3065C32 | COBC3065STNV6M38G | COBC3065STNV6F38G |
| COBC4080 | COBC4080M38G | COBC4080F38G | COBC4080M38GA | COBC4080F38GA | COBC4080C32 | COBC4080STNV6M38G | COBC4080STNV6F38G |
| COBC55110 | COBC55110M38G | COBC55110F38G | COBC55110M38GA | COBC55110F38GA | COBC55110C32 | COBC55110STNV6M38G | COBC55110STNV6F38G |
| COBC70140 | COBC70140M38G | COBC70140F38G | COBC70140M38GA | COBC70140F38GA | COBC70140C32 | on request | on request |

# High-performance Suction Cups

## Suction Cup Properties

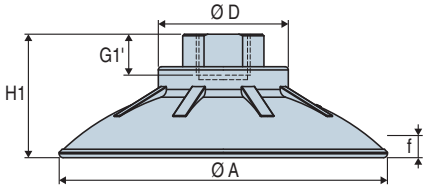
### CFC Flat Suction Cup



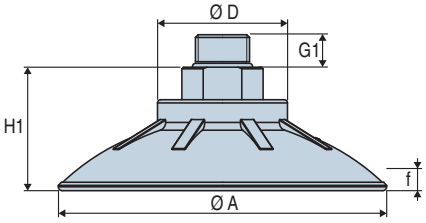


| | ØA at rest | ØA gripping | (cm³) | (lbf)(1) | (lbf)(1) | Rmin | Rmin | Ø bore | tightening |
|---|---|---|---|---|---|---|---|---|---|
| CFC 35 | 37 | 38.5 | 2.46 | 13.49 | 12.59 | 58 | 50 | 6.3 | w 22 + hk 6 |
| CFC 50 | 51 | 54 | 8.37 | 24.05 | 24.73 | 66 | 52 | 6.3 | w 22 + hk 6 |
| CFC 75 | 76 | 80 | 25.03 | 47.21 | 50.58 | 100 | 58 | 6.3 | w 22 + hk 6 |
| CFC 100 | 101 | 105.7 | 57.61 | 78.68 | 105.66 | 120 | 90 | 6.3 | w 22 + hk 6 |
| CFC 125 | 127 | 132 | 119.7 | 134.89 | 134.89 | 160 | 115 | 6.3 | w 22 + hk 8 |

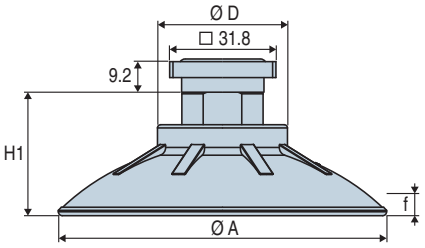
| | H1 | f(*) | G1 | G1' | ØD | (g) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | F38G | F38GA | M38G | M38GA | C32 |
| CFC 35 | 25 | 3 | 10 | 12.6 | 37 | 14 | 25.7 | 18 | 33.7 | 36.2 |
| CFC 50 | 30 | 5 | 10 | 12.6 | 38 | 25 | 34.9 | 29 | 42.9 | 47.2 |
| CFC 75 | 33 | 8 | 10 | 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"

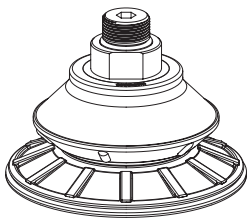



**M38G/M38GA** Male fitting G3/8"

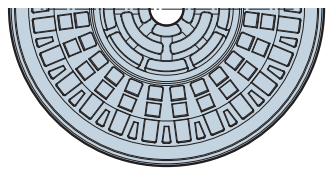



**C32** Square coupling 32

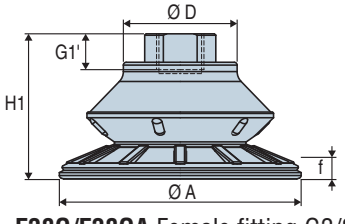
### CBC Suction Cup with 1.5 Bellows



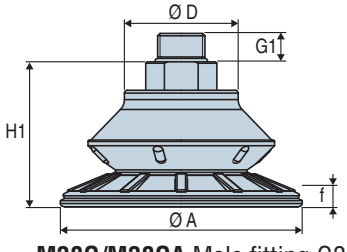
| | ØA at rest | ØA gripping | (cm³) | (lbf)(1)(2) | (lbf)(1)(3) | (lbf)(1) | Rmin | Rmin | Ø bore | tightening |
|---|---|---|---|---|---|---|---|---|---|---|
| CBC 22 | 21.5 | 22 | 1.6 | 4.05 | 4.50 | 3.82 | 25 | 30 | 6.3 | w 22 + hk 6 |
| CBC 30 | 32 | 34 | 5 | 7.87 | 8.99 | 7.42 | 30 | 32 | 6.3 | w 22 + hk 6 |
| CBC 45 | 47 | 48.7 | 11.47 | 8.77 | 17.31 | 19.11 | 36 | 45 | 6.3 | w 22 + hk 6 |
| CBC 60 | 62 | 64.5 | 25.31 | 13.49 | 30.35 | 34.85 | 44 | 62 | 6.3 | w 22 + hk 6 |
| CBC 85 | 85 | 88 | 66.54 | 28.10 | 56.20 | 49.46 | 65 | 115 | 6.3 | w 22 + hk 6 |
| CBC 115 | 115 | 119 | 141.47 | 48.11 | 96.67 | 96.67 | 84 | 140 | 6.3 | w 22 + hk 8 |
| CBC 125 | 125 | 132 | 200.1 | 50.13 | 106.78 | 125.89 | 93 | 155 | 6.3 | w 22 + hk 8 |



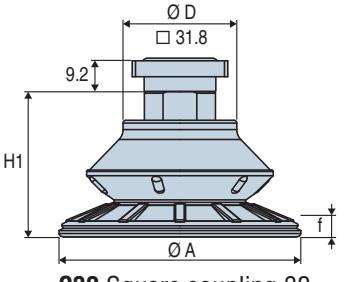
| | H1 | f(*) | G1 | G1' | ØD | (g) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | F38G | F38GA | M38G | M38GA | C32 |
| CBC 22 | 32 | 6 | 10 | 12.6 | 37 | 10 | 23 | 14 | 31 | 32.2 |
| CBC 30 | 31 | 8 | 10 | 12.6 | 37 | 14 | 26.3 | 19 | 34.3 | 36.2 |
| CBC 45 | 36 | 11 | 10 | 12.6 | 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"



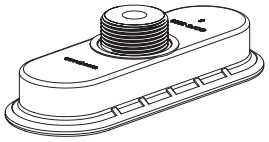

**C32** Square coupling 32

(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.

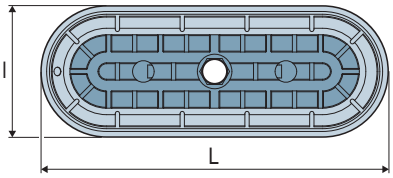
# High-performance Suction Cups

## Suction Cup Properties

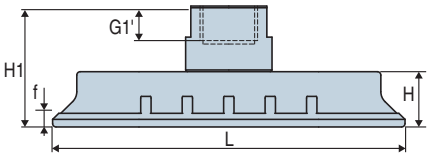
### COFC Flat Oblong Suction Cup



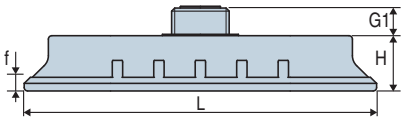
| | l x L at rest | l x L gripping | (cm³) | (lbf)(1) | (lbf)(1) | Rmin | Rmin | Ø bore | tightening |
|---|---|---|---|---|---|---|---|---|---|
| COFC 2565 | 25x65 | 26.8x67 | 3.78 | 18.43 | 12.81 | 25 | 25 | 6 | hk 6 |
| COFC 3080 | 30x80 | 31.5x82 | 6.08 | 28.10 | 20.46 | 40 | 32 | 6 | hk 6 |
| COFC 4080 | 40x80 | 42x82 | 11.03 | 32.60 | 29.90 | 60 | 40 | 6 | hk 6 |
| COFC 50100 | 50x100 | 52.5x102.5 | 22.25 | 53.95 | 49.01 | 70 | 50 | 6 | hk 6 |



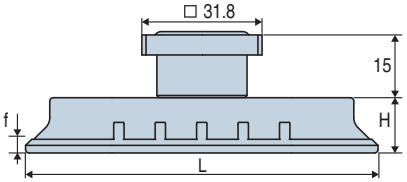

| | H1 | H | G1 | G1' | f(*) | (g) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | F38G | F38GA | M38G | M38GA | C32 |
| COFC 2565 | 31.5 | 12.5 | 8 | 10 | 3 | 24 | 37.8 | 17 | 26.3 | 35 |
| COFC 3080 | 32 | 13 | 8 | 10 | 3 | 29 | 42.7 | 22 | 31.2 | 40 |
| COFC 4080 | 34 | 15 | 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"

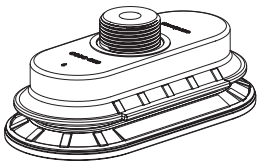



**M38G/M38GA** Male fitting G3/8"

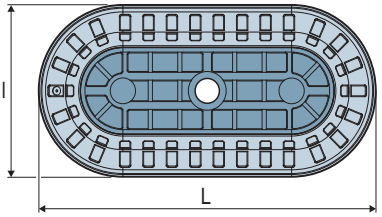



**C32** Square coupling 32

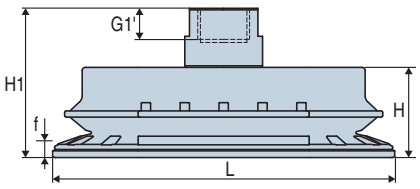
### COBC Oblong Suction Cup with 1.5 Bellows



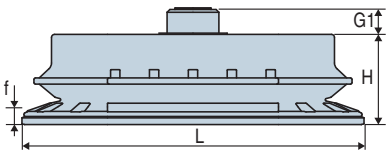
| | l x L at rest | l x L gripping | (cm³) | (lbf)(1)(2) | (lbf)(1)(3) | (lbf)(1) | Rmin | Rmin | Ø bore | tightening |
|---|---|---|---|---|---|---|---|---|---|---|
| COBC 3065 | 31x65 | 32.3x67 | 9.98 | 11.24 | 16.86 | 19.56 | 25 | 30 | 6 | hk 6 |
| COBC 4080 | 40x80 | 41.5x82 | 19.44 | 26.08 | 29.23 | 34.85 | 38 | 37 | 6 | hk 6 |
| COBC 55110 | 55x110 | 57x112.5 | 49.25 | 38.22 | 47.21 | 59.57 | 58 | 57 | 6 | hk 6 |
| COBC 70140 | 70x140 | 72x143 | 93.57 | 60.70 | 78.68 | 92.17 | 72 | 68 | 6 | hk 6 |



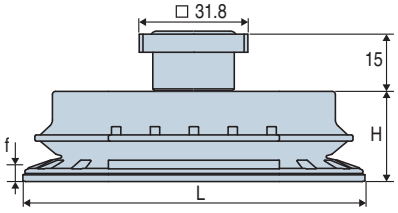

| | H1 | H | G1 | G1' | f(*) | (g) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | F38G | F38GA | M38G | M38GA | C32 |
| COBC 3065 | 39 | 20 | 8 | 10 | 7 | 31 | 45.5 | 25 | 34 | 43 |
| COBC 4080 | 41 | 22 | 8 | 10 | 9.5 | 37 | 52.1 | 31 | 40.6 | 49 |
| COBC 55110 | 48 | 29 | 8 | 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

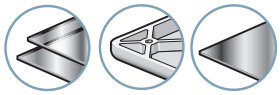
The values represent the average characteristics of our products.

(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.

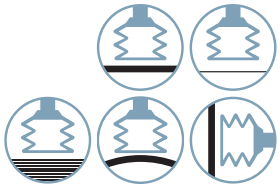
# CTC
## High-Performance Bell-type Suction Cups

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.

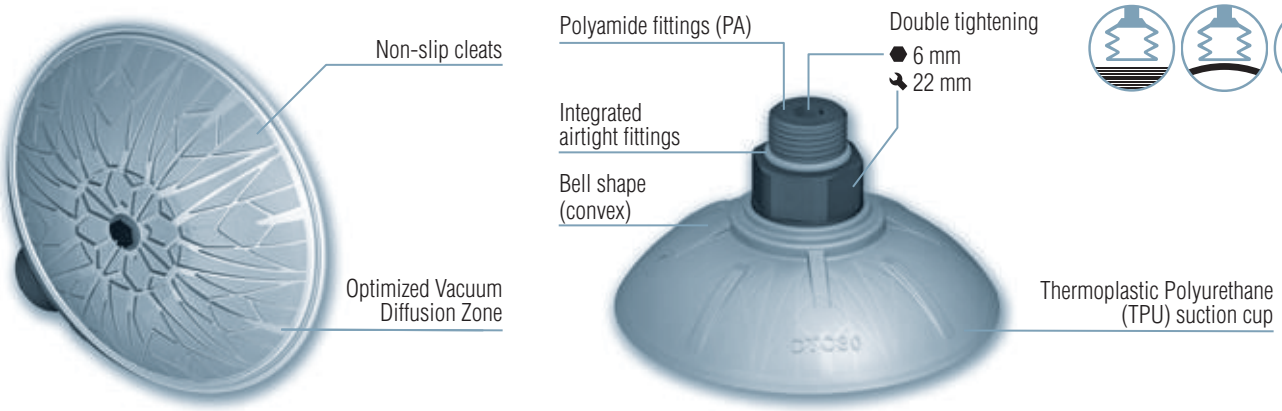
Industry-specific applications



Types of use

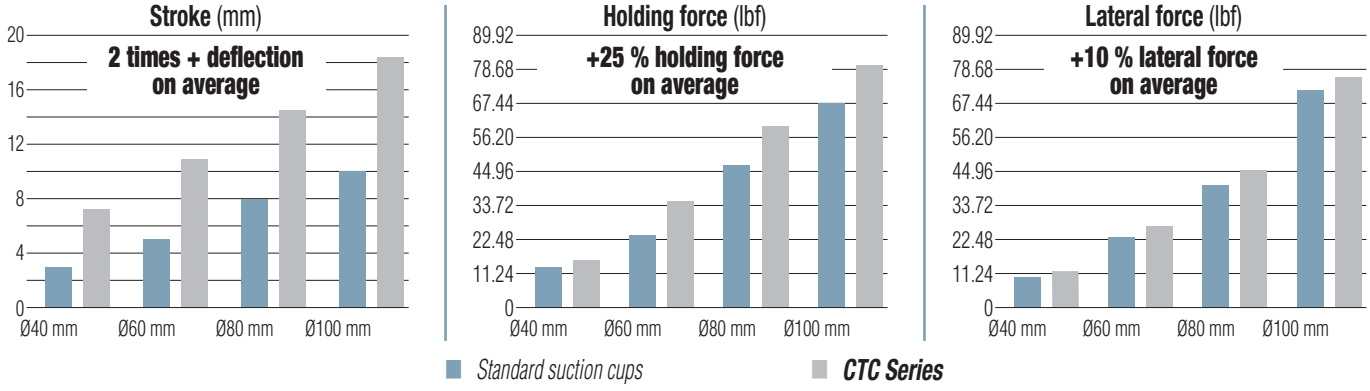







## Advantages

- 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.




## 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.

# CTC
## High-Performance Bell-type Suction Cups

## Fittings

**M38G**
Male fitting G3/8"
(polyamide insert)

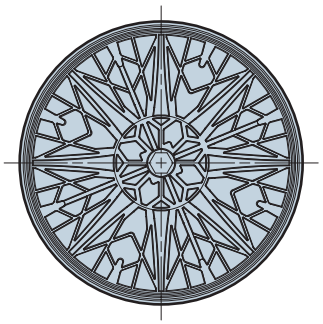
**F38G**
Female fitting G3/8"
(polyamide insert)

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

*Other fittings available upon request*

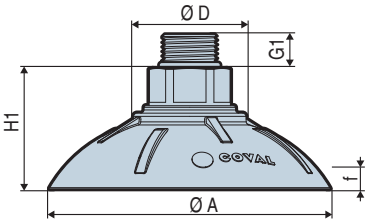
## Characteristics

*(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.*

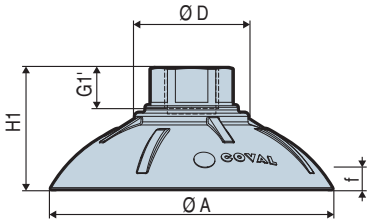


| | ØA At rest | ØA gripping | (cm³) | (lbf)(1) | (lbf)(1) | Rmin | Ø bore | tightening |
|---|---|---|---|---|---|---|---|---|
| **CTC 40** | 43.5 | 47.6 | 8.1 | 15.74 | 11.91 | 18 | 6.3 | w 22 + hk 6 |
| **CTC 60** | 64.7 | 71.7 | 26.1 | 35.07 | 26.98 | 24 | 6.3 | w 22 + hk 6 |
| **CTC 80** | 84.1 | 92.7 | 72.1 | 59.80 | 45.41 | 36 | 6.3 | w 22 + hk 6 |
| **CTC 100** | 106 | 115.6 | 103.4 | 80.03 | 75.98 | 40 | 6.3 | w 22 + hk 6 |

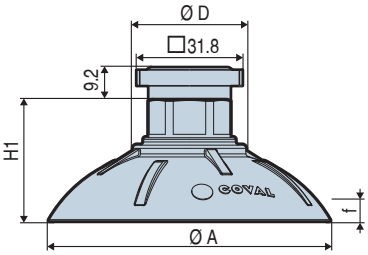
| | H1 | f (2) | G1 | G1' | ØD | (g) | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | F38G | M38G | C32 |
| **CTC 40** | 30 | 7.2 | 10.5 | 10.7 | 32.8 | 12.9 | 17.9 | 35.1 |
| **CTC 60** | 33.9 | 10.9 | 10.5 | 10.7 | 32.7 | 18.3 | 23.3 | 40.5 |
| **CTC 80** | 36.5 | 14.5 | 10.5 | 10.7 | 33.3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




**M38G** Male fitting G3/8"




**F38G** Female fitting G3/8"




**C32** Square coupling 32

## Materials

### SUCTION CUPS

- **TPU: Thermoplastic polyurethane, 85 shore A**
  - High resistance to oils and abrasion.
  - Operating temperature from -4° to 212°F (up to 248°F 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 | |
|---|---|
| Ø 40 mm | **40** |
| Ø 60 mm | **60** |
| Ø 80 mm | **80** |
| Ø 100 mm | **100** |

| FITTING | |
|---|---|
| **M38G** | G3/8"-M |
| **F38G** | G3/8"-F |
| **C32** | C32 |

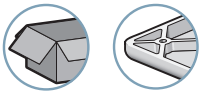
Example:
**CTC80TPUM38G**

# 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.

Industry-specific applications



Types of use

**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 392°F 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 Cups with 1.5 Bellows with Foam Ring Seals, VSA-BM series

| | Ø (mm) | NBR (cm³) | NBR (lbf)(1) | NBR Part Nr. | SIT5 / SI (cm³) | SIT5 / SI (lbf)(1) | SIT5 / SI Part Nr. |
|---|---|---|---|---|---|---|---|
| **VSA 20---BM** | 20 | 1.3 | 1.57 | **VSA20NBRBM** | 1.3 | 0.90 | **VSA20SIT5BM** |
| **VSA 25---BM** | 25 | 3.3 | 2.25 | **VSA25NBRBM** | 3.2 | 1.80 | **VSA25SIT5BM** |
| **VSA 26---BM** | 26 | 4.2 | 2.25 | **VSA26NBRBM** | 4.1 | 1.80 | **VSA26SIT5BM** |
| **VSA 33---BM** | 33 | 6.7 | 3.14 | **VSA33NBRBM** | 5.3 | 3.37 | **VSA33SIT5BM** |
| **VSA 43---BM** | 43 | 12.3 | 5.62 | **VSA43NBRBM** | 10.8 | 5.84 | **VSA43SIT5BM** |
| **VSA 53---BM** | 53 | 34.8 | 4.49 | **VSA53NBRBM** | 30.5 | 7.86 | **VSA53SIT5BM** |
| **VSA 63---BM** | 63 | 52.9 | 8.99 | **VSA63NBRBM** | 45.9 | 11.24 | **VSA63SIT5BM** |
| **VSA 78---BM** | 78 | 102.4 | 15.06 | **VSA78NBRBM** | 87.5 | 17.08 | **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 (cm³) | NBR (lbf)(1) | NBR Part Nr. | SIT5 / SI (cm³) | SIT5 / SI (lbf)(1) | SIT5 / SI Part Nr. |
|---|---|---|---|---|---|---|---|
| **VS 20---BM** | 20 | 2.4 | 1.12 | **VS20NBRBM** | 2.4 | 0.90 | **VS20SIT5BM** |
| **VS 25---BM** | 25 | 5.7 | 2.02 | **VS25NBRBM** | 5.6 | 1.80 | **VS25SIT5BM** |
| **VS 26---BM** | 26 | 6.5 | 2.02 | **VS26NBRBM** | 6.4 | 1.80 | **VS26SIT5BM** |
| **VS 32---BM** | 32 | 11.9 | 2.47 | **VS32NBRBM** | 10.6 | 2.69 | **VS32SIT5BM** |
| **VS 42---BM** | 42 | 22.6 | 5.17 | **VS42NBRBM** | 21.1 | 6.52 | **VS42SIT5BM** |
| **VS 52---BM** | 52 | 44.6 | 7.19 | **VS52NBRBM** | 40.3 | 6.97 | **VS52SIT5BM** |
| **VS 62---BM** | 62 | 86.4 | 8.31 | **VS62NBRBM** | 79.4 | 9.21 | **VS62SIT5BM** |
| **VS 88---BM** | 88 | 201.3 | 20.90 | **VS88NBRBM** | 181.1 | 22.03 | **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.

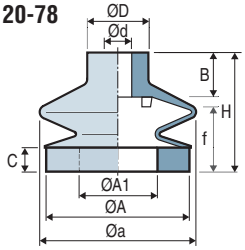
# VSA-VS BM

## Suction Cups with Foam Ring Seals

Dimensions

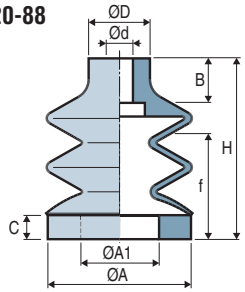
### Dimensions

**VSA-BM 20-78**




| | ØA | Øa | Ød | ØD | B | NBR ØA1 | NBR C | NBR H | NBR f (2) | NBR (g) | SIT5 / SI ØA1 | SIT5 / SI C | SIT5 / SI H | SIT5 / SI f (2) | SIT5 / SI (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**




| | ØA | Øa | Ød | ØD | B | NBR ØA1 | NBR C | NBR H | NBR f (2) | NBR (g) | SIT5 / SI ØA1 | SIT5 / SI C | SIT5 / SI H | SIT5 / SI f (2) | SIT5 / SI (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **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 392°F 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) SIT5 / SIF | (lbf)(1) | SIT5 / SIF | | Ø (mm) | (cm³) SIT5 / SIF | (lbf)(1) | SIT5 / SIF |
| VSA 20 | 20 | 1.3 | 0.90 | VSA20SIT5BMSIF | VS 20 | 20 | 2.4 | 0.90 | VS20SIT5BMSIF |
| VSA 25 | 25 | 3.2 | 1.80 | VSA25SIT5BMSIF | VS 25 | 25 | 5.6 | 1.80 | VS25SIT5BMSIF |
| VSA 26 | 26 | 4.1 | 1.35 | VSA26SIT5BMSIF | VS 26 | 26 | 6.4 | 1.80 | VS26SIT5BMSIF |
| VSA 33 | 33 | 5.3 | 3.77 | VSA33SIT5BMSIF | VS 32 | 32 | 10.6 | 2.70 | VS32SIT5BMSIF |
| VSA 43 | 43 | 10.8 | 4.54 | VSA43SIT5BMSIF | VS 42 | 42 | 21.1 | 4.70 | VS42SIT5BMSIF |
| VSA 53 | 53 | 30.5 | 9.58 | VSA53SIT5BMSIF | VS 52 | 52 | 40.3 | 6.50 | VS52SIT5BMSIF |
| VSA 63 | 63 | 45.9 | 13.31 | VSA63SIT5BMSIF | VS 62 | 62 | 79.4 | 9.26 | VS62SIT5BMSIF |
| VSA 78 | 78 | 87.5 | 24.68 | VSA78SIT5BMSIF | VS 88 | 88 | 181.1 | 29.88 | VS88SIT5BMSIF |

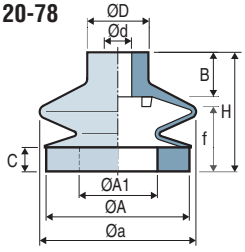
(1) Actual force of the suction cup in use with a 65% vacuum and including a safety factor of 2 for horizontal handling.

Suction cup made of silicone SIT5

Foam ring in silicone FDA SIF

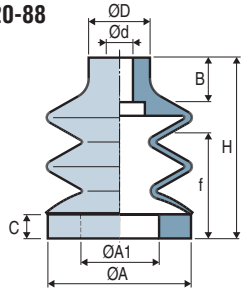
## Dimensions

**VSA-BM 20-78**




| | ØA | Øa | Ød | ØD | B | ØA1 | C | H | f (2) | (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**




| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 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 392°F, 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

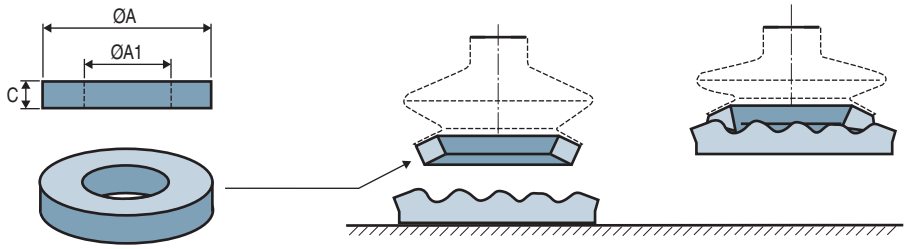
**NBR**

| Part Nr. | ØA | ØA1 | C | f (1) | (g) |
|---|---|---|---|---|---|
| **VSBM32** | 32 | 22 | 5 | 2.5 | 0.3 |
| **VSBM42** | 42 | 28 | 5 | 2.5 | 0.7 |
| **VSBM53** | 53 | 33 | 10 | 5.0 | 2.7 |
| **VSBM62** | 62 | 42 | 10 | 5.0 | 2.8 |
| **VSBM78** | 78 | 58 | 10 | 5.0 | 3.7 |
| **VSBM88** | 88 | 68 | 10 | 5.0 | 4.6 |

**SI / SIF**

| Part Nr. | ØA | ØA1 | C | f (1) | (g) |
|---|---|---|---|---|---|
| **VSBM20SI / SIF** | 20 | 10 | 2 | 1.0 | 0.2 |
| **VSBM25SI / SIF** | 25 | 13 | 2 | 1.0 | 0.4 |
| **VSBM32SI / SIF** | 32 | 19 | 2 | 1.0 | 0.5 |
| **VSBM42SI / SIF** | 42 | 20 | 5 | 2.5 | 2.2 |
| **VSBM53SI / SIF** | 53 | 33 | 5 | 2.5 | 2.8 |
| **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

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

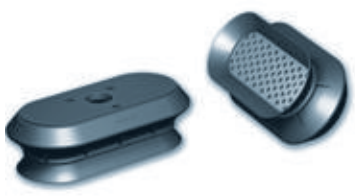
### VSAF

#### 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 °F to 428 °F

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

## 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

### Rounded 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

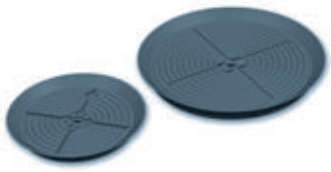
## VPYR

### Radial Ball-joint Suction Cups

- Flat suction cups with axial 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

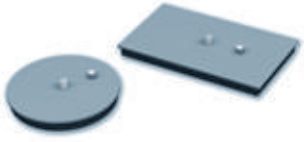


### Heavy Load Suction Cups

- "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

# FPC/FPCX

## FlowPack Suction Cups

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.

Industry-specific application

Types of use

### 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 < 1.5 kg: suction cup Ø 60 mm, FPC60/FPCX60.
- FlowPack ≤ 5 kg: elliptical suction cup 120x100 mm, FPC120100.

### Materials

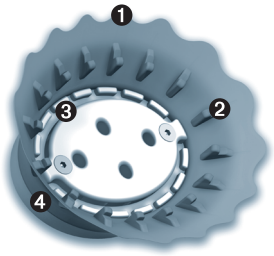
| | | |
|---|---|---|
| Suction cups: | **SIBL3** | Blue silicone 35 Shore A |
| | **SIBL5** | Blue silicone 50 Shore A |
| Fittings: | | Plastic POM-C and PETP |
| Flat seal: | | Silicone |
| Screw: | | Stainless steel |

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.




❶ Thin and wavy fl wer-shaped lips that perfectly mold to the packaging, whatever the shape.
❷ Internal cleats that allow for optimized vacuum while preventing any crushing and also strengthen the hold on the product being handled.
❸ Fittings featuring a lateral vacuum distributor that prevent any loss in efficie y when the product is held.
❹ 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) | (lbf) (1) | SIBL3 Part number suction sup + fittin | SIBL5 Part number suction sup + fittin |
|---|---|---|---|---|---|
| FPC351.5___IF14PC | Ø 35 | 7.2 | 1.12 | FPC351.5SIBL3IF14PC | FPC351.5SIBL5IF14PC |
| FPC45___IF38PC | Ø 45 | 13 | 2.24 | FPC45SIBL3IF38PC | FPC45SIBL5IF38PC |
| FPC60___IF38PC | Ø 60 | 24.5 | 3.37 | FPC60SIBL3IF38PC | FPC60SIBL5IF38PC |
| FPCX60___IF38PC | Ø 60 | 24.5 | 3.37 | - | FPCX60SIBL5IF38PC |
| FPC120100___IF38P1V | 120x100 | 167 | 11.24 | FPC120100SIBL3IF38P1V | FPC120100SIBL5IF38P1V |

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

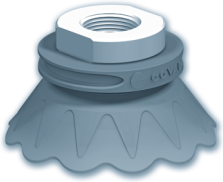
## Range

**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**

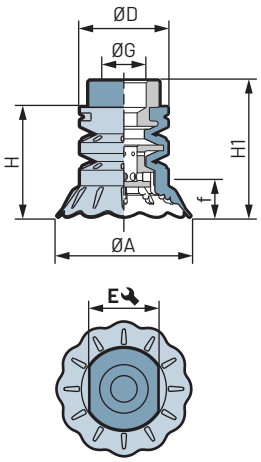
# FPC/FPCX

## FlowPack Suction Cups

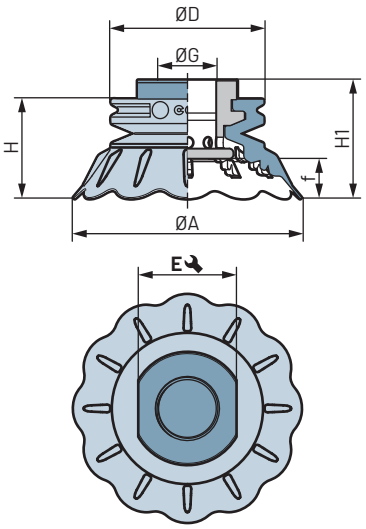
Dimensions

## Suction Cup + fittin

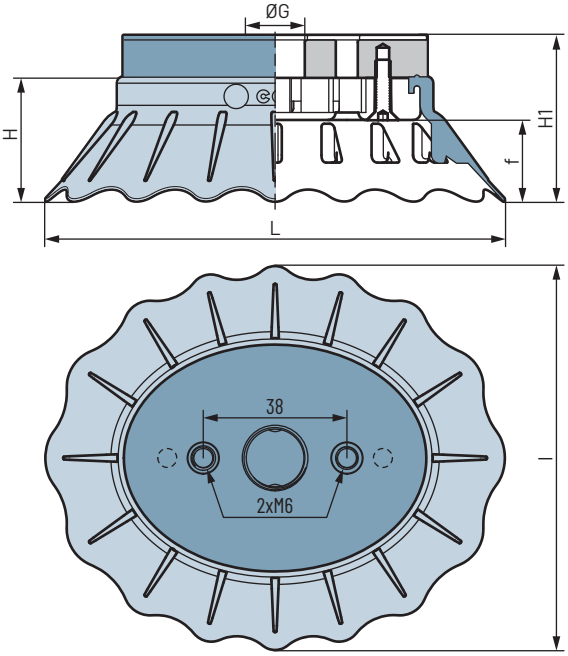
**FPC351.5---IF14PC**
Round, Ø 35 mm, 1.5 bellows




**FPC45---IF38PC**
**FPC60/FPCX60---IF38PC**
Round, Ø 45 and 60 mm




**FPC120100---IF38P1V**
Elliptical, 120 x 100 mm

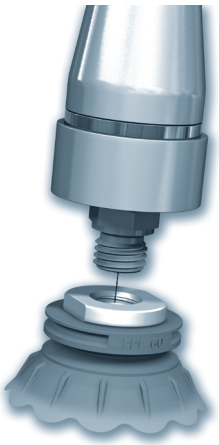



| | Ø A | Ø D | L | I | f (1) | H | H1 | Ø G | E | (g) |
|---|---|---|---|---|---|---|---|---|---|---|
| **FPC351.5---IF14PC** | 35 | 23 | - | - | 10 | 29 | 36 | G1/4"-F | 19 | 9.9 |
| **FPC45---IF38PC** | 45 | 39 | - | - | 7 | 23 | 30 | G3/8"-F | 26 | 20 |
| **FPC60---IF38PC** | 60 | 40 | - | - | 10 | 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

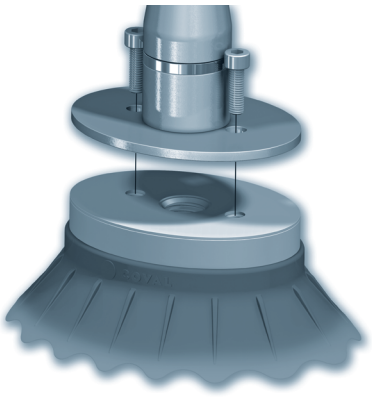
## Mounting Configu ations

**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

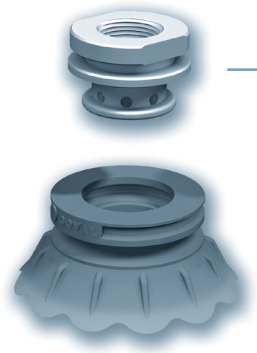
**COMPLETE PART CONFIGURATION**

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**

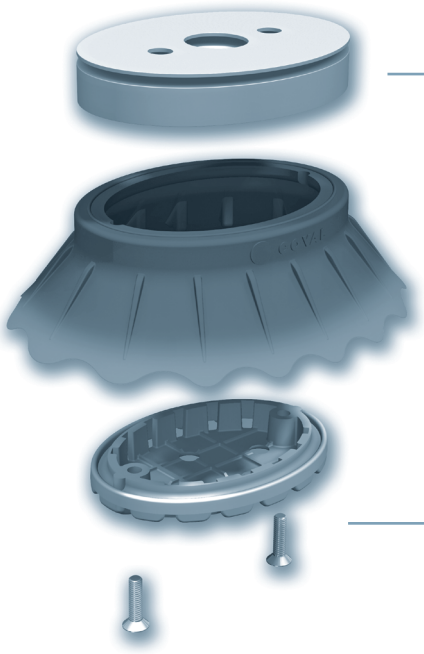
### FPC120100

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.

# MVS

## Soft Suction Cups for High Speed Applications

Industry-specific applications

Types of use

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



## Suction Cup Characteristics

| | Ø (mm) | (cm³) | (lbf) (1) | SIB | SIT5 | Aluminum fittings | | FDA fittings | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Reference | Reference | G1/4"-M | G1/4"-F | G1/4"-M | G1/4"-F | G1/8"-M |
| **MVS202.5___G** | 20 | 4 | 0.70 | **MVS202.5SIBG** | **MVS202.5SIT5G** | - | - | - | - | IM18SP1251 |
| **MVS202.5___C** | 20 | 4 | 0.74 | **MVS202.5SIBC** | **MVS202.5SIT5C** | - | - | - | - | IM18SP1251 |
| **MVS301.5___G** | 30 | 7 | 1.75 | **MVS301.5SIBG** | **MVS301.5SIT5G** | IM51SP143 | IF50SP143 | IM14PMVS30 | IF14PMVS30 | - |
| **MVS301.5___C** | 30 | 7 | 2.27 | **MVS301.5SIBC** | **MVS301.5SIT5C** | IM51SP143 | IF50SP143 | IM14PMVS30 | IF14PMVS30 | - |
| **MVS302.5___G** | 30 | 11.2 | 1.71 | **MVS302.5SIBG** | **MVS302.5SIT5G** | IM51SP143 | IF50SP143 | IM14PMVS30 | IF14PMVS30 | - |
| **MVS302.5___C** | 30 | 11.2 | 1.91 | **MVS302.5SIBC** | **MVS302.5SIT5C** | IM51SP143 | IF50SP143 | IM14PMVS30 | IF14PMVS30 | - |
| **MVS303.5___C** | 30 | 11.6 | 1.89 | **MVS303.5SIBC** | **-** | IM51SP143 | IF50SP143 | IM14PMVS30 | IF14PMVS30 | - |
| **MVS401.5___C** | 40 | 7.3 | 2.85 | **MVS401.5SIBC** | **MVS401.5SIT5C** | IM51SP143 | IF50SP143 | - | - | - |
| **MVS402.5___C** | 40 | 13 | 1.84 | **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.

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

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**.

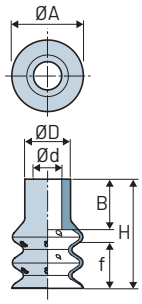
# MVS

## Soft Suction Cups for High Speed Applications

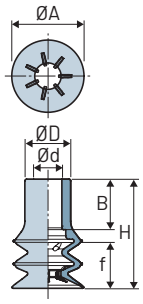
Dimensions

## Suction Cups

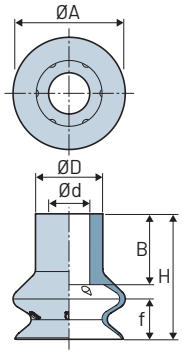
MVS202.5___G



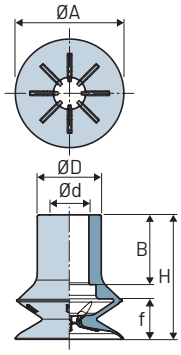

MVS202.5___C



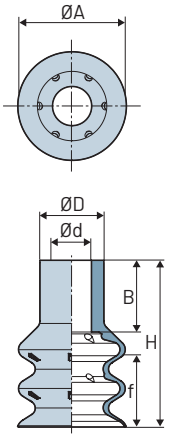

MVS301.5___G



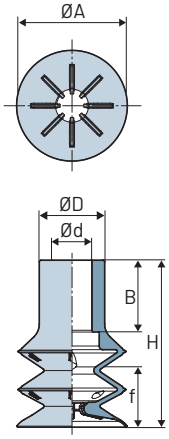

MVS301.5___C



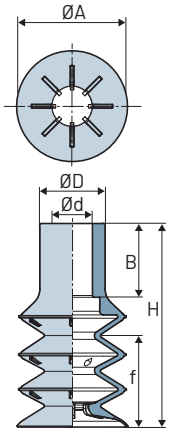

MVS302.5___G



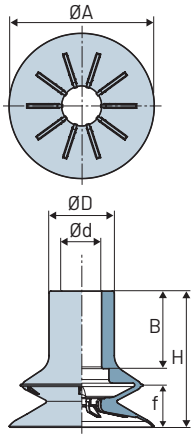

MVS302.5___C



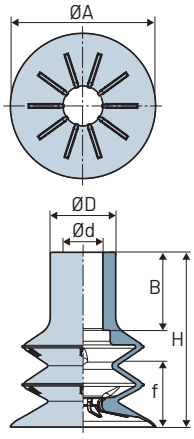

MVS303.5___C




MVS401.5___C




MVS402.5___C

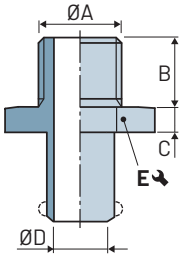



| | Ø A | H | Ø d | Ø D | f (2) | B | (g) |
|---|---|---|---|---|---|---|---|
| MVS202.5___G | 20 | 31 | 8 | 13 | 10 | 13 | 2.3 |
| MVS202.5___C | 20 | 31 | 8 | 13 | 10 | 13 | 3 |
| MVS301.5___G | 30 | 35 | 11 | 18 | 10 | 19.5 | 5.9 |
| MVS301.5___C | 30 | 35 | 11 | 18 | 9 | 19.5 | 6.5 |
| MVS302.5___G | 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 |

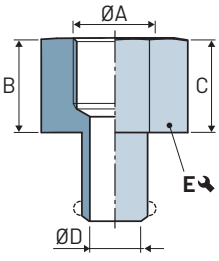
(2) f = Deflection of the suction cup.

## Barbed Fittings

Male fittings




Female fittings




| | Ø A | B | C | Ø D | 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 |
| IM 14 P MVS30 | G1/4"-M | 11 | 6 | 8 | 21 | POM-C | 5.2 |
| IF 14 P MVS30 | G1/4"-F | 12.5 | 17 | 8 | 21 | POM-C | 8.3 |

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

3

# MVP
## 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) equiped with O-ring sealing

Industry-specific applications

Types of use

### Applications

The high flexibilty 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)...

### Materials

**NBR** Nitrile
**SIBL5** Blue silicone 50 shore A
**SI5BD** Blue silicone 50 shore A detectable

### Suction Cup Characteristics

| | Ø (mm) | (cm³) | (lbf) | NBR | SIBL5 | SI5BD |
|---|---|---|---|---|---|---|
| **MVP204.5** | 20 | 3.2 | 0.97 | **MVP204.5NBR** | **MVP204.5SIBL5** | **MVP204.5SI5BD(*)** |
| **MVP304.5** | 30 | 11.6 | 2.81 | **MVP304.5NBR** | **MVP304.5SIBL5** | **MVP304.5SI5BD(*)** |
| **MVP404.5** | 40 | 25.3 | 3.71 | **MVP404.5NBR** | **MVP404.5SIBL5** | **MVP404.5SI5BD(*)** |
| **MVP504.5** | 50 | 50.4 | 6.25 | **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

**E**

**Version E:** Pressed fitting

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

# MVP

## Suction Cups with 4.5 Bellows

Reference and Dimensions - «Suction Cup + Fitting»

## References «Suction Cup + Fitting»

Ø 20 mm

| | E 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

| | E G1/8"-F | | E G1/4"-M | | E 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 |

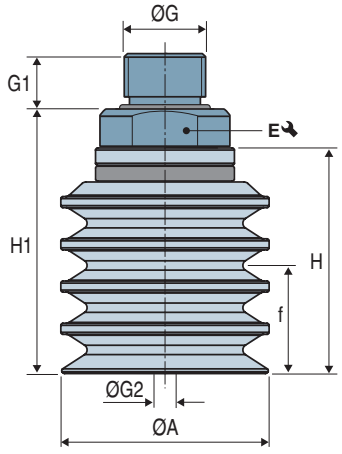
Ø 50 mm

| | E G1/4"-M | | E 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»

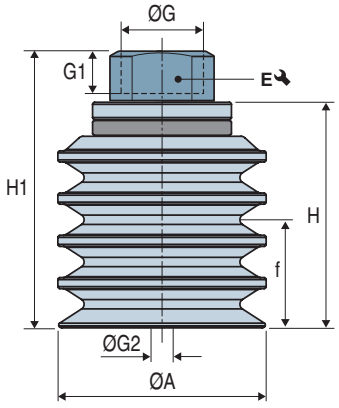
**MVP---IM**

1




**MVP---IF**

2




| | Diagram | ØA | f (1) | H | H1 | ØG | G1 | ØG2 (2) | 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.

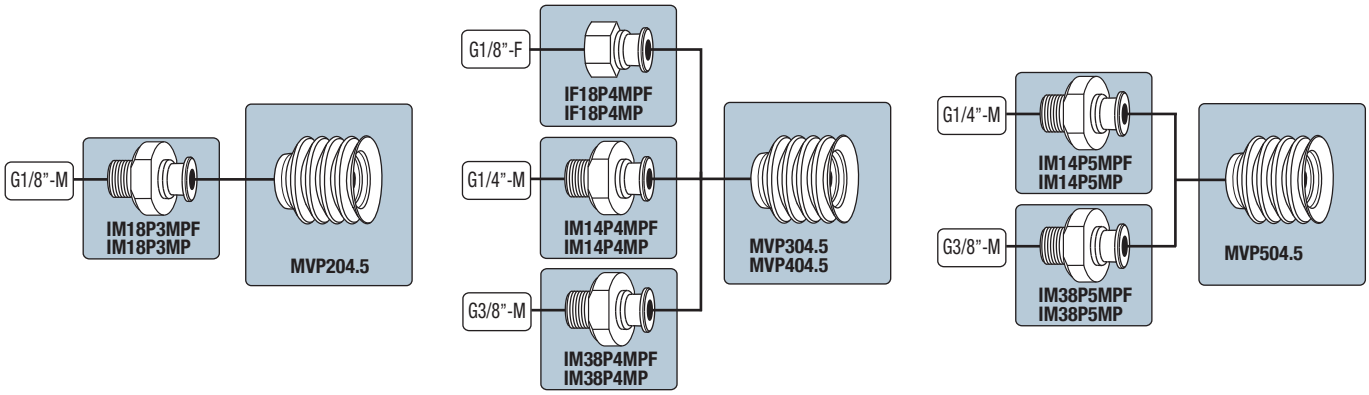
(2) Ø G2 = Ø internal orifice of the fitting.

# MVP

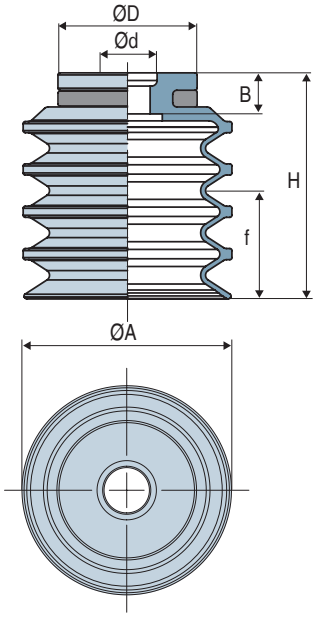
## Suction Cups with 4.5 Bellows

Assembly Diagrams and dimensions

### Assembly Diagrams




### Dimensions Suction Cups

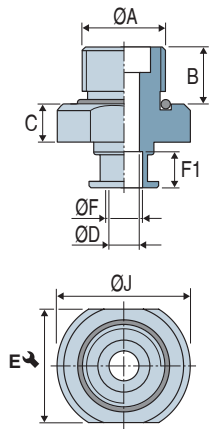



| | ØA | H | Ød | ØD | f (2) | B | (g) |
|---|---|---|---|---|---|---|---|
| **MVP204.5** | 20 | 22.3 | 6 | 14 | 13.2 | 4.8 | 2.1 |
| **MVP304.5** | 30 | 32.5 | 6.5 | 20 | 20.2 | 6.9 | 5.4 |
| **MVP404.5** | 40 | 41.2 | 6.5 | 19.5 | 27 | 6.9 | 12.7 |
| **MVP504.5** | 50 | 52.1 | 6.5 | 27 | 32.8 | 9.9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

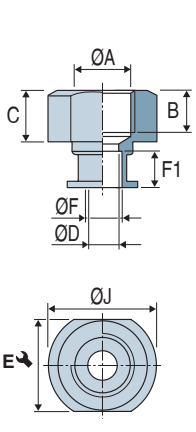
(2) f = Deflection of the suction cup.

### 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) equiped with O-ring sealing

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

# VSAF

## 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

Industry-specific applications

Types of use

**Materials**

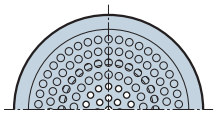
**SIBL5** 50 Shore A blue silicone

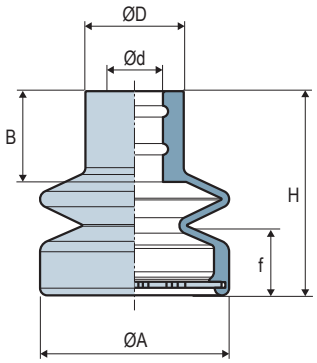
### Suction Cup Characteristics

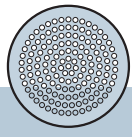
| | Ø (mm) | (cm³) | (lbf) (1) |
|---|---|---|---|
| **VSAF50SIBL5** | 50 | 24.1 | 4.27 |

(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 (2) | (g) |
|---|---|---|---|---|---|---|---|
| **VSAF50SIBL5** | 50 | 54 | 15 | 26 | 24 | 11 | 28 |

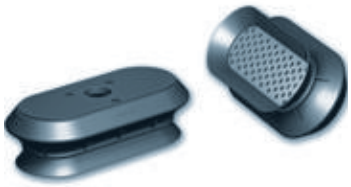
(2) f = Deflection of suction cup.

**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

# VSAOF

## 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

Industry-specific applications

Types of use

**Materials**

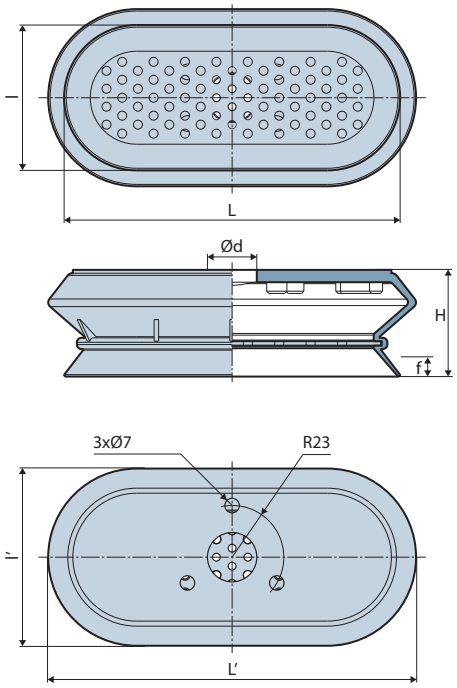
**SIBL5** 50 Shore A blue silicone

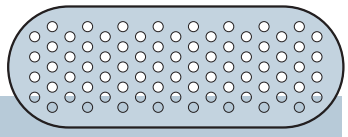
### Suction Cup Characteristics

| | Dim. (mm) | (cm³) | (lbf) (1) |
|---|---|---|---|
| **VSAOF65150SIBL5** | 65x150 | 298 | 11.58 |

(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 | l | L' | l | Ø d | f (2) | (g) |
|---|---|---|---|---|---|---|---|
| **VSAOF65150SIBL5** | 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 °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

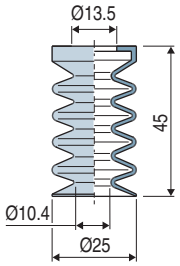
### Suction Cup Characteristics

| | dim. (mm) | f (1) | maximum vacuum (%) | shore hardness | (g) | Fittings | |
|---|---|---|---|---|---|---|---|
| | | | | | | M5-M | G1/8"-M |
| **VSD 25 SI** | Ø 25 | 24 | 90 | 30 | 6.5 | - | - |
| **VSD 38 SI5** | Ø 37 | 21 | 20 | 50 | 6.3 | - | - |
| **VSE 35 SI3** | Ø 35 | 26 | 20 | 30 | 8.8 | - | - |
| **VSE 35 SI** | Ø 35 | 26 | 30 | 50 | 8.8 | - | - |
| **VSE 39 SI** | Ø 39 | 28 | 30 | 50 | 11.5 | - | - |
| **VSP 14 SI3** | Ø 14 | 9 | 70 | 35 (2) | 0.9 | IM21SP139 | IM11ASP139 |
| **VSP 14 SIT6** | Ø 14 | 9 | 90 | 60 | 0.9 | IM21SP139 | IM11ASP139 |
| **VSP 2258 SIT5** | 22 x 58 | 8 | 20 | 50 | 12.5 | - | - |
| **VSP 2747 SIT3** | 27 x 47 | 26 | 15 | 30 | 9.8 | - | - |
| **VSP 3856 SIT5** | 38 x 56 | 28 | 15 | 50 | 11.8 | - | - |
| **VSP 7623 SIT5** | 23 x 76 | 14 | 15 | 50 | 13.5 | - | - |

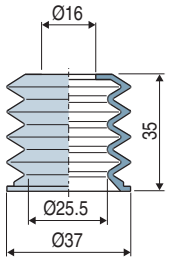
(1) f = Deflection of the suction cup. (2) Non-toxic red silicone

### Suction Cup Dimensions

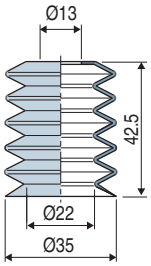
**VSD 25**



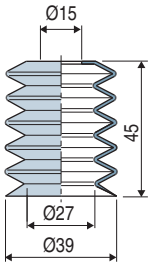

**VSD 38**



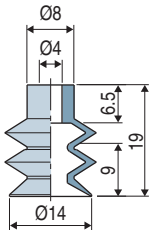

**VSE 35**



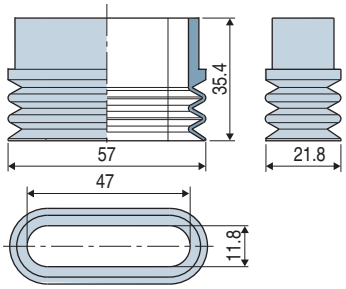

**VSE 39**



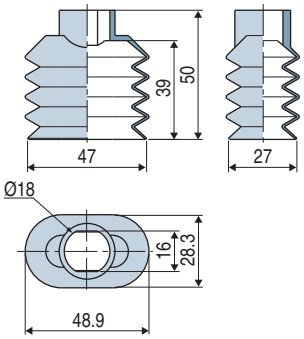

**VSP 14**



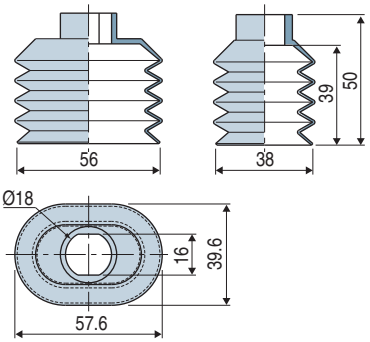

**VSP 2258**



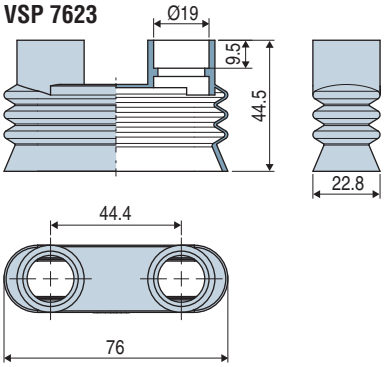

**VSP 2747**




**VSP 3856**




**VSP 7623**




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

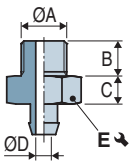
**Specify the part number e.g.: VSP14SIT6**
**Please refer to the characteristics table above**

**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**.

## 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 |

# VSO
## Suction Cups for Egg-handling

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.

Industry-specific applications

Types of use

**Materials**

**SI** 35 Shore A red silicone
**SIT3** 35 Shore A translucent silicone
**SIT5** 50 Shore A translucent silicone



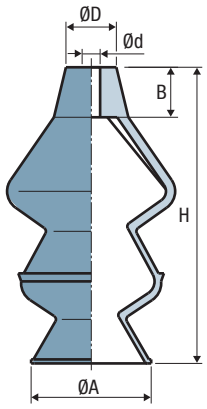
### Suction Cup Characteristics

| | Ø (mm) | (cm³) | (lbf) (1) | SI | SIT3 | SIT5 |
|---|---|---|---|---|---|---|
| **VSO 30** | 30 | 40 | 0.24 | **VSO30SI** | - | - |
| **VSO 33** | 33 | 13 | 0.24 | - | - | **VSO33SIT5** |
| **VSO 36** | 36 | 34 | 0.24 | - | **VSO36SIT3** | - |

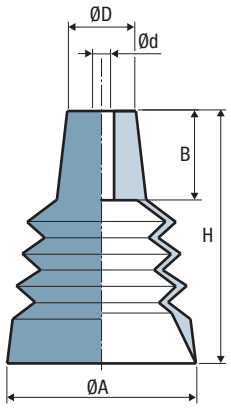
(1) at 30% vacuum with a safety factor of 2 included.

### Suction Cup Dimensions

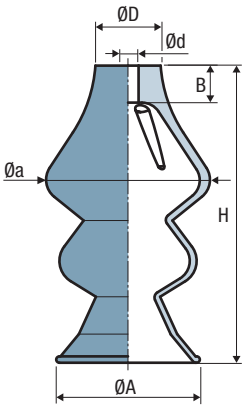
**VSO 30 SI**




**VSO 33 SIT5**




**VSO 36 SIT3**




| | Ø A | H | Ø a | Ø d | Ø D | B | (g) |
|---|---|---|---|---|---|---|---|
| **VSO 30** | 30 | 74 | - | 4.5 | 12.6 | 12.5 | 17 |
| **VSO 33** | 33 | 46 | - | 4.5 | 12.5 | 14 | 7.3 |
| **VSO 36** | 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 | |
|---|---|
| Version **VSBO** | **-** |
| Version **VSBO+** | **C** |

| | MATERIAL |
|---|---|
| **NBR** | Nitrile |
| **NR** | Natural rubber |

| | REINFORCEMENTS |
|---|---|
| **D5** | ■ 1 upper insert: stainless steel<br>■ 4 reinforcements: stainless steel wire<br>■ 1 lower reinforcement: stainless steel |
| **D6** | ■ 1 upper insert: stainless steel<br>■ 4 reinforcements: stainless steel plates<br>■ 1 lower reinforcement: stainless steel |
| **D5P** | ■ 1 upper insert: stainless steel<br>■ 4 reinforcements: stainless steel wire<br>■ 1 lower reinforcement: polypropylene |
| **D6P** | ■ 1 upper insert: stainless steel<br>■ 4 reinforcements: stainless steel plates<br>■ 1 lower reinforcement: polypropylene |

| | MOUNTING DISTANCE |
|---|---|
| **30** | 30 mm |
| **45** | 45 mm |
| **-** | 30 and 45 mm (only available for VSBO+, cutout to be made on suction cup) |

*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 | |
|---|---|
| Version **VSBO** | **-** |
| Version **VSBO+** | **C** |

| MATERIAL | |
|---|---|
| Nitrile | **NBR** |
| Natural rubber | **NR** |

| | REINFORCEMENTS |
|---|---|
| **D5P** | ■ 1 upper insert<br>■ 3 reinforcements: stainless steel wire<br>■ 1 lower reinforcement: polypropylene |
| **D6P** | ■ 1 upper insert<br>■ 3 reinforcements: stainless steel plates<br>■ 1 lower reinforcement: polypropylene |

| | VALVE TECHNOLOGY |
|---|---|
| **CH2** | V2 mechanical sensing valve (only with D6P reinforcements) |
| **CH4** | V4 mechanical sensing valve |

*Note: Version CHV_, 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*

### Bottle Suction Cups with Gripping Interface p. 3/24

| VSBO | 50105 | NBR | D5 | X | 45 | BM10N |
|---|---|---|---|---|---|---|

| REINFORCEMENTS | |
|---|---|
| ■ 1 upper insert: stainless steel<br>■ 4 reinforcements: stainless steel wire<br>■ 1 lower reinforcement: stainless steel | **D5** |
| ■ 1 upper insert: stainless steel<br>■ 4 reinforcements: stainless steel plates<br>■ 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 |

# 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 ml 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 ml bottles can be handled at high rates and in humid environments.

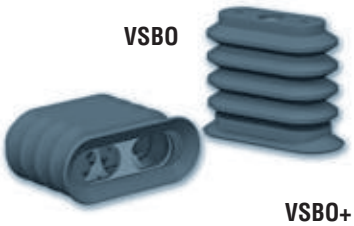
- Dual mounting option: To provide users with more options, the bottle suction cups feature M6 threads, so that they can be mounted from the inside using with two M5 screws or from the top using two M6 screws.

Note: To handle magnum bottles or textured bottles, COVAL has designed a range of suction cups with various gripping interfaces (see VSBO LM/BM).

Industry-specific applications

Types of use

VSBO



VSBO+

### Materials

**Suction cups**

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

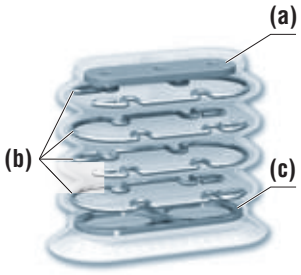
### Suction Cup Characteristics

| | (cm³) | (lbf) (1) | (lbf) (1) | f (2) (mm) | (g) |
|---|---|---|---|---|---|
| **VSBO 4095 (VSBO)** | 112.5 | 35.5 | 18.6 | 34 | 120 |
| **VSBO 4095C (VSBO+)** | 112.5 | 35.5 | 18.6 | 35.5 | 120 |

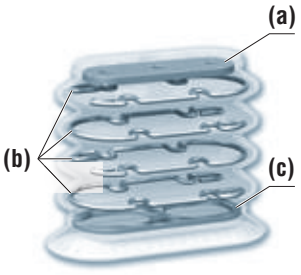
(1) Force measured at 65% on dry and smooth bottles without safety factor.
(2) f = Suction cup deflection.

### Insert and Reinforcements

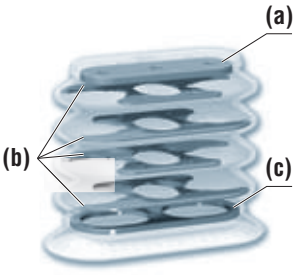
**Version D5**
(a) 1 upper insert: stainless steel
(b) 4 reinforcements: stainless steel wire
(c) 1 lower reinforcement: stainless steel



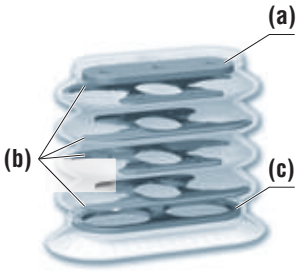

**Version D5P**
(a) 1 upper insert: stainless steel
(b) 4 reinforcements: stainless steel wire
(c) 1 lower reinforcement: polypropylene




**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



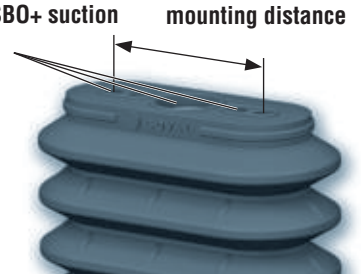

### Mounting Hole Distance

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.

**Integrated seals on VSBO+ suction cups**

**30 or 45 mm mounting distance**



# VSBO, VSBO+

## 40 x 95 mm Bottle Suction Cups

### How To Order

| VSBO | 4095 | C | NBR | | D5 | X | 30 |
|---|---|---|---|---|---|---|---|

| TYPE | |
|---|---|
| Version **VSBO** | **-** |
| Version **VSBO+** | **C** |

| | MATERIAL |
|---|---|
| **NBR** | Nitrile |
| **NR** | Natural rubber |

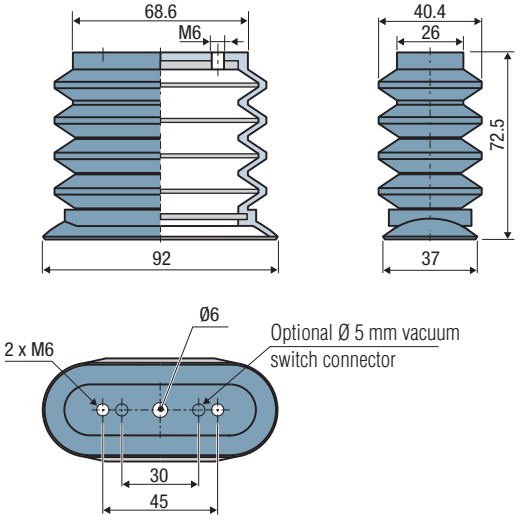
| REINFORCEMENTS | |
|---|---|
| **D5** | ■ 1 upper insert: stainless steel<br>■ 4 reinforcements: stainless steel wire<br>■ 1 lower reinforcement: stainless steel |
| **D6** | ■ 1 upper insert: stainless steel<br>■ 4 reinforcements: stainless steel plates<br>■ 1 lower reinforcement: stainless steel |
| **D5P** | ■ 1 upper insert: stainless steel<br>■ 4 reinforcements: stainless steel wire<br>■ 1 lower reinforcement: polypropylene |
| **D6P** | ■ 1 upper insert: stainless steel<br>■ 4 reinforcements: stainless steel plates<br>■ 1 lower reinforcement: polypropylene |

| MOUNTING DISTANCE | |
|---|---|
| **30** | 30 mm |
| **45** | 45 mm |
| **-** | 30 and 45 mm (only available for VSBO+, cutout to be made on suction cup) |

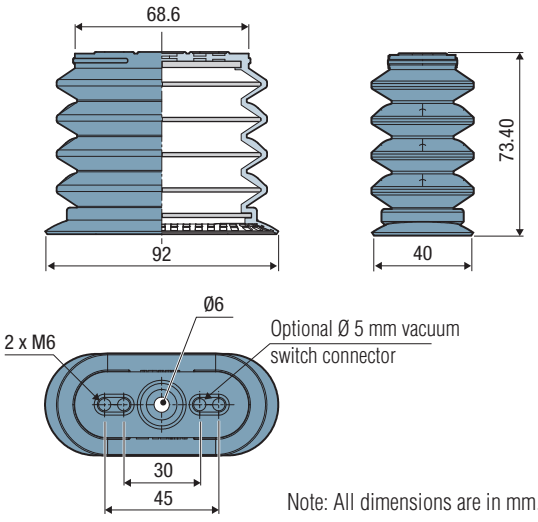
*Note: 40 mm mounting hole distance available upon request*

### 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 | |
|---|---|
| Version **VSBO** | **-** |
| Version **VSBO+** | **C** |

| | MATERIAL |
|---|---|
| **NBR** | Nitrile |
| **NR** | Natural rubber |

| MOUNTING DISTANCE | |
|---|---|
| **30** | 30 mm |
| **45** | 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

Industry-specific applications

Types of use

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.

**VSBO_CH2_**

**VSBO_CH4_**

### Materials

**Suction cups**

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

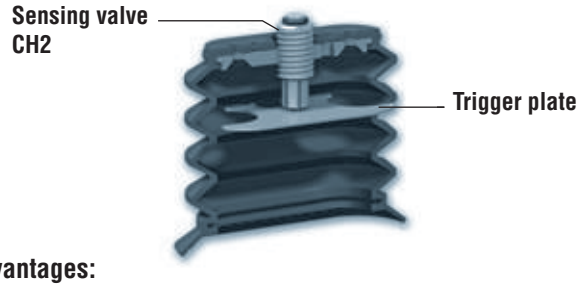
### Suction Cup Characteristics

| | (cm³) | (lbf) (1) | (lbf) (1) | f (2) (mm) | (g) |
|---|---|---|---|---|---|
| **VSBO / VSBO+_CH2** | 112.5 | 35.5 | 18.6 | 34 | 125 |
| **VSBO / VSBO+_CH4** | 112.5 | 35.5 | 18.6 | 22 | 125 |

(1) Force measured at 65% on dry and smooth bottles without safety factor.
(2) f = Suction cup deflection.

### Sensing Valve Technologies

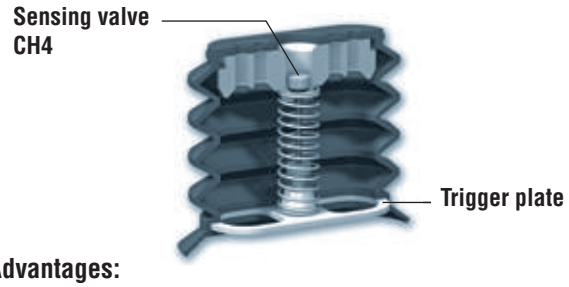
**CH2 mechanical sensing valve**
The **CH2 sensing valve** opens as pressure is exerted on the suction cup by an **internal** reinforcement, called a **"trigger plate"**.
The CH2 sensing valve is only compatible with stainless steel reinforcement plates (version D6P).




**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).

# VSBO, VSBO+

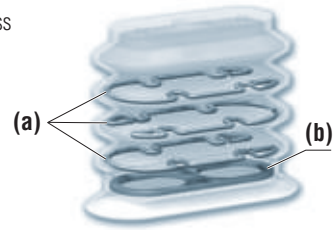
## 40 x 95 mm Bottle Suction Cups with Sensing Valve

## Insert and Reinforcements

**Version D5P**

(a) 3 reinforcements: stainless steel wire

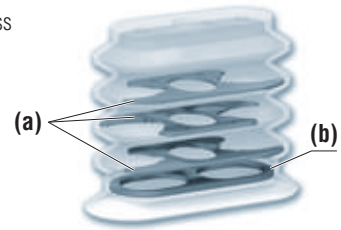
(b) 1 lower reinforcement: polypropylene




**Version D6P**

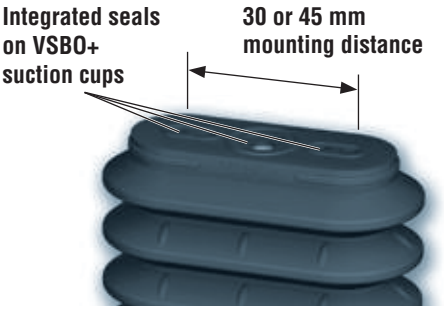
(a) 3 reinforcements: stainless steel plate

(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.



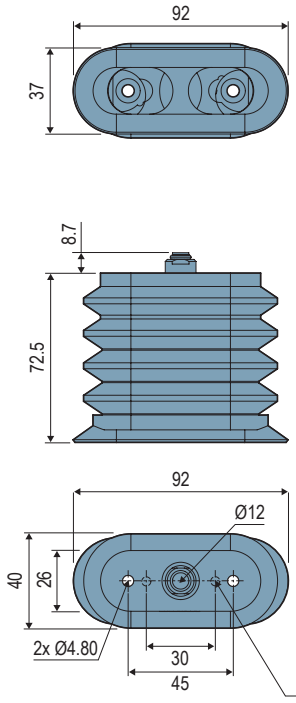

**Available upon request: Vacuum switch connector**

The VSBO and VSBO+ suction cups with sensing valve have a Ø 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.

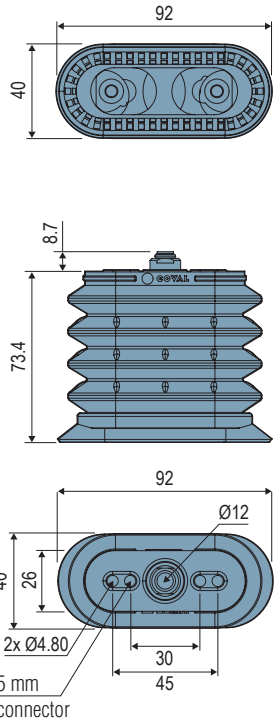
## Suction Cup Dimensions

### CH2 sensing valve

**VSBO (VSBO4095_D6PCH2_)**

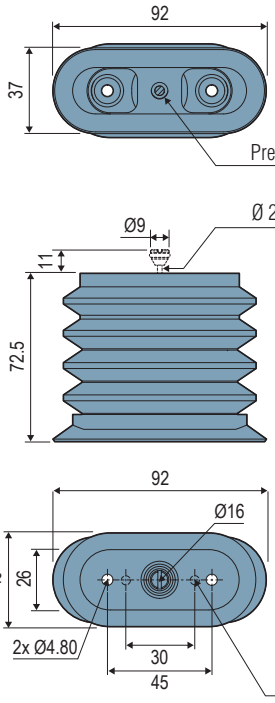



**VSBO+ (VSBO4095C_D6PCH2_)**

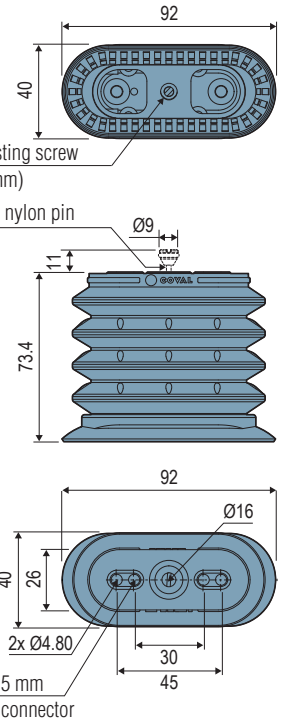



### CH4 sensing valve

**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

NR | NBR

D6 P reinforcements

CH2 sensing valve

**VSBO___CH4**

VSBO series suction cup | VSBO+ series suction cups

NR | NBR

D5 P reinforcements | D6 P reinforcements

CH4 sensing valve

## 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<br>■ 3 reinforcements: stainless steel wire<br>■ 1 lower reinforcement: polypropylene |
| D6P | ■ 1 upper insert<br>■ 3 reinforcements: stainless steel plates<br>■ 1 lower reinforcement: polypropylene |

**VALVE TECHNOLOGY**

| | |
|---|---|
| CH2 | V2 mechanical sensing valve (only with D6P reinforcements) |
| CH4 | V4 mechanical sensing valve |

*Note: Version CHV_, 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**

| | |
|---|---|
| Version VSBO | - |
| Version VSBO+ | C |

**MATERIAL**

| | |
|---|---|
| NBR | Nitrile |
| NR | Natural rubber |

**Ø OF VACUUM FLOW**

| | |
|---|---|
| N12 | 12mm Ø of vacuum flow for mounting with mechanical sensing valve V2 (CH2) |
| N16 | 16mm Ø of vacuum flow for mounting with mechanical sensing valve V4 (CH4) |

**MOUNTING DISTANCE**

| | |
|---|---|
| 30 | 30 mm |
| 45 | 45 mm |

# VSBO LM/BM

## Bottle Suction Cups with Gripping Interface

Industry-specific applications

Types of use

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

**VSBO50105NBR_BM10N**

**VSBO50105NBR_LMNBR**

**Materials**

**Suction cups**

**NBR** Nitrile

### Suction Cup Characteristics

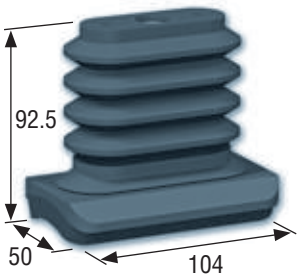
| | (cm³) | (lbf) (1) | (lbf) (1) | f (2) (mm) | (g) |
|---|---|---|---|---|---|
| **VSBO50105NBR_BM10N** | 150 | 35.5 | 18.6 | 7 + 34 | 205 |
| **VSBO50105NBR_LMNBR** | 142.5 | 55 | 18.6 | 2.5 + 34 | 205 |

(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**



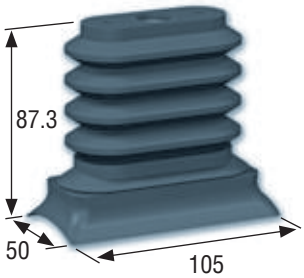

The **VSBO50105_BM10N** suction cup is designed for handling textured bottles. It features a curved gripping interface that fits the shape of the bottle and includes an EPDM foam seal that compensates for any irregular surfaces and guarantees an airtight seal.

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**



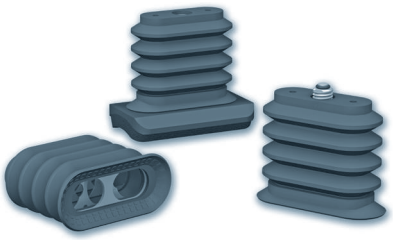

The **VSBO50105_LMNBR** suction cup is designed for handling magnum bottles. It features a lip shape and surface suited for the weight and diameter of magnum bottles.

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

# VSBO LM/BM

## Bottle Suction Cups with Gripping Interface

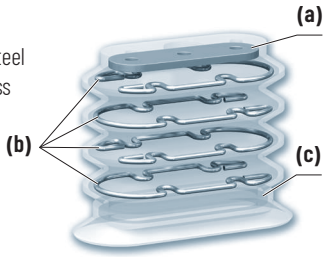




## Reinforcements

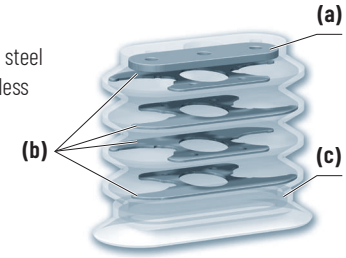
**Version D5**

(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

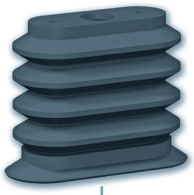



## Bottle Suction Cups with Modular Gripping Interfaces

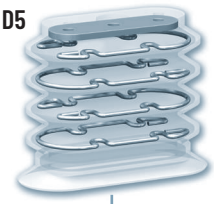
**PART NUMBER FOR COMPLETE SUCTION CUPS**
including gripping interface with foam seal:

- With stainless steel reinforcement wire (version D5):
  Part no.: **VSBO50105NBRD5X45BM10N**
- With stainless steel reinforcement plate (version D6):
  Part no.: **VSBO50105NBRD6X45BM10N**

Bottle suction cup
**VSBO4095NBR**

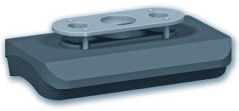


4 reinforcements: stainless steel wire
**D5**

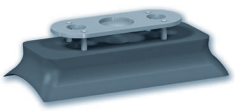


4 reinforcements: stainless steel plate
**D6**

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<br>■ 4 reinforcements: stainless steel wire<br>■ 1 lower reinforcement: stainless steel | **D5** |
| ■ 1 upper insert: stainless steel<br>■ 4 reinforcements: stainless steel plates<br>■ 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 |

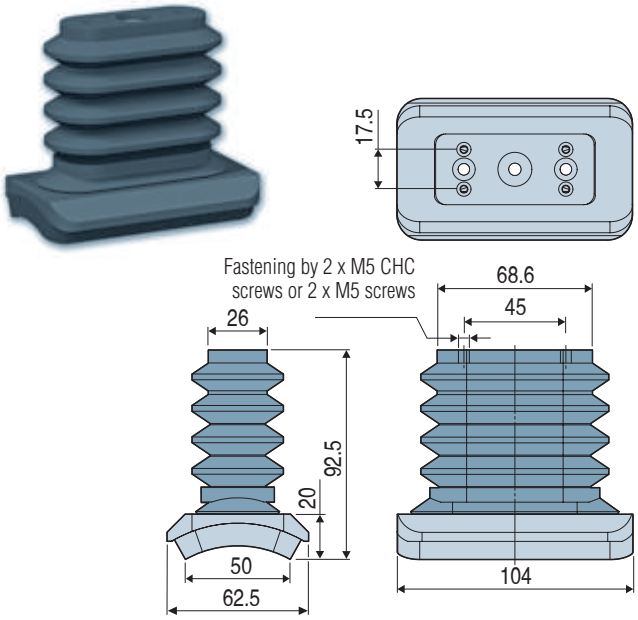
**Available upon request: Vacuum switch connector**
VSBO LM/BM suction cups feature an optional Ø 5 mm connector for a vacuum switch or blow-off valve.

# VSBO LM/BM

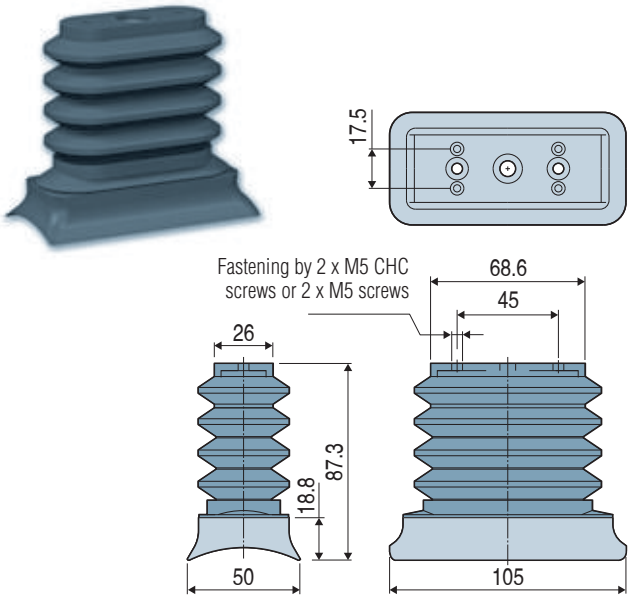
## Bottle Suction Cups with Gripping Interface

### Suction Cup Dimensions

**VSBO50105NBR_X45BM10N**




**VSBO50105NBR_X45LMNBR**

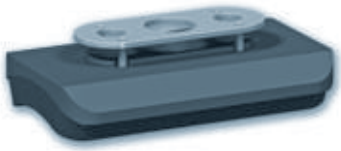



### Gripping Interface Kits

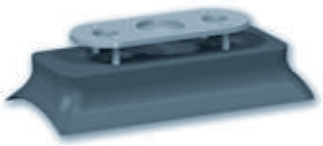
Gripping interface kits are used to turn 40 x 95 mm bottle suction cups (part no. VSBO4095NBR) into magnum bottle suction cups or suction cups with a foam gripping interface.

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**



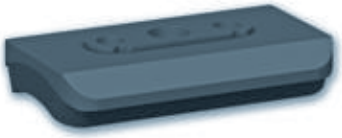
- Nitrile Magnum lip kit 50 x 105 mm:
  Part no.: **VSBOKIT50105LMNBR**



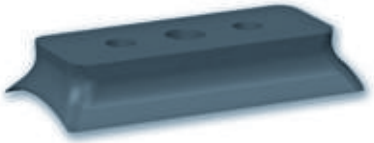
### Part Numbers for Spare Parts

- Nitrile suction cup with 4.5 bellows (without insert or reinforcement):
  Part no.: **VSBOR4095NBRN6X45**

- POM curved gripping interface with memory foam seal, 10 mm th.
  Part no.: **VSBOR50105BM10N**



- 50 x 105 mm nitrile lip:
  Part no.: **VSBOR50105LMNBR**



# VBO

## Suction Cup for Bottle Handling via the Punt

Industry-specific application

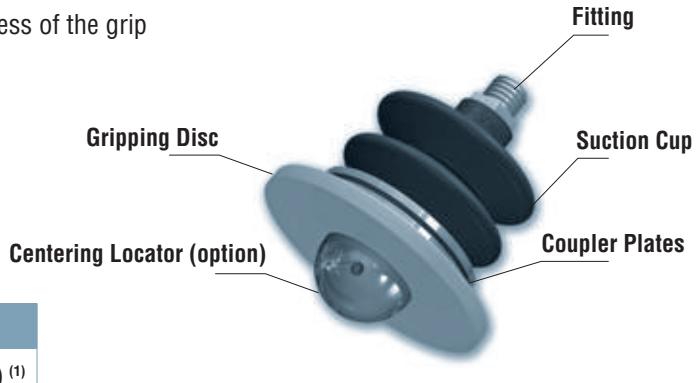
Types of use

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**

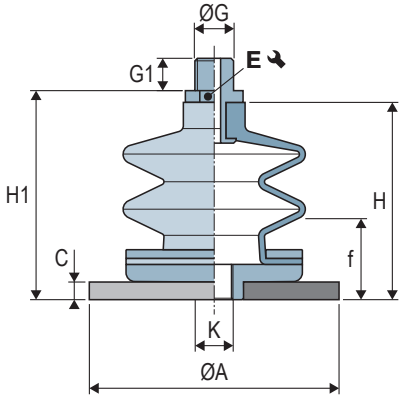
**Suction Cup:** NBR - Nitrile
**Fitting and Couplers:** Aluminum
**Gripping Disc:** SI - Silicone

### Suction Cup Characteristics

| | Ø (mm) | (cm³) | (lbf) (1) |
|---|---|---|---|
| VBO60D85A2.5X62NBRM14C0 | 85 | 72.5 | - |

Force to be determined depending on application

### Suction Cup Dimensions




| | Ø A | C | f (2) | 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.

# VPBO

## Coupler Plates for gripping bottles by the Punt

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

Industry-specific applications

Types of use



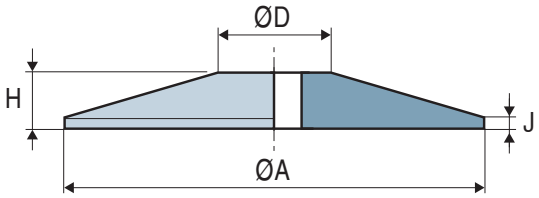
**Materials**

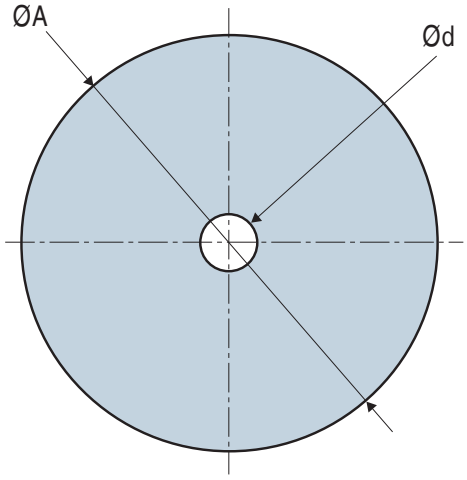
**NR** Natural rubber 45 Shore A

### Characteristics

| | Ø (mm) |
|---|---|
| **VPBO65NR** | 65 |
| **VPBO75NR** | 75 |
| **VPBO95NR** | 95 |

### Dimensions




| | Ø A | H | Ø d | Ø D | J | (g) |
|---|---|---|---|---|---|---|
| **VPBO65NR** | 65 | 10 | 10 | 23 | 2 | 19 |
| **VPBO75NR** | 75 | 10 | 10 | 20 | 2 | 24 |
| **VPBO95NR** | 95 | 10 | 10 | 49 | 2 | 47 |

**Specify the part number e.g.: VPBO95NR**
**Please refer to the characteristics table above**

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

# VPA
## 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).

Industry-specific applications

Types of use

### Materials

| | | | |
|---|---|---|---|
| **NBR** | Nitrile | **NR** | Natural rubber |
| **SIT5** | Translucent silicone | **STN** | SITON® |

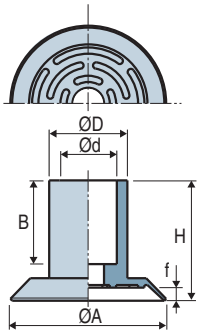
3 VPA

### Suction Cup Characteristics

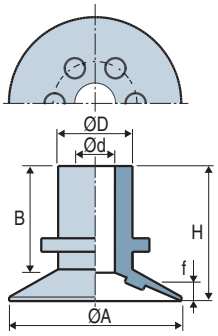
| | Ø (mm) | (lbf) (1) | NBR | SIT5 | NR | STN |
|---|---|---|---|---|---|---|
| **VPA 15** | 15 | 0.65 | - | **VPA15SIT5** | **VPA15NR** | - |
| **VPA 20** | 20 | 0.97 | - | **VPA20SIT5** | **VPA20NR** | - |
| **VPA 25** | 25 | 1.46 | - | **VPA25SIT5** | **VPA25NR** | - |
| **VPA 26** | 26 | 1.46 | - | - | **VPA26NR** | **VPA26STN** |
| **VPA 30** | 30 | 2.11 | **VPA30NBR** | **VPA30SIT5** | **VPA30NR** | **VPA30STN** |
| **VPA 35 A** | 35 | 2.76 | - | - | **VPA35ANR** | - |
| **VPA 40** | 40 | 4.71 | - | **VPA40SIT5** | **VPA40NR** | - |
| **VPA 25000** | 25.5 | 1.62 | - | **VPA25000SIT5** | **VPA25000NR** | - |
| **VPA 25001** | 25.5 | 1.62 | - | **VPA25001SIT5** | **VPA25001NR** | - |

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

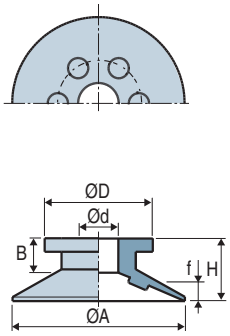
**VPA 15…40**




**VPA 25000**




**VPA 25001**




### Suction Cup Dimensions

| | ØA | H | Ød | ØD | f (2) | B |
|---|---|---|---|---|---|---|
| **VPA 15** | 15 | 9.8 | 5 | 9 | 0.8 | 7 |
| **VPA 20** | 20 | 10.3 | 5 | 10 | 1.3 | 7 |
| **VPA 25** | 25 | 10.8 | 5 | 10 | 1.8 | 7 |
| **VPA 26** | 26 | 21.5 | 6 | 14 | 1.9 | 13.5 |
| **VPA 30** | 30 | 23 | 11 | 15 | 2.5 | 16 |
| **VPA 35 A** | 35 | 23 | 11 | 15 | 2.5 | 16 |
| **VPA 40** | 40 | 20 | 8 | 16 | 2 | 15 |
| **VPA 25000** | 25.5 | 20 | 5.8 | 11 | 3 | 15.8 |
| **VPA 25001** | 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

**Specify the part number e.g.: VPA20NR**
**Please refer to the characteristics table above**

**Accessories**

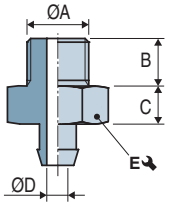
To optimize the use of your suction cups, Coval offers a comprehensive range of accessories (nozzle fittings, spring extensions, and feeder systems, etc.), see chapters **4** and **14**.

# VPA
## Suction Cups for Paper Applications

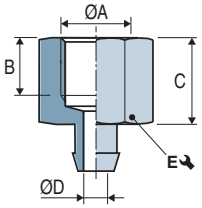
### Choice of Fittings

| | 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 | - |

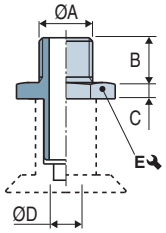
**Male fittings**
**VPA 15...25**



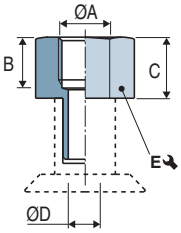

**Female fittings**
**VPA 15...25**




**Male fittings**
**VPA 30...40**




**Female fittings**
**VPA 30...40**

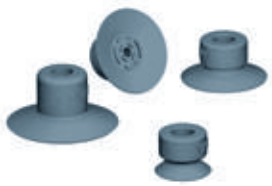



### Barbed Fittings

| 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 (1) | M5-M | 4.5 | 5 | 2.5 | 7 | Nickel-plated brass | 3.1 |
| IM 22 (1) | 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).

Industry-specific applications

Types of use

**Materials**

**SIBL5** Blue Silicone 50 Shore

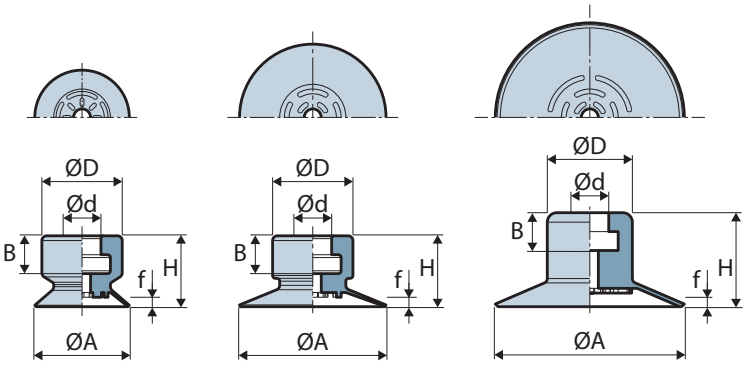
3 VPAL

### Suction Cup Characteristics

| | Ø (mm) | (lbf) (1) | SIBL5 |
|---|---|---|---|
| **VPAL 10** | 10 | 0.65 | **VPAL10SIBL5** |
| **VPAL 15** | 15.5 | 0.97 | **VPAL15SIBL5** |
| **VPAL 20** | 20 | 1.46 | **VPAL20SIBL5** |

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

**VPAL10** **VPAL15** **VPAL20**

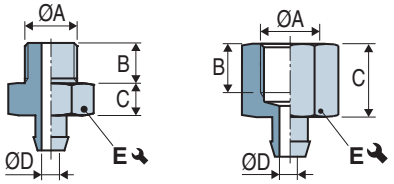



### Suction Cup Dimensions

| | ØA | H | Ød | ØD | f (2) | B |
|---|---|---|---|---|---|---|
| **VPAL 10** | 10 | 7.5 | 4 | 8.5 | 1.5 | 4 |
| **VPAL 15** | 15.5 | 7.5 | 4 | 8.5 | 1.5 | 4 |
| **VPAL 20** | 20 | 9.9 | 4 | 9 | 1.4 | 4 |

(2) f = Deflection of the suction cup.

**Male fittings VPAL 10…20** **Female fittings VPAL 10…20**




### Choice of Fittings

| | Male fittings | | Female fittings | |
|---|---|---|---|---|
| | **G1/8"-M** | **M5-M** | **G1/8"-F** | **M5-F** |
| **VPAL 10** | IM18VPG5 | IM5VPG5 | IF18VPG5 | IF5VPG5 |
| **VPAL 15** | IM18VPG5 | IM5VPG5 | IF18VPG5 | IF5VPG5 |
| **VPAL 20** | IM18VPG5 | IM5VPG5 | IF18VPG5 | IF5VPG5 |

### Barbed Fittings

| Model | ØA | B | C | ØD | E | Materials | (g) |
|---|---|---|---|---|---|---|---|
| **IM 5 VPG 5** | M5-M | 4.5 | 3.5 | 2.2 | 7 | Aluminum | 0.7 |
| **IM 18 VPG 5** | G1/8"-M | 8 | 5 | 2.2 | 14 | Aluminum | 3.9 |
| **IF 5 VPG 5** | M5-F | 6 | 9 | 2.2 | 8 | Aluminum | 1.2 |
| **IF 18 VPG 5** | 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

**Specify the part number e.g.: VPAL15SIBL5**
**Please refer to the characteristics table above**

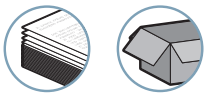
**Accessories**

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**.

# VSAPL
## Suction Cups with 1.5 Bellows for Labels

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).

Industry-specific applications



Types of use

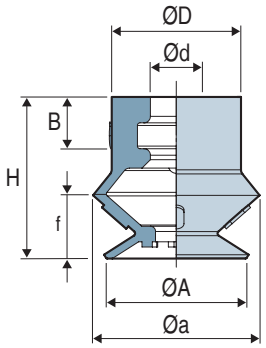
### Materials

**SIBL5** Blue Silicone 50 Shore A

### Suction Cup Characteristics

| | Ø (mm) | (lbf) (1) | (g) | Fitting M5-M |
|---|---|---|---|---|
| **VSAPL11SIBL5** | 11 | 0.65 | 0.7 | IM5VPG5 |

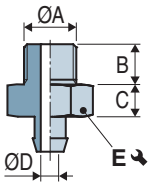
(1) Actual force of the suction cup with 65% vacuum and a safety factor of 2 included.




### Suction Cup Dimensions

| | ØA | H | Øa | Ød | ØD | f (2) | B |
|---|---|---|---|---|---|---|---|
| **VSAPL11SIBL5** | 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) |
|---|---|---|---|---|---|---|---|
| **IM 5 VPG 5** | 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**

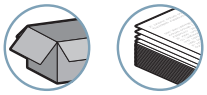
The values represent the average characteristics of our products.
Note: All dimensions are in mm

# VPR
## Suction Cups for Mailing Applications

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).

Industry-specific applications



Types of use

**Material**

**NR** Natural rubber

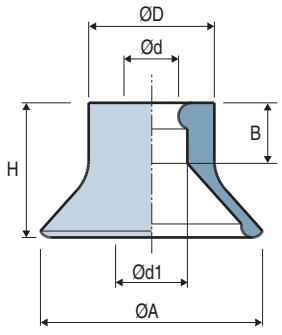
### Advantages

- Longer life expectancy
- Optimized for high throughput rates
- Excellent resistance to abrasion and slipping
- 100% compatible with machines currently on the market

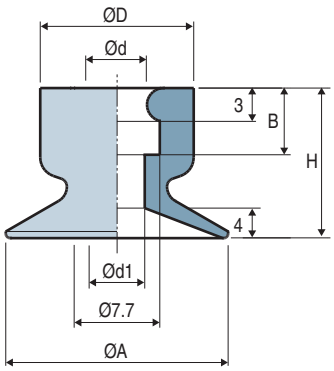
### Suction Cup Characteristics

| | 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**



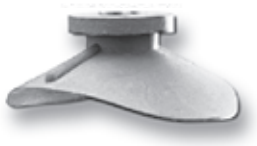

**VPR 003 - 004**




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

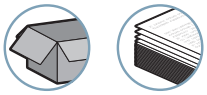
**Specify the part number e.g.: VPR003NR**
**Please refer to the characteristics table above**

# VPAG
## 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.

Industry-specific applications



Types of use

**Material**

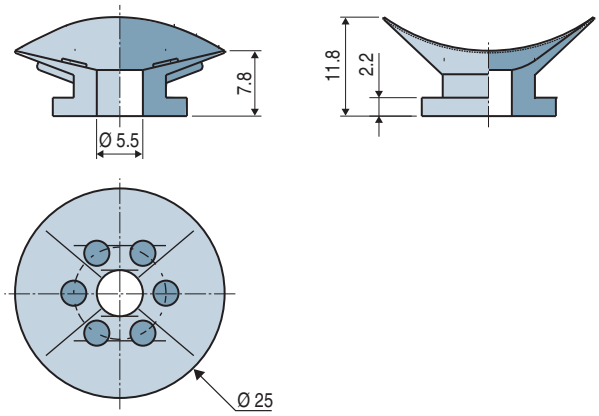
**NR** Natural rubber

### Suction Cup Characteristics

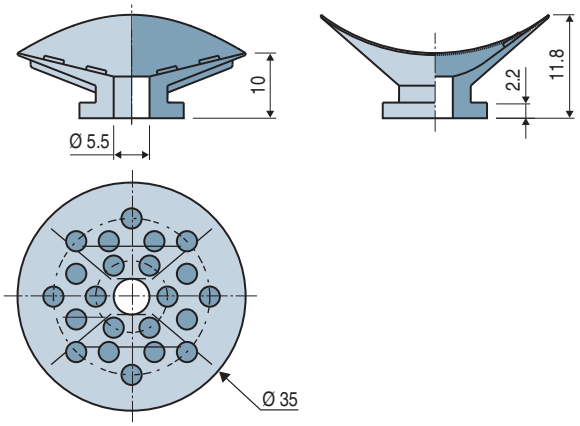
| | NR | Fittings | |
|---|---|---|---|
| | | G1/8"-M | G1/8"-F |
| VPAG 25 | VPAG25NR | IM11ASP082 | IF10ASP082 |
| VPAG 3536 | VPAG3536NR | - | - |

### Suction Cup Dimensions

**VPAG 25**

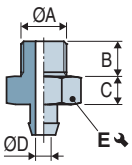



**VPAG 3536**

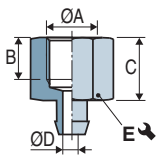



### Barbed Fittings

**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 |

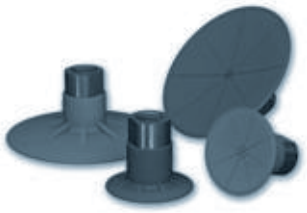
The values represent the average characteristics of our products.
Note: All dimensions are in mm

**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**.

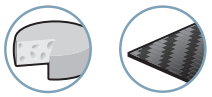
# VPSC
## Ultra-Flat, Non-Marking Suction Cups



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.

Industry-specific applications



Types of use

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.



### Materials

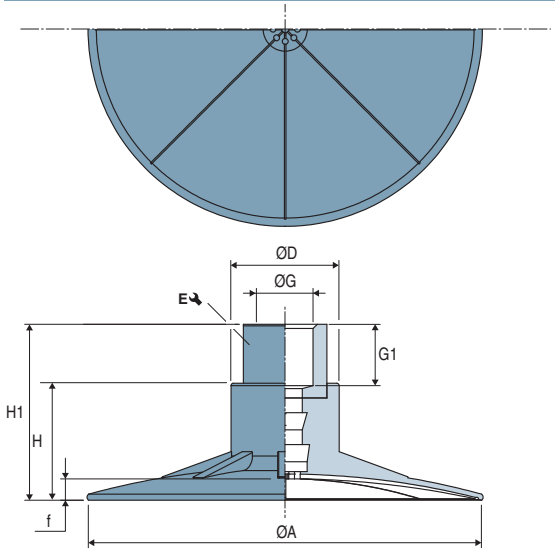
**PU** Polyurethane 60 Shore A
**SIBL5** Blue Silicone 50 Shore A

### Suction Cup Characteristics

| | Ø (mm) | (cm³) | (lbf) (1) | (lbf) (1) | PU | SIBL5 |
|---|---|---|---|---|---|---|
| **VPSC 40** | 40 | 5.6 | 6.07 | 3.37 | **VPSC40PUIF14** | **VPSC40SIBL5IF14** |
| **VPSC 80** | 80 | 11.2 | 20.82 | 10.41 | **VPSC80PUIF14** | **VPSC80SIBL5IF14** |

(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 (2) | H | H1 | Ø G | E | (g) |
|---|---|---|---|---|---|---|---|---|
| **VPSC 40** | 40 | 21 | 1.5 | 21.8 | 33.8 | G1/4"-F | 17 | 16 |
| **VPSC 80** | 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
## Radial Ball-joint Suction Cups

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

Types of use

**Materials**

**Suction cups**
**NBR** Nitrile
**SI** Silicone

**Ball-joint**
Nickel-plated brass and zinc-plated steel

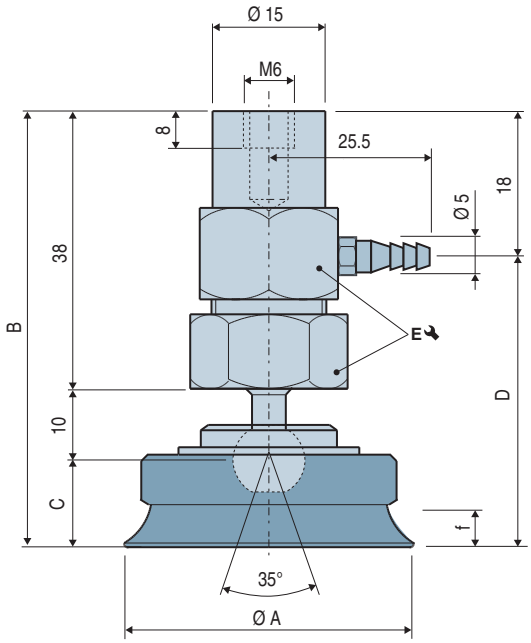


### Suction Cup Characteristics

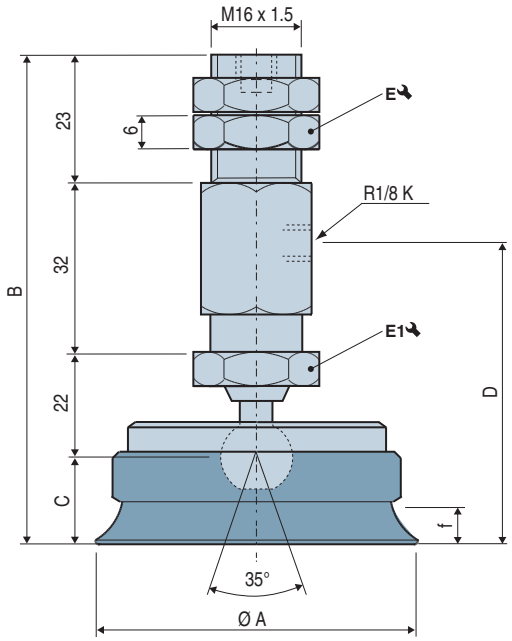
| | (lbf) (1) | Rmin | Ø A | B | C | D | E | E1 | f (2) | NBR | SI | (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **VPYR 50** | 14.61 | 41 | 50 | 60 | 12 | 42 | 19 | - | 4 | **VPYR50NBR** | **VPYR50SI** | 117 |
| **VPYR 60** | 21.06 | 70 | 60 | 93 | 16 | 58 | 21 | 19 | 5 | **VPYR60NBR** | **VPYR60SI** | 352 |
| **VPYR 80** | 37.34 | 100 | 80 | 95 | 18 | 60 | 21 | 19 | 6 | **VPYR80NBR** | **VPYR80SI** | 444 |
| **VPYR 100** | 58.45 | 150 | 100 | 95 | 18 | 60 | 21 | 19 | 6 | **VPYR100NBR** | **VPYR100SI** | 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.

**VPYR 50**




**VPYR 60...100**




**Replacement suction cup**

If the suction cup becomes worn, the VPR suction cup can be ordered alone, specifying the diameter (Ø A) and material of the suction cup.

Example VPR 50 NBR.

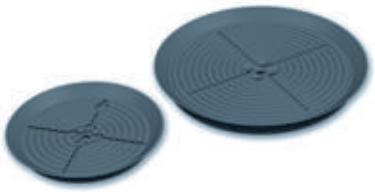
The values represent the average characteristics of our products.
Note: All dimensions are in mm

**Specify the part number e.g.: VPYR50NBR**
**Please refer to the characteristics table above.**

**Accessories**

Possibility of telescopic spring-mounting on request.

# SPL
## Heavy Load Suction Cups



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

3 SPL

### Suction Cup Characteristics

| | (cm³) | (lbf) (1) | (lbf) (1) | Ø A | H | Ø D | f (2) | NBR | SI | Fittings (3) | (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SPL 240** | 510 | 292 | 146 | 240 | 28 | 200 | 14 | **SPL240NBR** | **SPL240SI** | Steel | 2.2 |
| **SPL 340** | 720 | 617 | 308 | 340 | 32 | 300 | 15 | **SPL340NBR** | **SPL340SI** | Steel | 5.5 |
| **SPL 400** | 850 | 812 | 406 | 400 | 46 | 300 | 25 | **SPL400NBR** | **SPL400SI** | Steel | 7.6 |
| **SPL 500** | 1050 | 1299 | 649 | 500 | 46 | 400 | 25 | **SPL500NBR** | - | Steel | 12 |
| **SPL 600** | 1300 | 1786 | 893 | 600 | 46 | 500 | 25 | **SPL600NBR** | - | Steel | 18 |

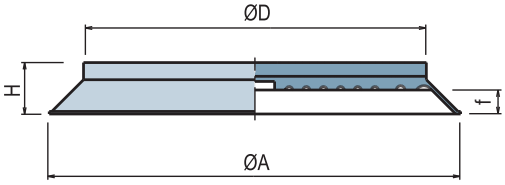
(1) Actual force of the suction cup in use with 65% vacuum and including a safety factor of 2 for horizontal handling and a factor of 4 for vertical handling.
(2) f = Deflection of the suction cup.
(3) Thickness of the steel fitting: 8 mm

**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

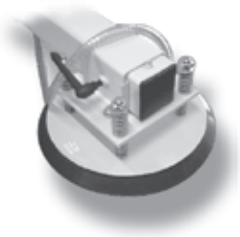
RSC2: specify **G38 RS2** in the order number

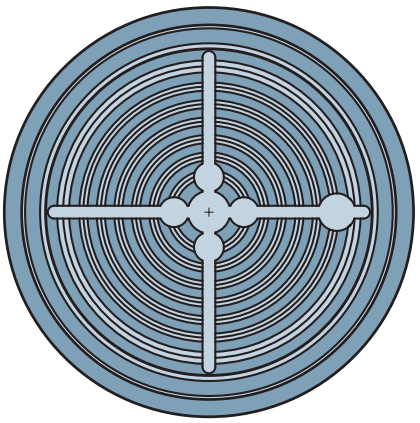


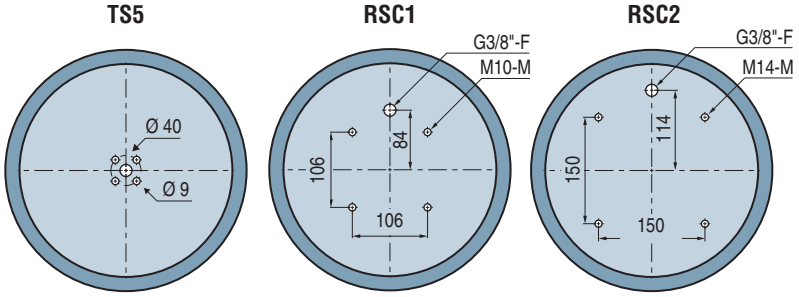

### Internal Thread

| | TS5 + IFA 12120 | RSC1 (1) | RSC2 (1) |
|---|---|---|---|
| **SPL 240** | ■ | ■ | - |
| **SPL 340** | ■ | ■ | ■ |
| **SPL 400** | - | - | ■ |

(1) A G3/8" internal thread is available for connection to the vacuum system.








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

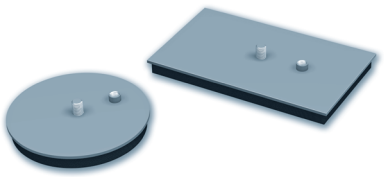
**For all orders, please specify the part number from characteristics table and any required threadings**
**E.g.: SPL240NBRG38RS1**

**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 12 120 fitting and the TS560 spring system.
See page 4/5.

# Steel Suction Cups with Bonded Seal

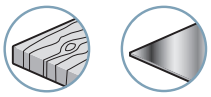
## With Bonded Seal



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.

Industry-specific application



Types of use

**Materials**

| | |
|---|---|
| **Body** | Painted steel |
| **Foam seal** | Nitrile |

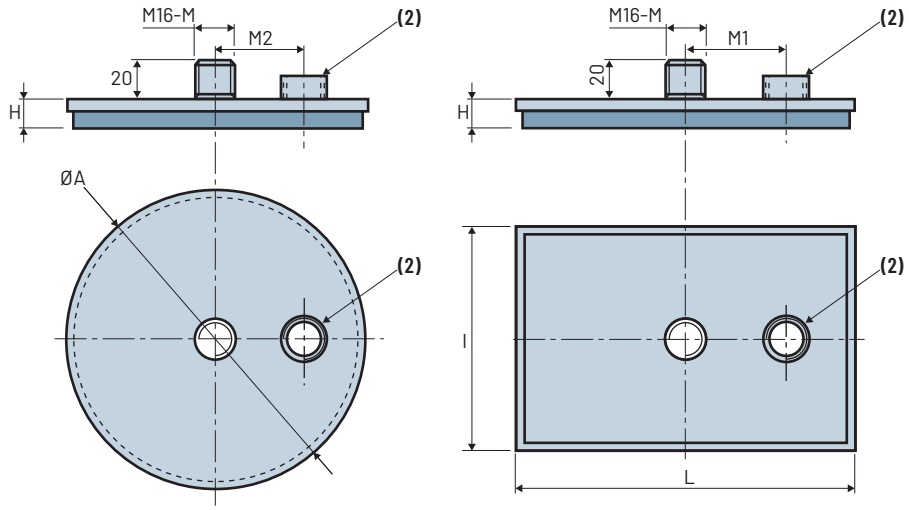


## Suction Cup Characteristics

| Round suction cups | | | | Rectangular suction cups | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ø A | H | (lbf) (1) | | L | l | H | M1/M2 | Rac. (2) | (lbf) (1) | Type of seal |
| **5020** | 150 | 25 | 70 | **6020** | 175 | 115 | 25 | 40 | G1/4"-F | 75 | BM 2020 SPTR |
| **5028** | 170 | 25 | 97 | **6028** | 215 | 115 | 25 | 45 | G1/4"-F | 96 | BM 2020 SPTR |
| **5035** | 190 | 25 | 128 | **6035** | 225 | 125 | 25 | 50 | G1/4"-F | 115 | BM 2020 SPTR |
| **5050** | 210 | 25 | 166 | **6050** | 250 | 150 | 25 | 60 | G1/4"-F | 169 | BM 2020 SPTR |
| **5085** | 260 | 25 | 278 | **6085** | 305 | 180 | 25 | 70 | G1/4"-F | 271 | BM 2020 SPTR |
| **5150** | 350 | 35 | 482 | **6150** | 410 | 250 | 35 | 80 | G3/8"-F | 485 | BM 3030 SPTR |
| **5240** | 420 | 35 | 744 | **6240** | 480 | 310 | 35 | 100 | G3/8"-F | 768 | BM 3030 SPTR |
| **5330** | 500 | 35 | 1111 | **6330** | 575 | 330 | 35 | 120 | G3/8"-F | 1016 | BM 3030 SPTR |
| **5500** | 580 | 35 | 1550 | **6500** | 705 | 385 | 35 | 140 | G3/8"-F | 1531 | BM 3030 SPTR |

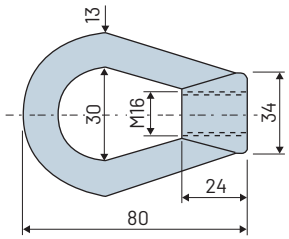
(1) Force measured at 65% vacuum including a factor of 2.

## Dimensions




## Accessory

- Ring fittin
  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



## 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 4/3

## TS

### Level Compensators TS1 – TS2 – TS3

- 4 models
- 5 to 70 mm stroke available

- TS Series spring systems are recomended 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 4/4

## 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 recomended 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 4/5

## 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 4/5

## 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 4/6

## 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 4/7

# 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 4/8

## 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 4/10

## 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 4/11

## 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 4/12

## CSP

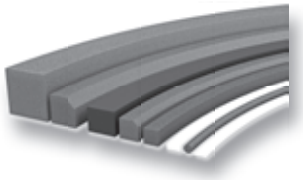
### Piloted Safety Valves

- 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 malfuntioning of the vacuum generator. The controlled dropping is done by connecting the fitting attached to the compressed air.

P 4/13

## BM



### Foam Seals

- Foam strip (airtight cells)
- 9 models
- 2 types of material (Nitrile and Natural rubber)

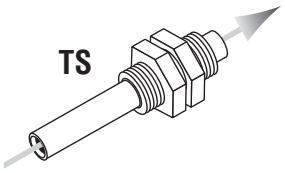
- The foam strip is designed for gripping products with an uneven or ridged surface: sawn wood, metal sheets, flat surfaces with bumps or hollows.
- All granular surfaces to which suction cups cannot adhere correctly and therefore cannot be airtight.

P 4/14

# 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

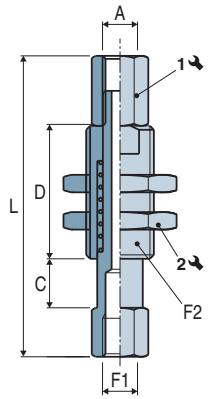


### Characteristics

| References | A | F1 | F2 | C | D | L | 1 | 2 | k (lbf/in) | Frep (lbf) | (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **TS11 7** | M5-F | M5-F | G1/8"-M | 7 | 19 | 43 | 7 | 14 | 3.88 | 0.29 | 20 |
| **TS11 10** | M5-F | M5-F | G1/8"-M | 10 | 22 | 49 | 7 | 14 | 2.57 | 0.40 | 22 |
| **TS11 20** | M5-F | M5-F | G1/8"-M | 20 | 39 | 76 | 7 | 14 | 1.37 | 0.38 | 33 |
| **TS11 40** | M5-F | M5-F | G1/8"-M | 40 | 64 | 121 | 7 | 14 | 0.74 | 0.36 | 50 |

Note: All dimensions are in mm **C** = Stroke **k** = Spring stiffness **Frep** = Force at rest

### TS11



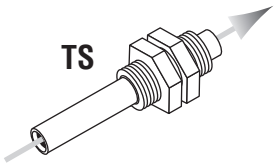

**Please specify the part n° e.g.: TS1140**
**See part n° table above.**

**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

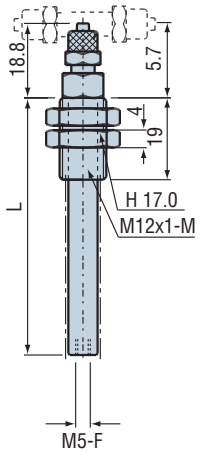


### Characteristics

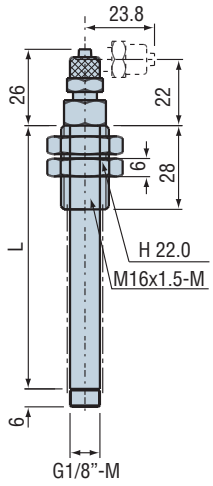
| Models | TS1 | | | | TS2 | | | | TS3 | | | | TS1.20 LG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Stroke** | 05 | 10 | 20 | 30 | 10 | 30 | 50 | 70 | 10 | 30 | 50 | 70 | 20 |
| **L** | 29 | 39 | 59 | 79 | 48 | 88 | 128 | 168 | 48 | 88 | 128 | 168 | 59 |
| **k (lbf/in)** | 2.06 | 0.86 | 0.40 | 0.26 | 5.14 | 1.14 | 0.66 | 0.46 | 5.14 | 1.14 | 0.66 | 0.46 | 0.40 |
| **Frep (lbf)** | 0.22 | 0.38 | 0.33 | 0.45 | 1.82 | 0.94 | 1.01 | 1.01 | 1.15 | 0.94 | 1.01 | 1.01 | 0.33 |

Note: All dimensions are in mm **k** = Spring stiffness **Frep** = Force at rest

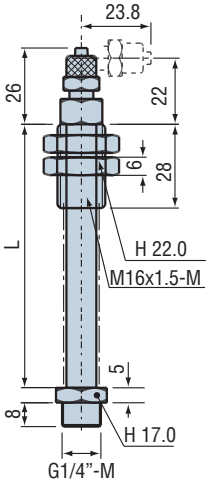
### TS1



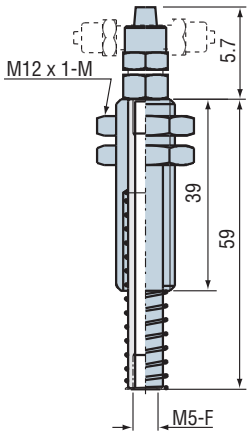

### TS2




### 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**<br>**TS2**<br>**TS3** | **05 - 10 - 20 - 30**<br>**10 - 30 - 50 - 70** | (TS1)<br>(TS2, TS3) | **D46**<br>**D68**<br>**C46**<br>**C68**<br>**T46**[1]<br>**N**[2] | (Straight 4 x 6 - TS1, TS2, TS3)<br>(Straight 6 x 8 - TS2, TS3)<br>(Elbow 4 x 6 - TS1, TS2, TS3)<br>(Elbow 6 x 8 - TS2, TS3)<br>(T-shape 4 x 6 - TS1)<br>(Without fitting) |

**Advantage of the TS120LG**

The adjustment height is twice that of the standard TS1 spring system and its spring is protected.

(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.

# TS
## Level Compensators

### Characteristics

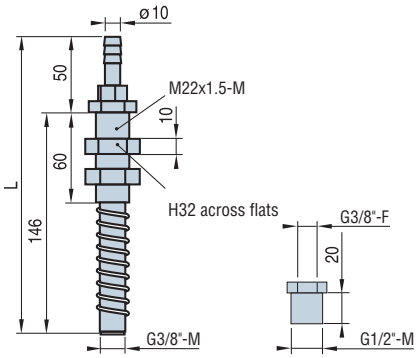
| Models | TS4 50 | TS5 60 |
|---|---|---|
| Stroke | 45 | 60 |
| L | 196 | 234 |
| k (lbf/in) | 2.68 | 7.02 |
| Force at rest (lbf) | 0.90 | 0 |

**k** = Spring stiffness

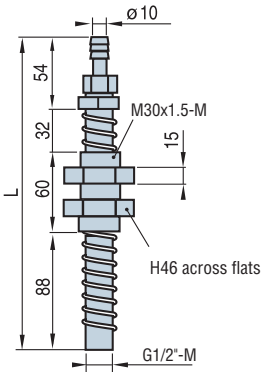
### Materials

**Spring** Stainless steel
**Tubing** Zinc-plated steel
**Slider** Zinc-plated steel

Note: All dimensions are in mm

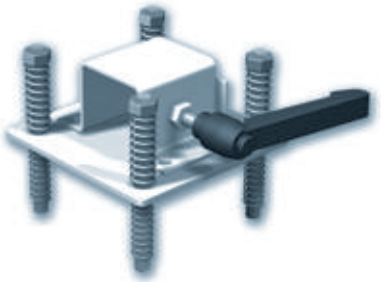



**TS4 50 VPI** **TS4 50 VPG**




**TS5 60**

# RSC
## Multi-Compensator Systems



### Use

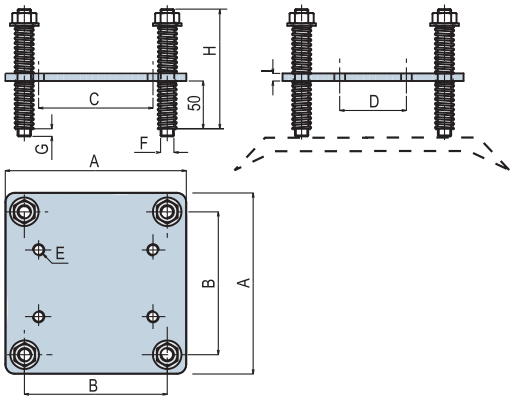
The system of 4 compensated springs is particularly recommended for horizontal handling requiring large diameter suction cups. The upper stainless steel springs act as dampers for all vertical movements. They compensate for different levels between the suction cups. The system of 4 compensated springs 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 (lbf) | Stroke under traction | Vertical force (lbf) | Maxi. weigth (kg) | Ball-joint angle | Tube mounted | A | B | C | D | E | F | G | H | I | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RSC1 | 449.60 | 30 | 35.97 | 1 | 10 ° | 50 | 140 | 106 | 88 | 50 | M8-F | M10-M | 8 | 120 | 5 | 52 | 52 | 9 |
| RSC2 | 899.20 | 30 | 76.43 | 2.7 | 10 ° | 80 | 190 | 150 | 120 | 70 | M12-F | M14-M | 8 | 130 | 8 | 83 | 83 | 13 |




Note: All dimensions are in mm

**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:**
- 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. 449.60 lbf | VAC | with tube-mounting option |
| | 2 | max. 899.20 lbf | | |

# 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.

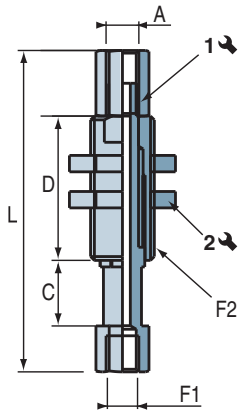
### Characteristics - TSOP

| References | A | F1 | F2 | C | D | L | 1 | 2 | k(lbf/in) | Frep (lbf) | (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **TSOP 107** | M5-F | M5-F | G1/8"-M | 7 | 18 | 42 | 7 | 14 | 3.88 | 0.29 | 20 |
| **TSOP 110** | M5-F | M5-F | G1/8"-M | 10 | 22 | 49 | 7 | 14 | 2.57 | 0.40 | 22 |
| **TSOP 120** | M5-F | M5-F | G1/8"-M | 20 | 39 | 73.5 | 7 | 14 | 1.37 | 0.38 | 33 |
| **TSOP 140** | M5-F | M5-F | G1/8"-M | 40 | 64 | 118.5 | 7 | 14 | 0.74 | 0.36 | 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

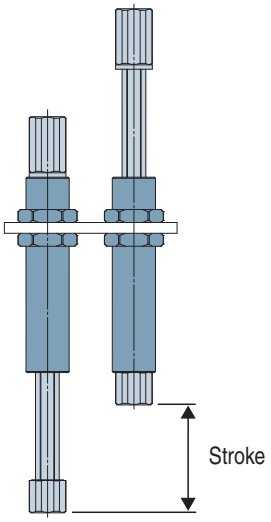



**Please specify the part e.g.: TSOP140**
**See part n° table above.**

# 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



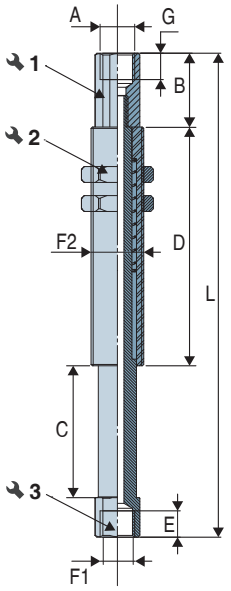
### Characteristics - TSOG

| References | A | F1 | F2 | C | B | D | E | G | L | 1 | 2 | 3 | k (lbf/in) | Frep (lbf) | Fcomp (lbf) | (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TSOG110FM12** | M5-F | M5-F | M12x1-M | 10 | 17 | 25 | 5.5 | 5.5 | 60 | 10 | 15 | 10 | 1.20 | 0.43 | 0.92 | 17 |
| **TSOG125FM12** | M5-F | M5-F | M12x1-M | 25 | 17 | 44 | 5.5 | 5.5 | 94 | 10 | 15 | 10 | 0.68 | 0.45 | 1.12 | 23 |
| **TSOG220FM16** | G1/8"-F | G1/8"-F | M16x1-M | 20 | 20 | 38.5 | 9 | 7 | 100 | 12 | 19 | 12 | 1.54 | 0.81 | 2.02 | 36 |
| **TSOG235FM16** | G1/8"-F | G1/8"-F | M16x1-M | 35 | 20 | 58.5 | 9 | 7 | 131.5 | 12 | 19 | 12 | 0.85 | 0.97 | 2.13 | 46 |
| **TSOG325FM20** | G1/4"-F | G1/4"-F | M20x1.5-M | 25 | 23 | 50 | 10 | 10 | 113 | 16 | 24 | 16 | 1.54 | 0.92 | 2.47 | 64 |
| **TSOG350FM20** | G1/4"-F | G1/4"-F | M20x1.5-M | 50 | 23 | 82.5 | 10 | 10 | 170.5 | 16 | 24 | 16 | 0.80 | 0.97 | 2.56 | 90 |
| **TSOG440FM25** | G3/8"-F | G3/8"-F | M25x1.5-M | 40 | 33 | 71 | 11 | 11 | 159 | 22 | 32 | 22 | 1.54 | 1.26 | 3.71 | 164 |
| **TSOG480FM25** | G3/8"-F | G3/8"-F | M25x1.5-M | 80 | 33 | 121 | 11 | 11 | 249 | 22 | 32 | 22 | 0.80 | 1.35 | 3.82 | 231 |

Note: All dimensions are in mm  **C** = Stroke  **k** = Spring stiffness  **Frep** = Spring force  **Fcomp** = Force at rest

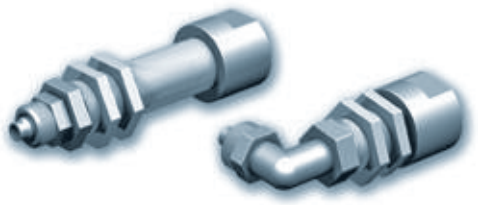
**Materials**

**Spring** Stainless steel
**Tubing** Anodized aluminum
**Slider** Anodized aluminum
**Nuts** Anodized aluminum




**Please specify the part e.g.: TSOG350FM20**
**See part n° table above.**

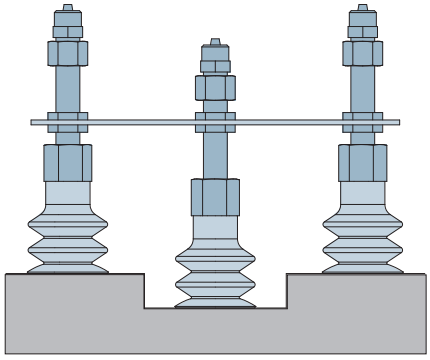
# L
# Mounting Extensions



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 |

4

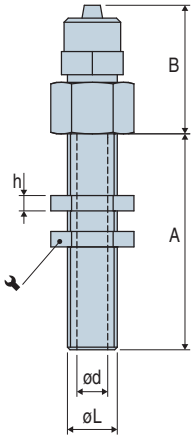
## Characteristics

| Models | A (1) | | | 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 | - | - |

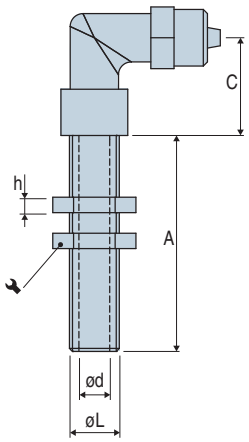
(1) Other lengths available on request for a minimum quantity of 10 pieces.

## G1/4"-M - G1/8"-M

Straight

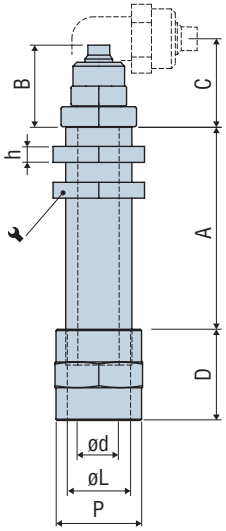



Elbow



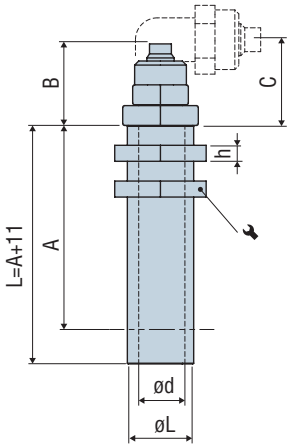

## G3/8"-F

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).

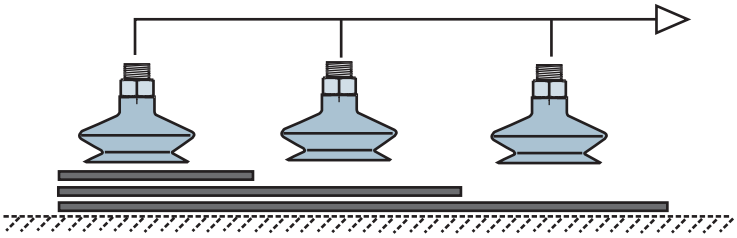
# Miscellaneous Gripping

**Principle**

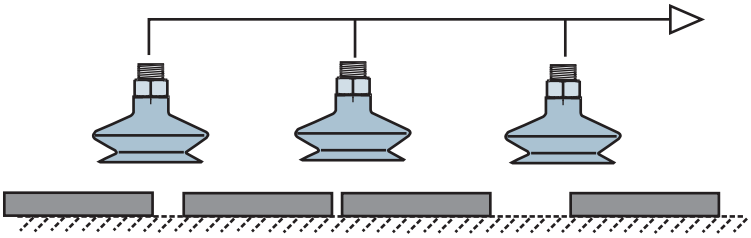
In many cases when using a multi-suction cup installation, some of the cups will not be covered by the product(s) to be handled. This leads to a high risk of reduced grip from the covered suction cups, or may even prevent them gripping at all.

## Examples

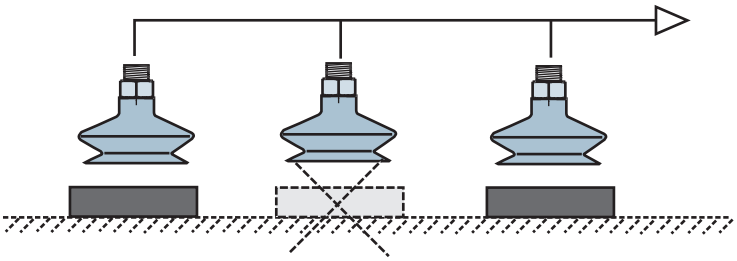
- Gripping of panels, sheet metal,etc. in a wide variety of sizes by a vacuum lifter equipped with suction cups.



- 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

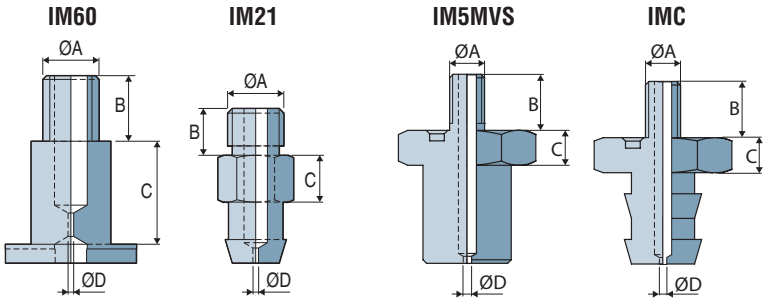
## Groups 1 and 2

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.

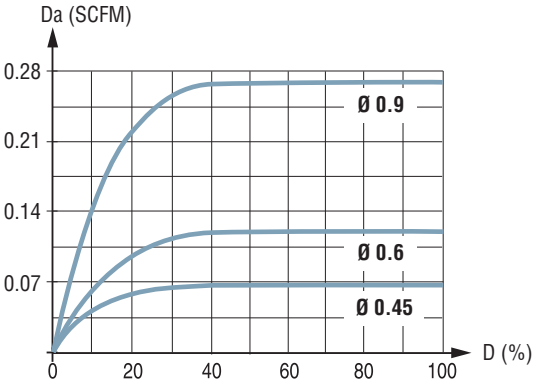
**Caution, do not use this type of fitting for applications in a dusty environment.**

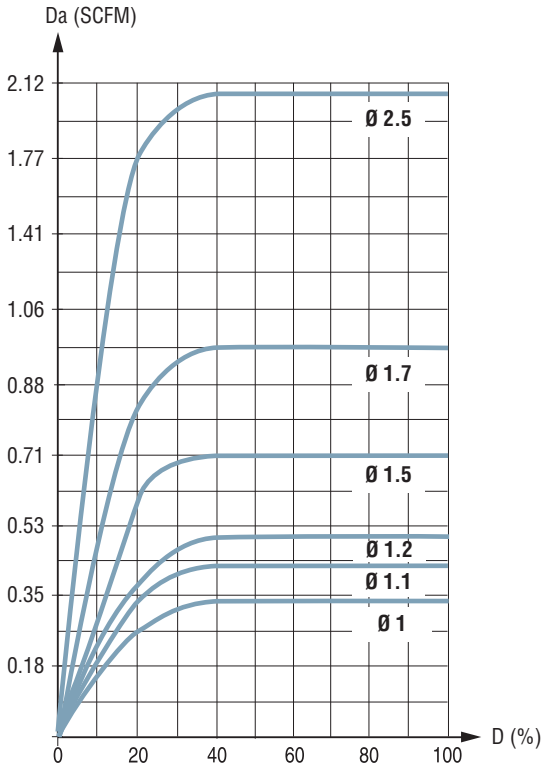
### Characteristics

| 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 |




### Maximum suction per nozzle diameter




Da = Suction rate
D = Vacuum

**Please specify the part e.g.: IM60SP387**
**See part n° table above.**

Note: All dimensions are in mm

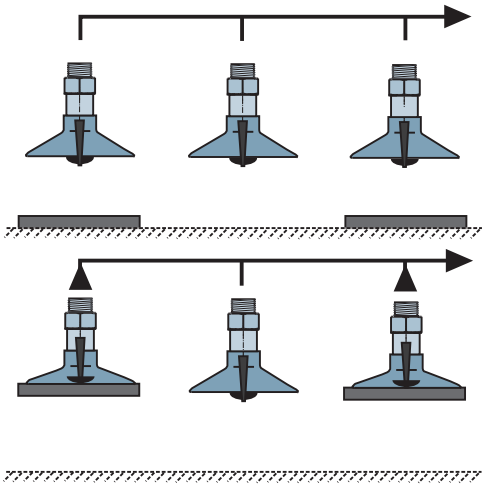
4

# 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 |



### Advantages

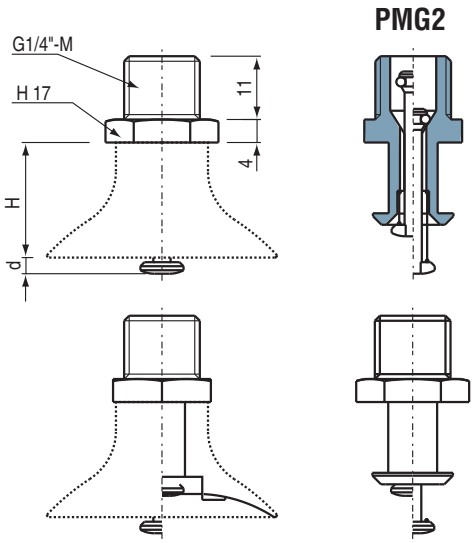
- Simple to install and operate.
- Very efficient air-tightness for non-covered suction cups.
- Little risk of marking delicate objects, as the feeler has a rounded surface.

### 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**).

# IMU
## 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.

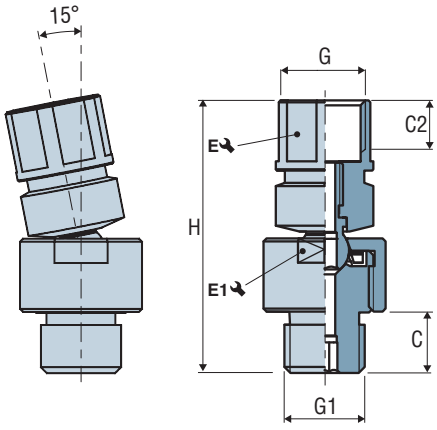
**Materials**

**Ball-joint** Zinc-plated steel and brass
**Seal** Nitrile (NBR)



### 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

# CSP
## Piloted Vacuum Valves

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 malfuntioning 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.

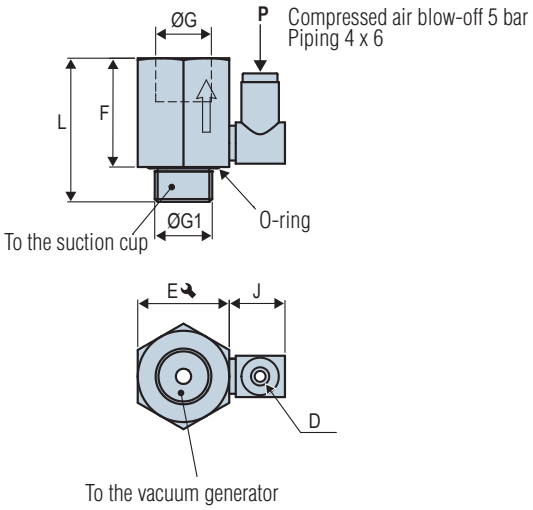
**Materials**

**Valve** Nitrile (NBR)
**Body** Anodized aluminum
**Filter** Stainless steel screen 200 µ



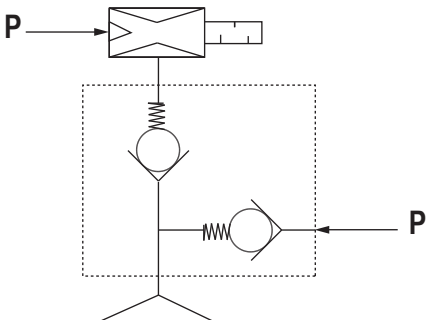
### Characteristics

| Reference | ØG | ØG1 | 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

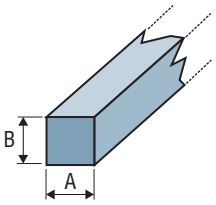
### Mounting

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

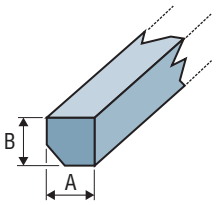
- All supports, particularly steel, aluminum, etc.
- Closed cells.
- Tube of neoprene adhesive (120 ml): Part No. 095.99.006.






## Nitrile beveled foam strip: 10m roll

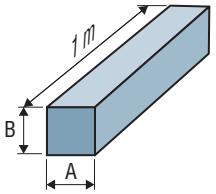
- The beveling facilitates gripping of products with uneven surfaces.
- Closed cells.
- Contact adhesive reference: BOSTIK 1400 (Neoprene adhesive).




| 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

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# Vacuum Pumps Overview

Chapter 5


| | |
|---|---|
| General Points | p. 5/2 |
| Choosing a Vacuum Pump | p. 5/3 |
| Comparison of Vacuum Pumps and Air Amplifiers | p. 5/4 |
| COVAL's Family of Intelligent Vacuum Pumps | p. 5/6 |
| Vacuum Pump Range | p. 5/8 |
| Evacuation Time and Weight of Vacuum Pumps | p. 5/11 |


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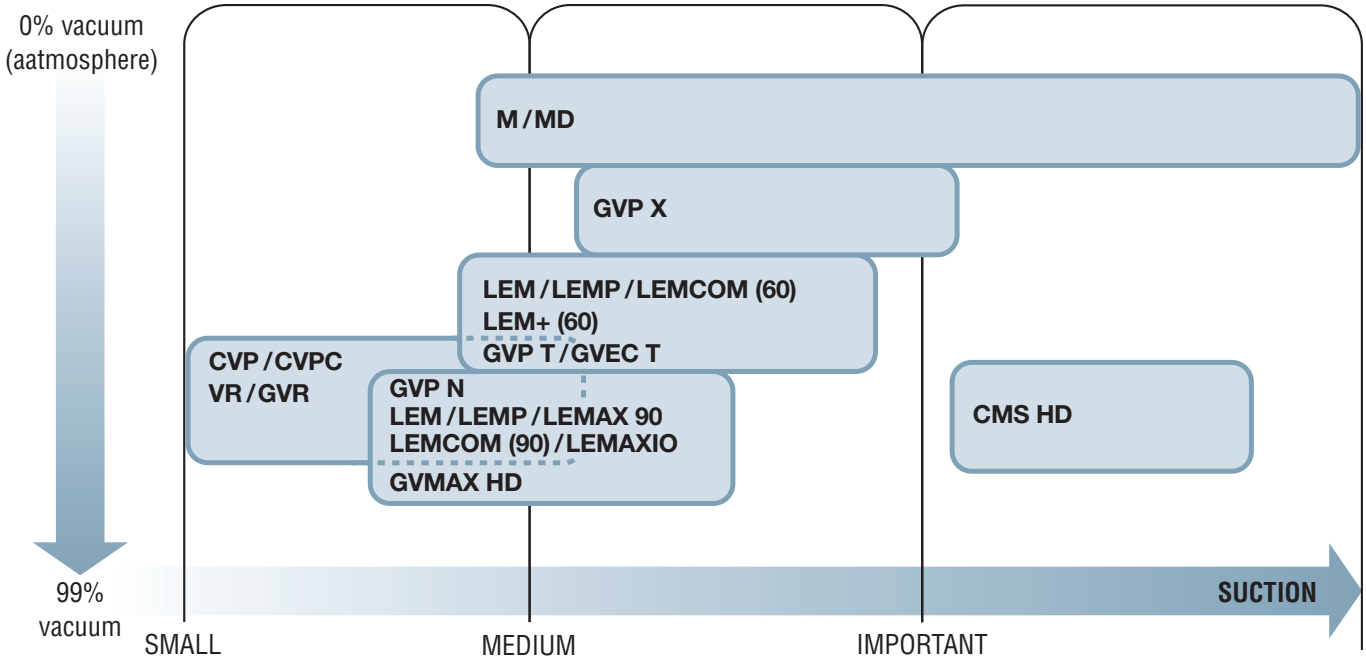
# Vacuum Pumps Overview

## General Points

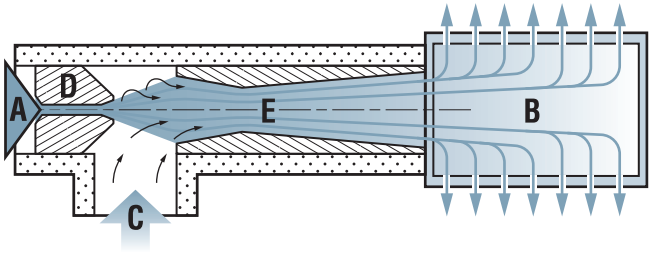


### What is vacuum?




### 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<br>10 N/cm² = 100 kPa | Atm<br>kp/cm² | Torr<br>mm of Hg |
|---|---|---|---|
| **Bar = 10 N/cm² = 100 kPa** | 1 | 0.986923 | 750.0617 |
| **Atm = kp/cm²** | 1.01325 | 1 | 760 |
| **Torr = mm of Hg** | 0.0013332 | 0.001316 | 1 |

### CONVERSION ACCORDING TO THE PERCENTAGE OF VACUUM

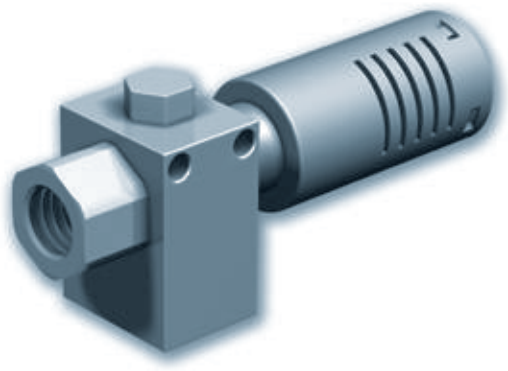
| % | Bar (10 N/cm² = 100 kPa) | Atm (kp/cm²) | mm of water column |
|---|---|---|---|
| 10% | -0.101 | -0.103 | 1000 |
| 20% | -0.203 | -0.207 | 2000 |
| 30% | -0.304 | -0.310 | 3000 |
| 40% | -0.405 | -0.413 | 4000 |
| 50% | -0.507 | -0.517 | 5000 |
| 60% | -0.608 | -0.620 | 6000 |
| 70% | -0.709 | -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%.



### 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. 2.65 SCFM).

For example, the leakage rate at -300mb is measured at 2.65 SCFM 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(lbf) = S (cm²) x 0.3 / 0.2248*** with:
**S** = surface of the suction cup in $cm^2$.
(-300 mbar = -0.3 bar, for calculation use 0.3).
(*) coefficient to convert daN (decanewton) to lbf (pound-force)

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.

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### 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.

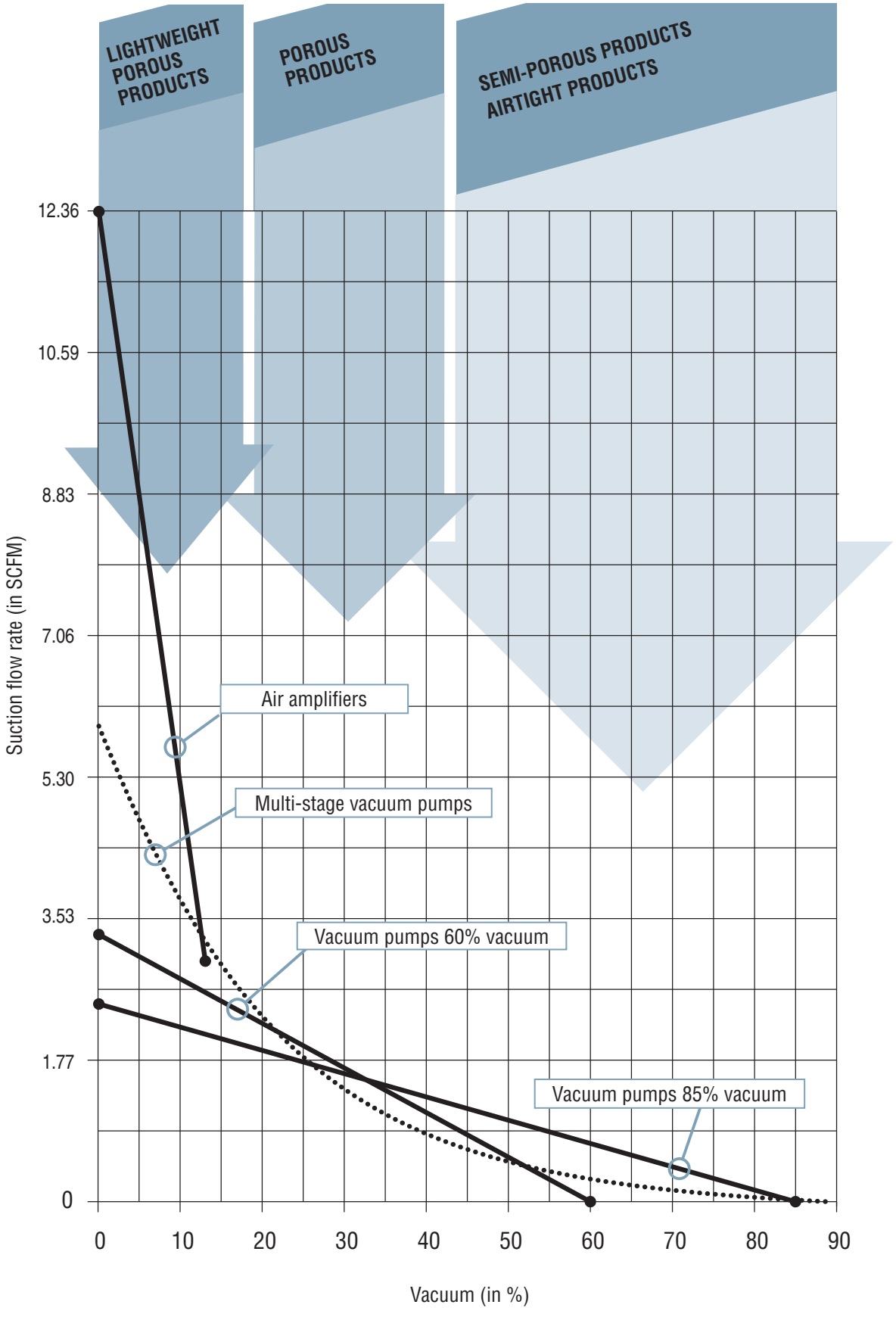
**NOTE**

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

| 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 1.02 to 3.25 SCFM | ■ | ■ | ■ | ■ | ■ | | | | |
| Suction flow rate from 4.41 to 9.71 SCFM | | | | | | ■ | ■ | ■ | |
| Suction flow rate from 24.72 to 56.50 SCFM | | | | | | | | | ■ |
| Maximum vacuum level: 60% | ■ | ■ | | | ■ | ■ | | | |
| Maximum vacuum level: 80 or 85% | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Vacuum control | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Blow-off control | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Integrated pressure regulator (ASR) AIR Saving Regulator | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | |
| Powerful blow-off | | | | | | □ | □ | □ | |
| Electronic vacuum switch with display | □ | □ | ■ | | | □ | ■ | ■ | □ |
| Electronic vacuum switch | | | | ■ | ■ | | | | |
| Pressure sensor | | | | | | | | ■ | □ |
| Vacuum check-valve | | | ■ | ■ | ■ | | ■ | ■ | |
| Automatic vacuum regulation (ASC) AIR Saving Control | | | ■ | ■ | ■ | | ■ | ■ | |
| 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.

AIR Saving Regulator

**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.

AIR Saving Control

**ASC** (Air Saving Control)
A vacuum regulation system that auto-adjusts to the product being handled.

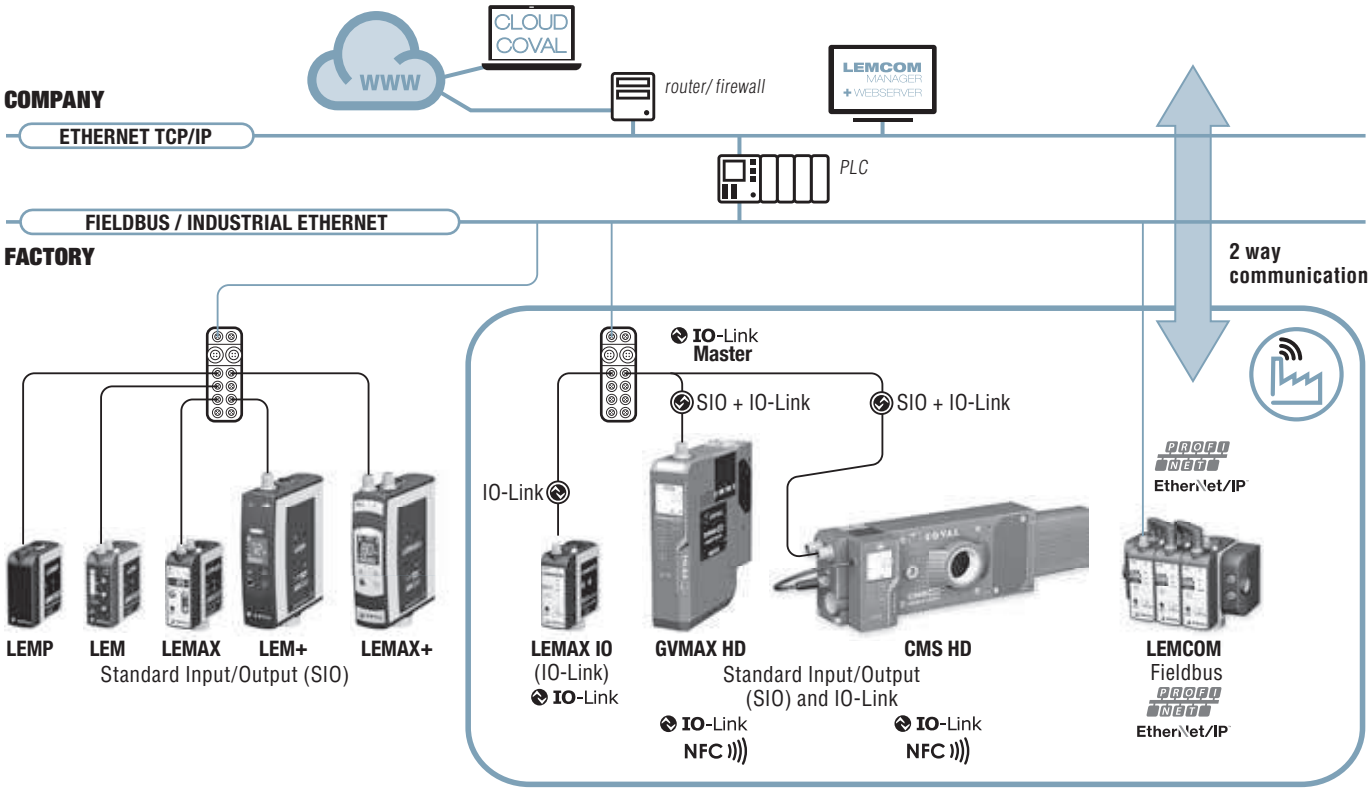
Ideal for gripping airtight products.

**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...

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## 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".

**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.

**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.

**High resolution display**

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

# Vacuum Pumps Overview

## Vacuum Pump Range



### Micro Ejectors / Vacuum Cartridges

| | | |
|---|---|---|
| **VR**<br> | ■ 5 models<br>■ Nozzle Ø: 0.5 ; 0.7 ; 0.9 ; 1 ; 1.2 ; 1.4mm<br>■ Suction flow rate: 0.25 to 2.26 SCFM<br>■ Optimum supply pressure: 5 bar<br>■ Weight between 20 and 45 g<br>■ Silencer option | ■ Wide range<br>■ Very compact<br>■ Installed directly on the suction cups<br>■ Excellent mechanical resistance<br>■ Reduced gripping time<br>■ Blow-off option<br>■ Extended suction flow rate range<br>■ Silent operation<br>■ Adaptable to all industries |
| **GVR**<br> | ■ 2 models<br>■ Nozzle Ø: 0.9 ; 1 ; 1.2 ; 1.4 mm<br>■ Suction flow rate: 0.74 to 2.26 SCFM<br>■ Optimum supply pressure: 5 bar<br>■ Weight 45 g<br>■ Integrated silencer | ■ Very compact<br>■ Installed directly on the suction cups<br>■ Excellent mechanical resistance<br>■ No clogging<br>■ Reduced gripping time<br>■ Blow-off option<br>■ Extended suction flow rate range<br>■ Silent operation<br>■ Adaptable to all industries |
| **CVP**<br> | ■ 2 sizes<br>■ Nozzle Ø:<br>1.2 ; 1.4 ; 1.6 ; 2.2 ; 2.7 mm<br>■ Suction flow rate:<br>1.45 to 7.59 SCFM<br>■ Optimum supply pressure:<br>5 to 5.5 bar<br>■ Weight between 6 and 23 g | ■ Ultra-light and compact cartridge design allows for great flexibility and easy integration.<br>■ Vacuum technology: powerful single-stage Venturi that is dust resistant and maintenance-free.<br>■ Adaptable to all industries |
| **CVPC**<br> | ■ 2 sizes<br>■ Nozzle Ø:<br>1.2 ; 1.4 ; 1.6 ; 2.2 ; 2.7 mm<br>■ Suction flow rate: 1.45 to 7.59 SCFM<br>■ Optimum supply pressure: 5 to 5.5 bar<br>■ Weight: 22 g<br>■ Control indicator light<br>■ M8 connector | ■ Ultra-light and compact cartridge design allows for great flexibility and easy integration.<br>■ 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.<br>■ Vacuum technology: powerful single-stage Venturi that is dust resistant and maintenance-free.<br>■ Adaptable to all industries |
| **CBP**<br> | ■ Pilot solenoid valve 2/2-way<br>■ Nominal flow rate at 6 bar:<br>12.5 SCFM<br>■ Nominal diameter: 3 mm<br>■ Control indicator light<br>■ M8 connector | ■ Ultra-light and compact cartridge design allows for great flexibility and easy integration<br>■ Electro-pneumatic control valve 2/2-way.<br>■ Blow-off control valve<br>■ Single and multi-cartridge control valve. |

### Vacuum Pumps without control

| | | |
|---|---|---|
| **GVP**<br> | ■ Simple vacuum pumps<br>■ Nozzle Ø: 1.2 ; 1.5 ; 2 ; 2.5 ; 3 mm<br>■ Suction flow rate: 1.59 to 15.9 SCFM<br>■ Optimum supply pressure: 4 bar<br>■ Integrated silencer | ■ Modular design with interchangeable options<br>■ Compact<br>■ Optimized performance for handling all types of objects<br>■ Silent operation<br>■ No clogging<br>■ Adaptable to all industries |
| **GEMP**<br> | ■ Simple energy-saving vacuum pumps<br>■ Nozzle Ø: 1.2 ; 1.5 ; 2 ; 2.5 ; 3 mm<br>■ 2 vacuum levels: 60% and 85%<br>■ Suction flow rate: 2.54 to 13.6 SCFM<br>■ Integrated supply pressure regulator (ASR)<br>■ Integrated silencer | ■ Very compact and light-weight<br>■ Exceptional energy savings thanks to automatic pressure regulation at 4 bar<br>■ Optimized performance for handling all types of objects<br>■ Silent operation<br>■ No clogging |
| **GVEC**<br> | ■ "Easy Clean" Vacuum Pumps<br>■ Nozzle Ø: 1.5 ; 2.5 ; 3 mm<br>■ Suction flow rate: 3.35 to 11.65 SCFM<br>■ Optimum supply pressure: 4 bar<br>■ Materials resistant to corrosion and compatible with food-processing sector | ■ Very compact and light-weight<br>■ Ideal for applications needs frequent cleaning<br>■ Use in washing or splashing zones<br>■ No clogging |

# Vacuum Pumps Overview

## Vacuum Pump Range

### Intelligent Vacuum Pumps

| | | |
|---|---|---|
| **LEMP**<br> <br>AIR Saving Regulator | ■ Mini Vacuum Pumps without control with ASR (Air Saving Regulator)<br>■ Nozzle Ø: 1; 1.2; 1.4 mm<br>■ 2 vacuum levels: 60% and 85%<br>■ Suction flow rate: 1.02 to 3.25 SCFM<br>■ Integrated supply pressure regulator (ASR)<br>■ With or without vacuum switch<br>■ Stand-alone or island module<br>■ Integrated silencer | ■ For airtight and porous objects<br>■ Ultra compact and lightweight<br>■ Energy savings in all networks > 4 bar<br>■ Reduced installation time<br>■ Adaptable to all industries |
| **LEM**<br> <br>AIR Saving Regulator | ■ Integrated Mini Vacuum Pumps with ASR (Air Saving regulator)<br>■ Nozzle Ø: 1; 1.2; 1.4 mm<br>■ 2 vacuum levels: 60% and 85%<br>■ Suction flow rate up to 3.25 SCFM<br>■ Integrated pressure regulator (ASR)<br>■ All required functions integrated internally<br>■ M8 connections<br>■ Stand-alone or island module | ■ For airtight and porous objects<br>■ Ultra compact and lightweight<br>■ Control panel for monitoring and adjustment<br>■ Energy savings in all networks > 4 bar<br>■ Reduced wiring<br>■ Reduced installation time<br>■ Adaptable to all industries |
| **LEMAX**<br> <br>AIR Saving Control | ■ Integrated Mini Vacuum Pumps with ASC (Air Saving Control)<br>■ Nozzle Ø: 1; 1.2; 1.4 mm<br>■ Vacuum level: 85%<br>■ Suction flow rate up to 2.47 SCFM<br>■ Integrated pressure regulator (ASR)<br>■ Integrated vacuum regulation (ASC)<br>■ All required functions integrated internally<br>■ M8 connections<br>■ Stand-alone or island module | ■ For sealed or slightly porous parts<br>■ Ultra compact and lightweight<br>■ Control panel for monitoring and adjustment<br>■ ASC = 75% to 90% energy savings<br>■ Reduced wiring<br>■ Reduced installation time<br>■ Adaptable to all industries |
| **LEMAX IO**<br> <br>IO-Link AIR Saving Control | ■ Mini Vacuum Pumps Communicating via Industrial Field Bus<br>■ Nozzle Ø: 1 ; 1.2 ; 1.4 mm<br>■ Vacuum level: 85%<br>■ Suction flow rate up to 2.47 SCFM<br>■ Integrated pressure regulator (ASR)<br>■ Integrated vacuum regulation (ASC)<br>■ IO-Link<br>■ M8 connections<br>■ Stand-alone or island module | ■ For sealed or slightly porous parts<br>■ Ultra compact and lightweight<br>■ Settings and diagnosis by remote monitoring.<br>■ ASC = 75% to 90% energy savings<br>■ Easy installation and operation thanks to the IO-Link communication interface<br>■ Adaptable to all industries |
| **LEMCOM**<br> <br>PROFINET AIR Saving Control<br>EtherNet/IP | ■ Mini Vacuum Pumps Communicating via Industrial Field Bus<br>■ Nozzle Ø: 1 ; 1.2 ; 1.4 mm<br>■ 2 vacuum levels: 60% and 85%<br>■ Suction flow rate up to 3.25 SCFM<br>■ Integrated pressure regulator (ASR)<br>■ Integrated vacuum regulation (ASC)<br>■ Field bus: PROFINET, EtherNet/IP™<br>■ M8 connections<br>■ Stand-alone or island module | ■ For sealed or slightly porous parts<br>■ Ultra compact and lightweight<br>■ Settings and diagnosis by remote monitoring.<br>■ ASC = 75% to 90% energy savings<br>■ Reduced wiring<br>■ Reduced installation time<br>■ Adaptable to all industries |
| **LEM+**<br> <br>AIR Saving Regulator | ■ Compact High Flow Vacuum Pumps with ASR (Air Saving Regulator)<br>■ Nozzle Ø: 2 ; 2.5 mm<br>■ 2 vacuum levels: 60% and 85%<br>■ Suction flow rate up to 9.71 SCFM<br>■ Integrated pressure regulator (ASR)<br>■ All required functions integrated internally<br>■ M12 connections | ■ For airtight and porous objects<br>■ Compact and lightweight<br>■ Control panel for monitoring and adjustment<br>■ Energy savings in all networks > 4 bar<br>■ Reduced wiring<br>■ Reduced installation time<br>■ Adaptable to all industries |

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# 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 7.06 SCFM
- 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**

NFC IO-Link AIR Saving Control

- Heavy Duty Communicating Vacuum Pumps
- Nozzle Ø: 2.5 ; 3 mm
- Vacuum level: 85%
- Suction flow rate up to 8.05 SCFM
- 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 24.72 to 56.50 SCFM
- 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 7.06 and 177 SCFM 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 71.1 and 154.2 SCFM 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: 0.25 to 2.26 SCFM
- 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:
  0.74 to 2.26 SCFM
- 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:
  1.45 to 7.59 SCFM
- 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:
  1.45 to 7.59 SCFM
- 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:
  12.5 SCFM
- 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

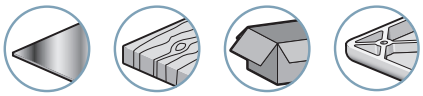
# VR 05, 07, 09
## Heavy-duty In-line Ejectors

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 (SCFM) | Maximum vacuum (%) | Air drawn in (SCFM) | At air pressure (bar) |
|---|---|---|---|---|---|
| **VR 05** | 0.5 | 0.42 | 87 | 0.25 | 5 |
| **VR 07** | 0.7 | 0.74 | 90 | 0.49 | 5 |
| **VR 09** | 0.9 | 1.27 | 90 | 0.74 | 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** | 32 to 176 °F. |

### 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**

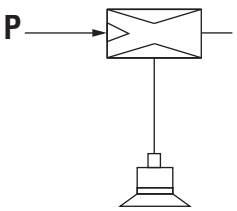
- Spring system, series TS3, available strokes: 10, 30, 50, 70mm, page 4/4.
- TSOP-TSOG series anti-rotation spring system, pages 4/6 and 4/7.
- Ball-joint systems, IMU series, page 4/12.

**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.



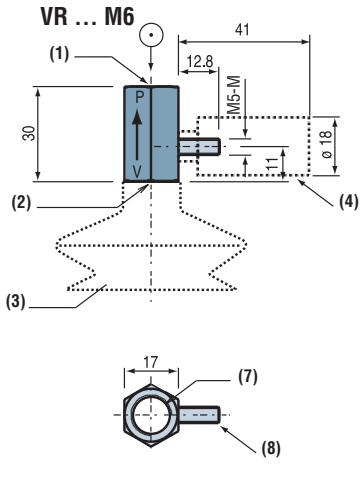
# VR 05, 07, 09

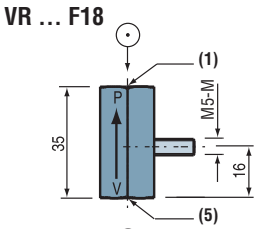
## Heavy-duty In-line Ejectors

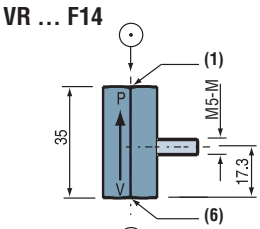
Dimensions and Data Curves

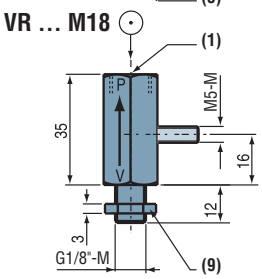
### Dimensions

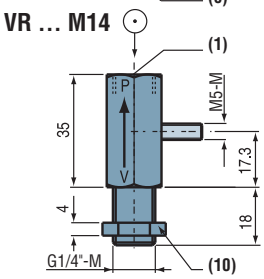
(**1**) G1/4"-F C.A. inlet, depth 10 mm
(**2**) M6-F vacuum outlet, depth 6 mm
(**3**) Example of suction cup
(**4**) Silencer
(**5**) G1/8"-F vacuum outlet, depth 7.5 mm
(**6**) G1/4"-F vacuum outlet, depth 10 mm
(**7**) Compressed air
(**8**) Exhaust
(**9**) Hexagonal nut, 14 across flats
(**10**) Hexagonal nut, 19 across flats



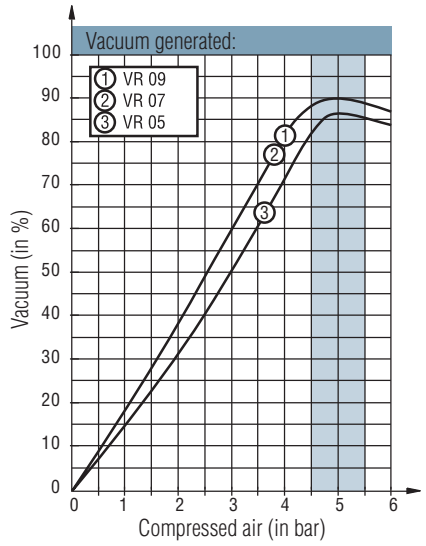



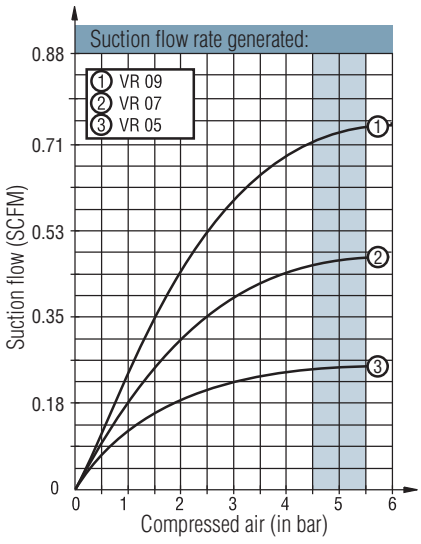



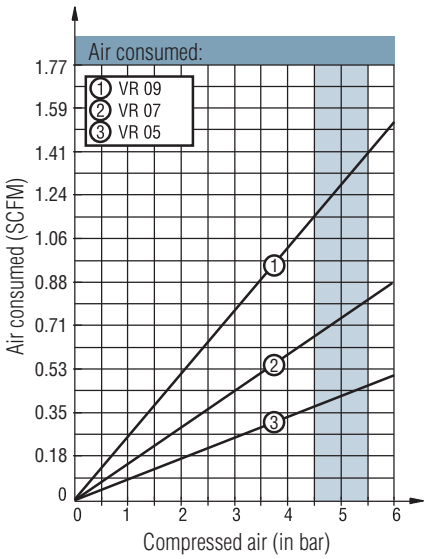



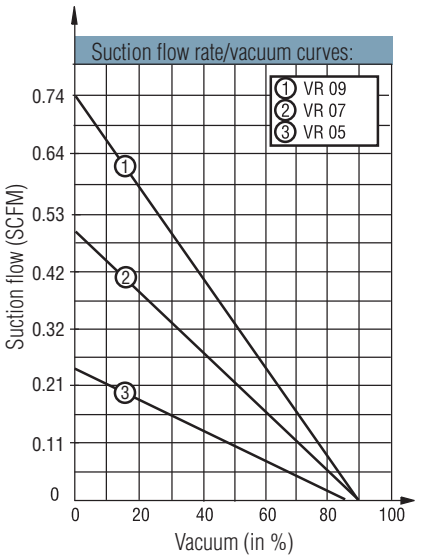

Note: All dimensions are in mm

### Data Curves



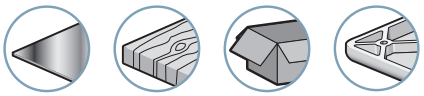
# VR 10, 12, 14
## Ejector Fittings

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 (SCFM) | Maximum vacuum (%) | Air drawn in (SCFM) | At air pressure (bar) |
|---|---|---|---|---|---|
| **VR 10** | 1 | 1.55 | 90 | 0.95 | 5 |
| **VR 12** | 1.2 | 2.37 | 90 | 1.59 | 5 |
| **VR 14** | 1.4 | 3.81 | 90 | 2.26 | 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** | 32 to 176 °F. |

### 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 | **M14** | G1/4" Male | **S** | SILGV 10 |
| | **12** | Ø 1.2 mm | | | **K** | SILK 18 C (1) |
| | **14** | Ø 1.4 mm | | | | |

(1) SILK 18 C through-type silencer dimensions, see page 11/11.

### Additional Information

**As standard**

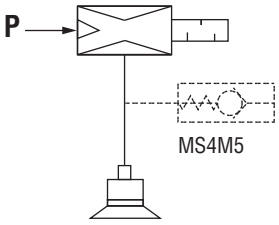
- New functions: vacuum switch or blow-off switch with or without silencer (SILGV 10).

**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).

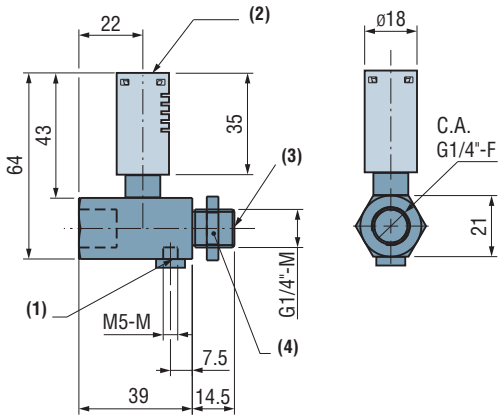


# VR 10, 12, 14

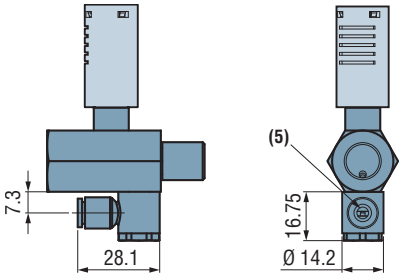
## Ejector Fittings

Dimensions and Data Curves

### Dimensions

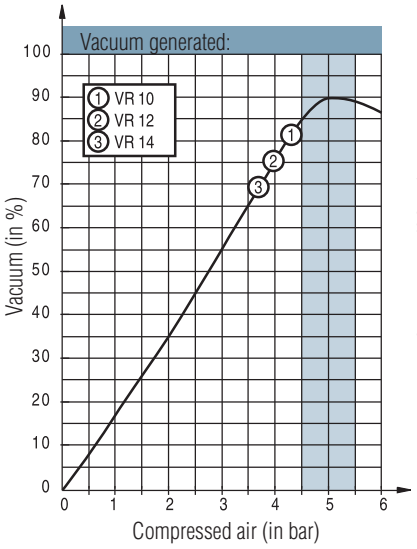


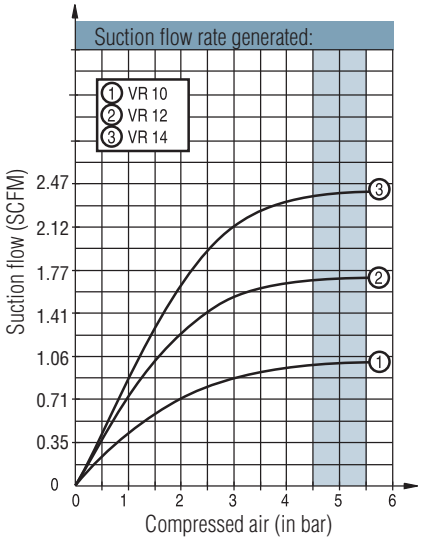

### VR + MS4M5 version

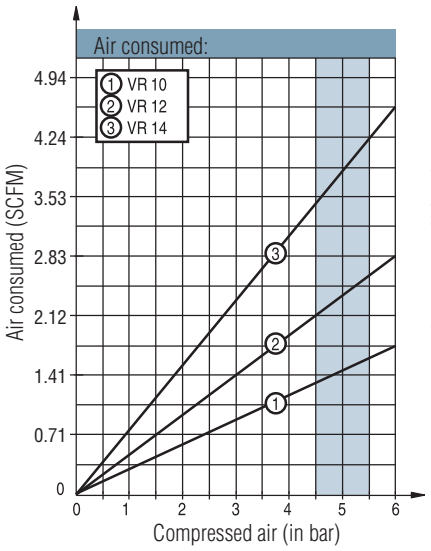


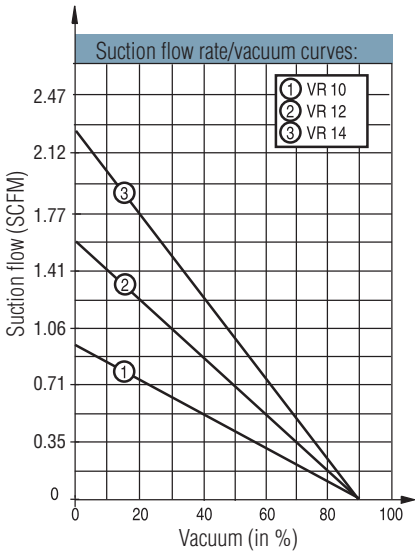

(**1**) Blow-off or vacuum switch
(**2**) Silencer
(**3**) Vacuum
(**4**) Hexagonal nut, 19 across flats
(**5**) Push fitting, external Ø 6

### Data Curves



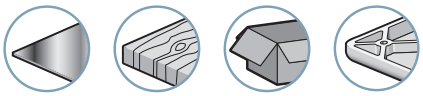




Note: All dimensions are in mm

# 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

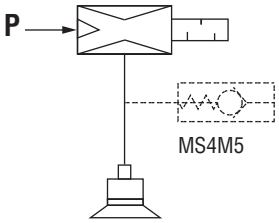


### Advantages
- Adaptable to all industries
- Lightweight and compact
- Reduced gripping time
- Direct installation on suction cups
- Excellent mechanical resistance
- Blow-off option
- No clogging
- Silent operation

### 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 (SCFM) | Maximum vacuum (%) | Air drawn in (SCFM) | At air pressure (bar) |
|---|---|---|---|---|---|
| **GVR 09** | 0.9 | 1.27 | 85 | 0.74 | 5 |
| **GVR 10** | 1 | 1.55 | 85 | 0.95 | 5 |
| **GVR 12** | 1.2 | 2.37 | 85 | 1.59 | 5 |
| **GVR 14** | 1.4 | 3.81 | 85 | 2.26 | 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** | 32 to 176 °F. |

### When ordering, please specify: Model + Nozzle diameter + Silencer e.g.: GVR12K

| 1: Model | 2: Ø nozzle | | 3: Silencer | |
|---|---|---|---|---|
| GVR | **09** | Ø 0.9 mm | **-** | Without |
| | **10** | Ø 1 mm | **S** | SILGV 10 |
| | **12** | Ø 1.2 mm | **K** | SILK 18 C (1) |
| | **14** | Ø 1.4 mm | | |

(1) SILK 18 C through-type silencer dimensions, see page 11/11.

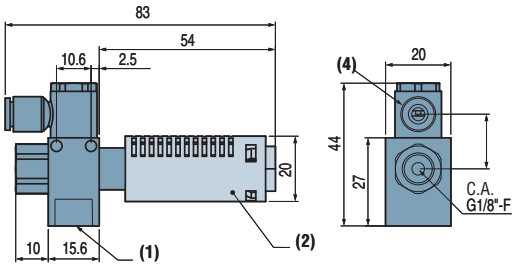
# GVR 09, 10, 12, 14

## Micro Ejectors

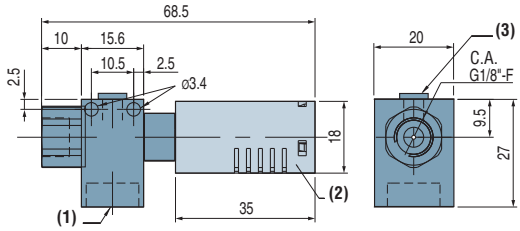
Dimensions and Data Curves

## Dimensions

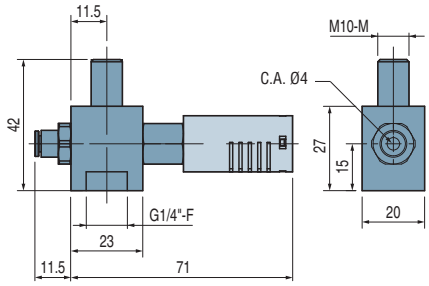
### GVR 10, 12, 14 + MS4M5



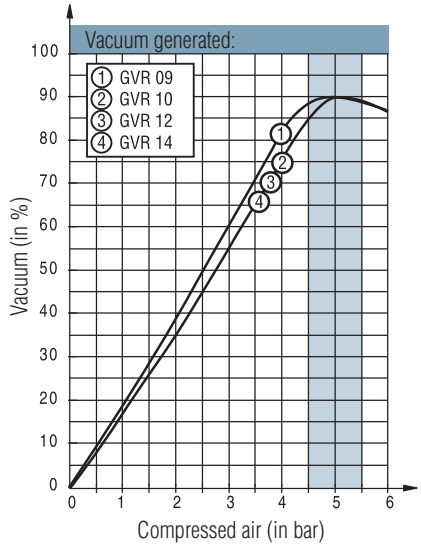

### GVR 10, 12, 14

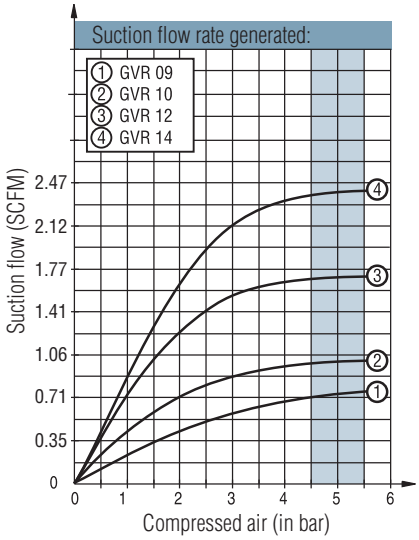


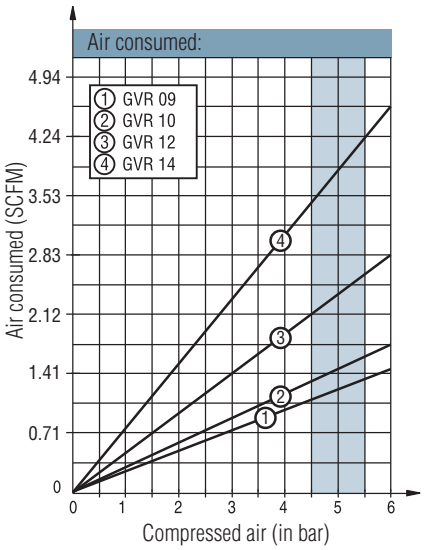

### GVR 09

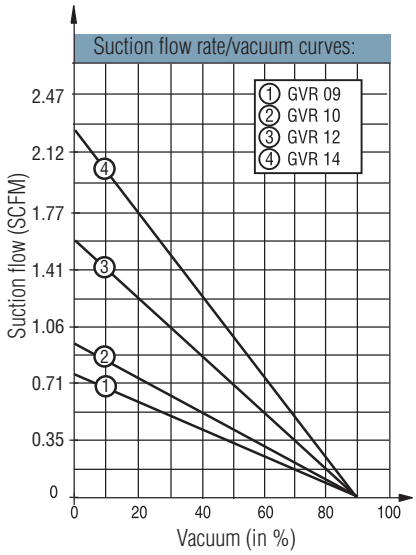



## Data Curves




(**1**) Vacuum G1/4"-F
(**2**) Silencer
(**3**) M5-F plug for vacuum switch
(**4**) Push fitting, outside Ø 6

Note: All dimensions are in mm

# CVP
## Vacuum Cartridges
General Information

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.

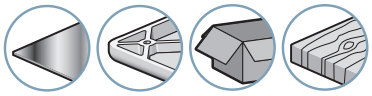
**CVP** Series vacuum cartridges are suitable for a broad variety of applications and are available in different sizes and suction capacities:

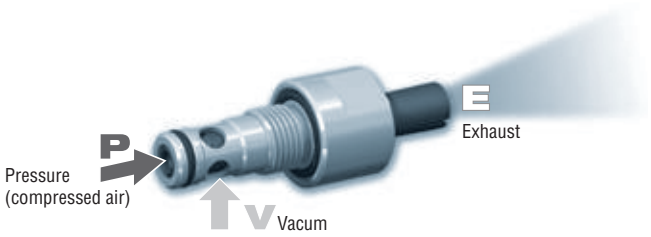
- Size 1: nozzle dia. 1.2, 1.4 and 1.6 mm generating a suction flow rate ranging from 1.45 to 3.18 SCFM. Max. vacuum 85%.
- Size 2: nozzle dia. 2.2 and 2.7 mm generating a suction flow rate ranging from 5.65 to 7.59 SCFM. Max. vacuum 85%.

### Advantages

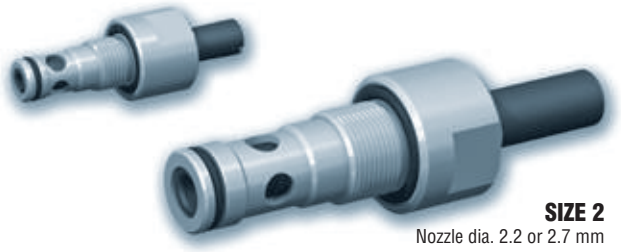
- Ultra-light and compact cartridge design allows for great flexibility and easy integration.
- Vacuum technology: powerful single-stage Venturi that is dust resistant and maintenance-free.

Industry-specific applications



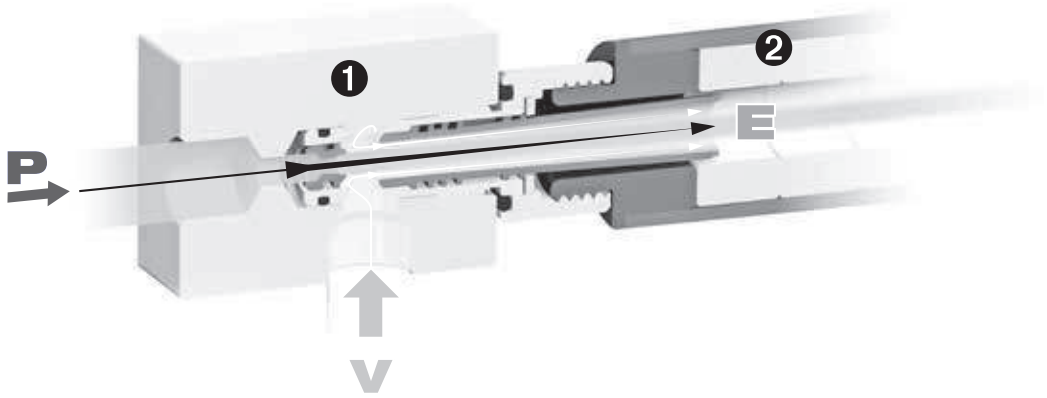



**SIZE 1**
Nozzle dia. 1.2, 1.4 or 1.6 mm



**SIZE 2**
Nozzle dia. 2.2 or 2.7 mm

### Compact integration




❶ Single-stage Venturi (nozzle + mixer system) ❷ 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**

1. Recess is machined to integrate the cartridge

**2**

2. Vacuum cartridge is installed.

**3**

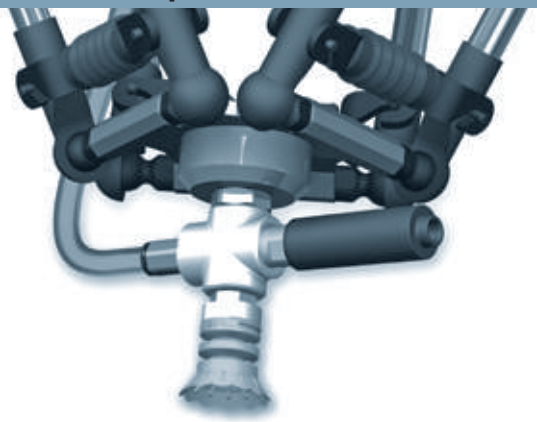
3. Peripheral equipment is assembled.

**4**

4. Pneumatic connections are established for use.

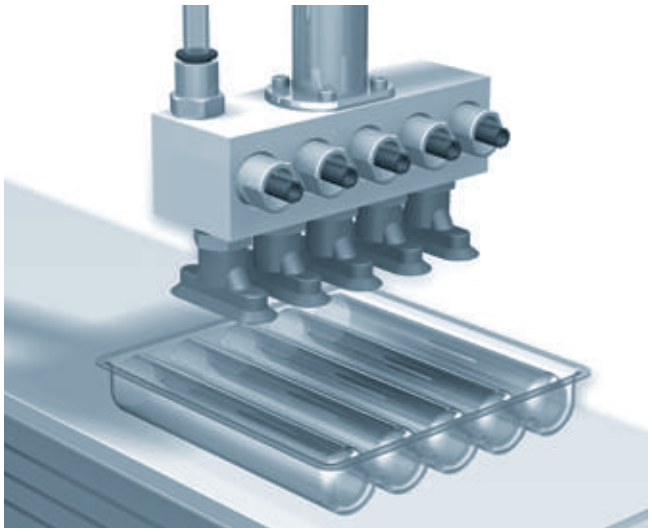
**3D COVAL Data** You will find the 3D files of the cartridges as well as the specifications of the machining operations to be carried out on our website **www.coval.com**

### Application examples

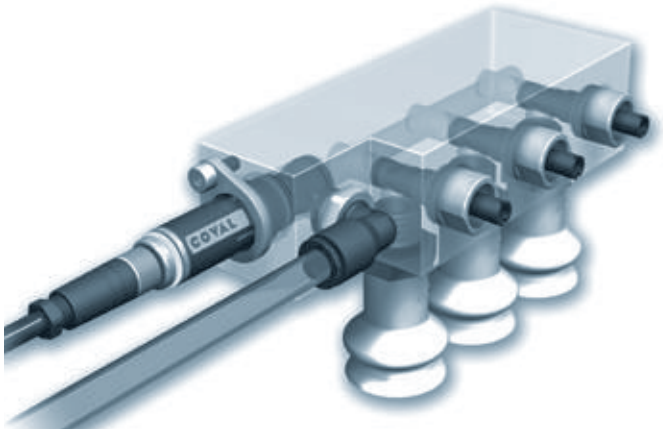


- 1 CVP series vacuum cartridge, with silencer
- 1 FPC series FlowPack suction cup

- 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

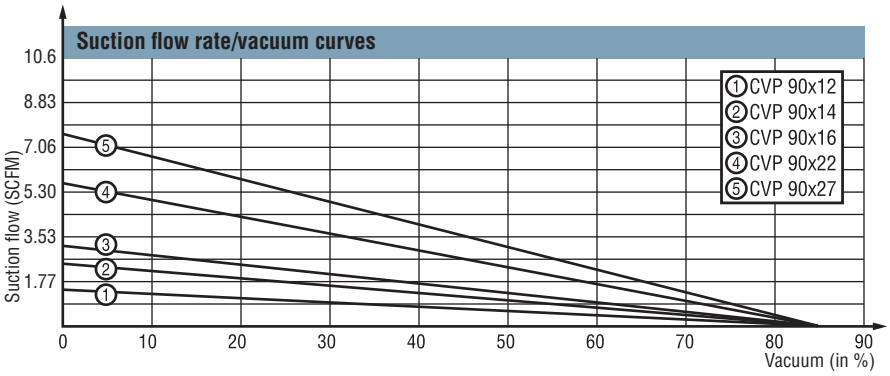
# CVP
## Vacuum Cartridges
Technical and Performance Data

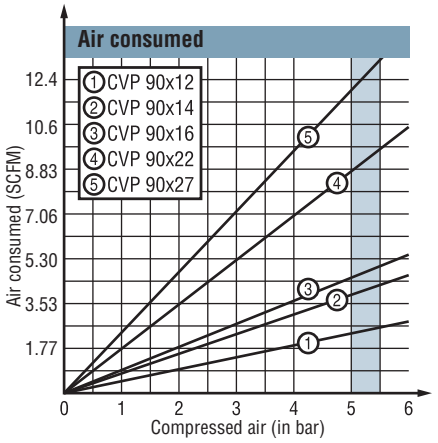
### Characteristics

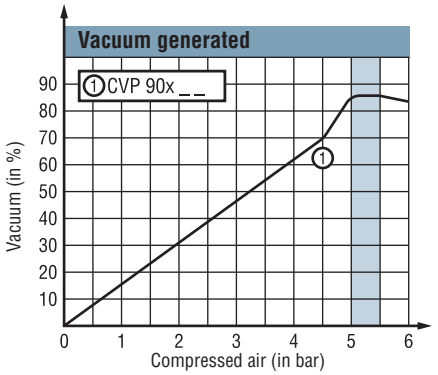
| Model | Ø nozzle (mm) | Air consumed (SCFM) | Maximum vacuum (%) | Air drawn in (SCFM) | At optimal air pressure (bar) |
|---|---|---|---|---|---|
| **CVP90x12** | 1.2 | 2.47 | 85 | 1.45 | 5 to 5.5 |
| **CVP90x14** | 1.4 | 4.06 | 85 | 2.47 | 5 to 5.5 |
| **CVP90x16** | 1.6 | 4.77 | 85 | 3.18 | 5 to 5.5 |
| **CVP90x22** | 2.2 | 9.18 | 85 | 5.65 | 5 to 5.5 |
| **CVP90x27** | 2.7 | 12.5 | 85 | 7.59 | 5 to 5.5 |

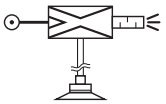
### Evacuation time in seconds per liter

| % 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 |

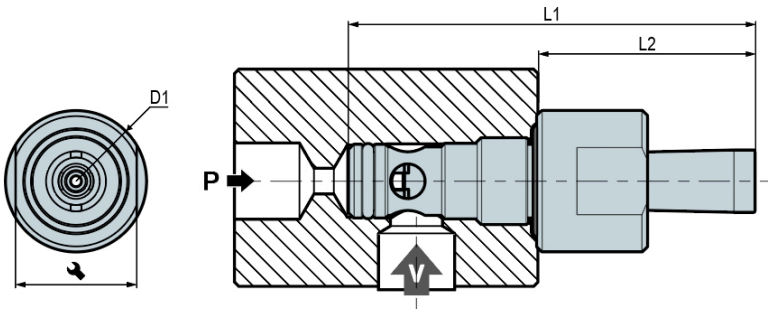


### Dimensions




| Model | D1 | L1 | L2 | |
|---|---|---|---|---|
| **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: 1.45 to 7.59 SCFM depending on model.
- Air consumption: 2.47 to 12.5 SCFM depending on model.
- Operating temperature: from 32 to 122 °F.
- 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

# CVP
## Vacuum Cartridges
Ordering, Accessories

### To place an order

| CVP | 90 | X | | 12 | | K |
|---|---|---|---|---|---|---|

| VACUUM LEVEL | |
|---|---|
| 85% max. vacuum | 90 |

| NOZZLE DIAMETER | |
|---|---|
| 1.2 mm nozzle Ø | 12 |
| 1.4 mm nozzle Ø | 14 |
| 1.6 mm nozzle Ø | 16 |
| 2.2 mm nozzle Ø | 22 |
| 2.7 mm nozzle Ø | 27 |

| THROUGH-TYPE SILENCER | |
|---|---|
| – | Without |
| K | With silencer |

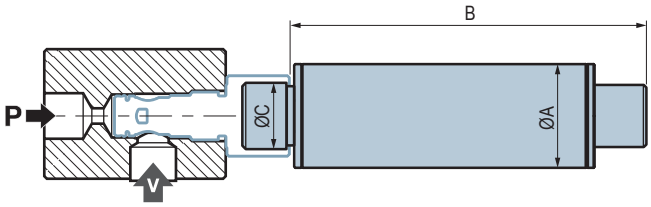
### Through-type silencers - option K

- 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**
(CVP90X**12K**/CVP90X**14K**/CVP90X**16K**)
- **G1/4"-M** silencer
  - Materials:- aluminum thread
  - PA6 tube, 30% GF

➔ Silencer for **CVP size 2**
(CVP90X**22K**/CVP90X**27K**)
- **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 |



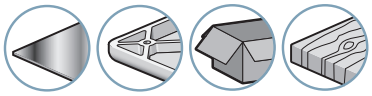

### Controlled blow-off / multi-cartridge control valve

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.

# CVPC
## Controlled Vacuum Cartridges
General Information

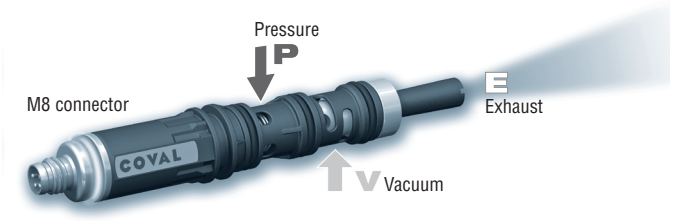
The ultra-compact and light **CVPC** Series controlled vacuum cartridges are used to effortlessly install a vacuum generation system equipped with an electric control, as close to the corresponding application as possible. They perfectly meet the flexibility, customization and performance needs of machine manufacturers and integrators of robotic solutions, who want to easily design flexible, modular and efficient gripping tools.

Industry-specific applications

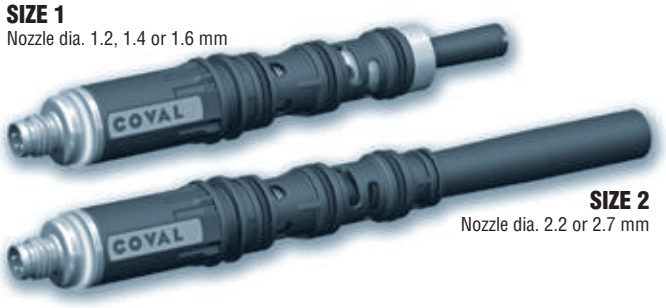


**CVPC** Series controlled vacuum cartridges are suitable for a broad variety of applications and are available in different sizes and suction capacities:

- Size 1: nozzle dia. 1.2, 1.4 and 1.6 mm generating a suction flow rate ranging from 1.45 to 3.18 SCFM. Max. vacuum 85%.
- Size 2: nozzle dia. 2.2 and 2.7 mm generating a suction flow rate ranging from 5.65 to 7.59 SCFM. Max. vacuum 85%.




**SIZE 1**
Nozzle dia. 1.2, 1.4 or 1.6 mm

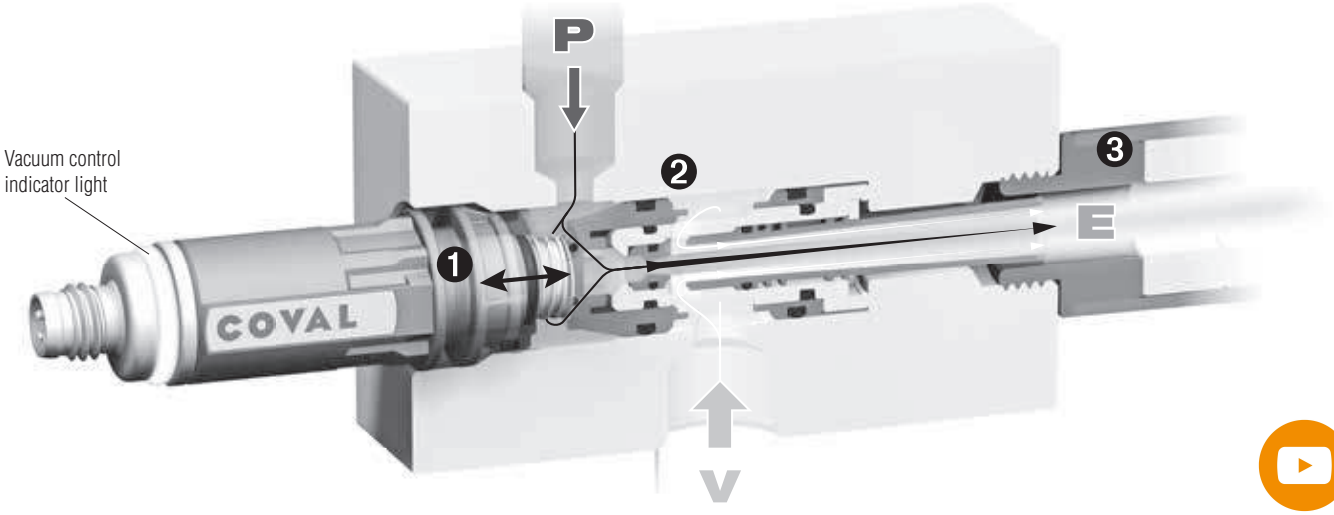



**SIZE 2**
Nozzle dia. 2.2 or 2.7 mm

### 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




❶ Solenoid valve. ❷ Single-stage Venturi (nozzle + mixer system). ❸ Option: non-clogging through-type silencer.

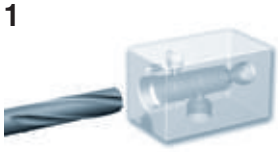
The innovative and patented design of the **CVPC** Series controlled vacuum cartridges combines two integrated functions:

- 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.
- 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

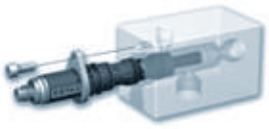
### Implementation

**1**



1. Recess is machined to integrate the cartridge.

**2**

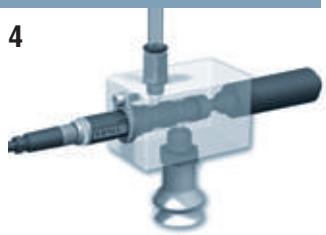


2. Vacuum cartridge is installed. Two mounting solutions are available: flange or threaded ring (see p. 6/15).

**3**

3. Peripheral equipment is assembled.

**4**

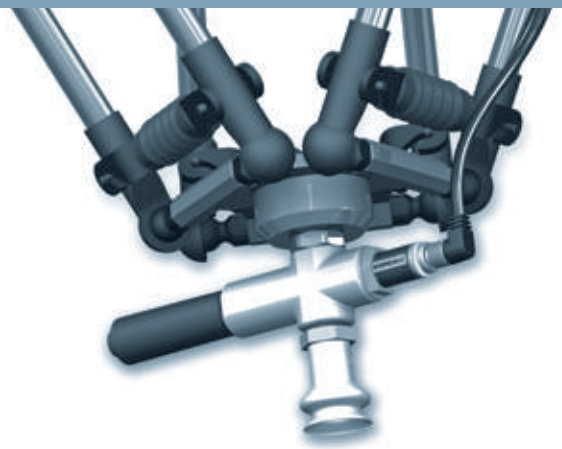


4. Pneumatic and electrical connections are established for use.

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**

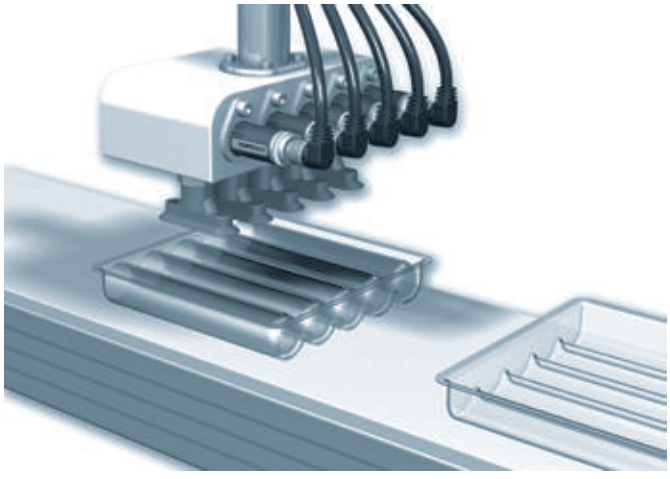
### Application examples

- 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

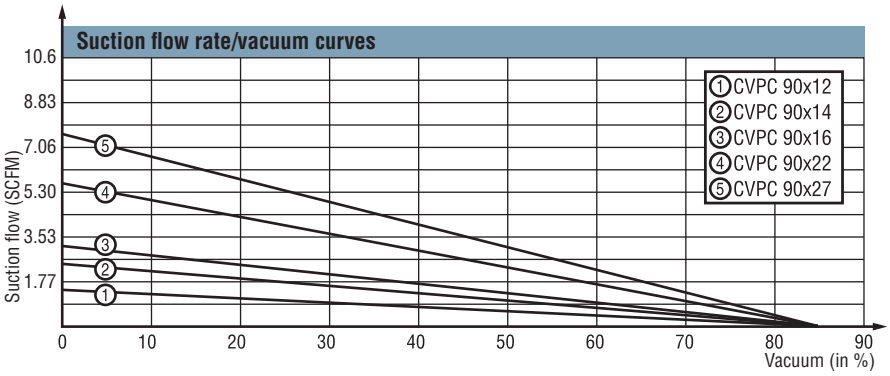
# CVPC
## Controlled Vacuum Cartridges
Technical and Performance Data

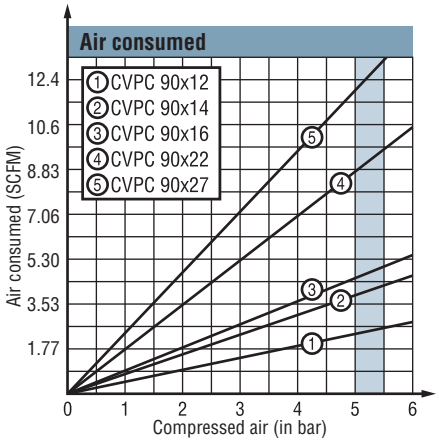
### Characteristics

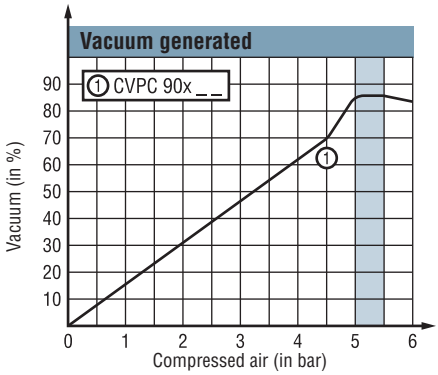
| Model | Ø nozzle (mm) | Air consumed (SCFM) | Maximum vacuum (%) | Air drawn in (SCFM) | At optimal air pressure (bar) |
|---|---|---|---|---|---|
| **CVPC90x12** | 1.2 | 2.47 | 85 | 1.45 | 5 to 5.5 |
| **CVPC90x14** | 1.4 | 4.06 | 85 | 2.47 | 5 to 5.5 |
| **CVPC90x16** | 1.6 | 4.77 | 85 | 3.18 | 5 to 5.5 |
| **CVPC90x22** | 2.2 | 9.18 | 85 | 5.65 | 5 to 5.5 |
| **CVPC90x27** | 2.7 | 12.5 | 85 | 7.59 | 5 to 5.5 |

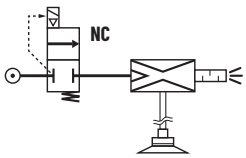
### Evacuation time in seconds per liter

| % 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 |

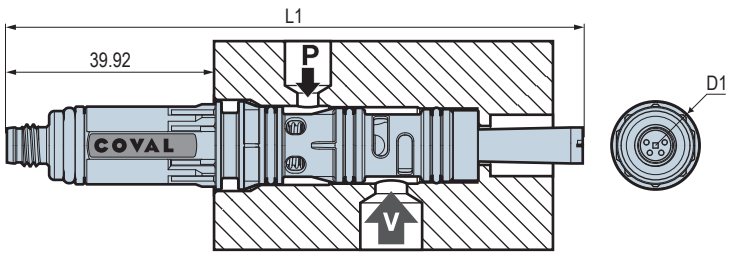


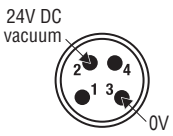




### Dimensions and electrical connections




| 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




M8 male connector, 4-pin

### 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: 1.45 to 7.59 SCFM depending on model.
- Air consumption: 2.47 to 12.5 SCFM 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 32 to 122 °F.
- 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

# CVPC
## Controlled Vacuum Cartridges
Ordering, Accessories

### To place an order

| CVPC | 90 | X | | 12 | | K |
|---|---|---|---|---|---|---|

| VACUUM LEVEL | |
|---|---|
| 85% max. vacuum | 90 |

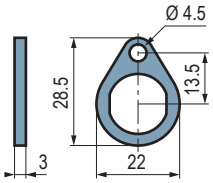
| NOZZLE DIAMETER | |
|---|---|
| 1.2 mm nozzle Ø | 12 |
| 1.4 mm nozzle Ø | 14 |
| 1.6 mm nozzle Ø | 16 |
| 2.2 mm nozzle Ø | 22 |
| 2.7 mm nozzle Ø | 27 |

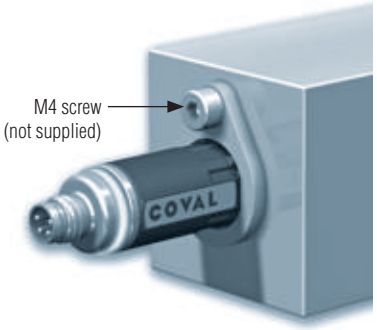
| THROUGH-TYPE SILENCER | |
|---|---|
| – | Without |
| K | With silencer |

### Mounting accessories

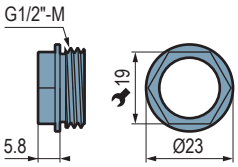
The CVPC controlled vacuum cartridges offer two mounting solutions:

**Option CVPCFIX1**
- Flange mounting




**Option CVPCFIX2**
- Mounting with G1/2"-M threaded ring



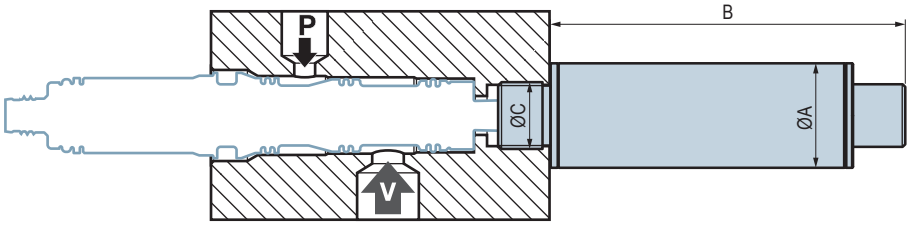
### Through-type silencers - option K

- Lateral noise absorption on sound-absorbing material.
- Unrestricted exhaust without pressure loss or clogging.
- Average sound attenuation of 20 dBA.

| 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 |

➔ Silencer for **CVPC size 1**
(CVPC90X**12K**/CVPC90X**14K**/CVPC90X**16K**)
- **G1/4"-M** silencer
  - Materials:- aluminum thread
  - PA6 tube, 30% GF

➔ Silencer for **CVPC size 2**
(CVPC90X**22K**/CVPC90X**27K**)
- **G1/2"-M** silencer
  - Material: - polycarbonate, 30% GF




### Blow-off valve

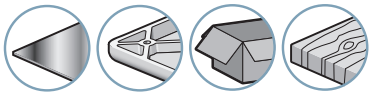
In some cases, a blow-off function must be added to the equipment to guarantee quick release and reduce cycle times. This is why COVAL developed an easy-to-integrate controlled blow-off cartridge.
➔ See **CBP** Series, page 6/16.

# CBP
## Pilot Control Cartridge
## General information

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.

Industry-specific applications



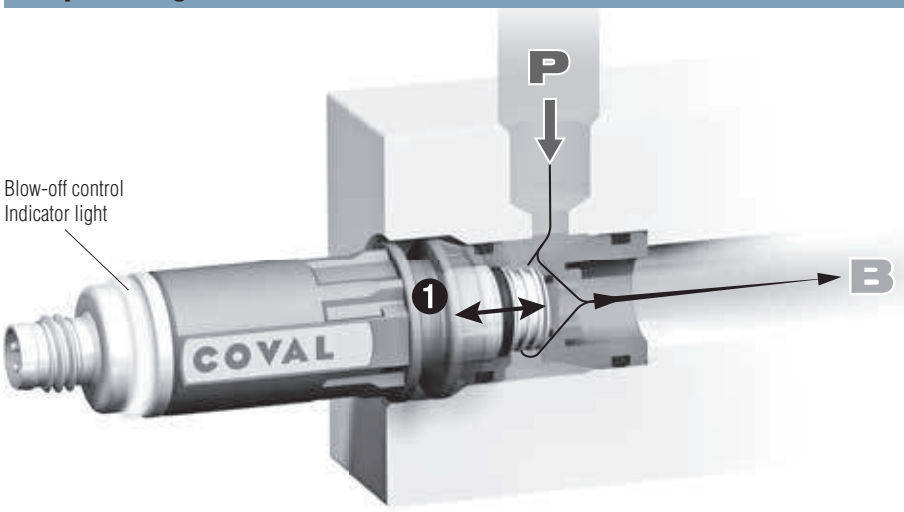
### Advantages

- 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.
- …

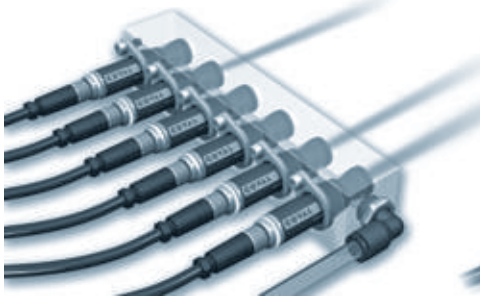
### Compact integration



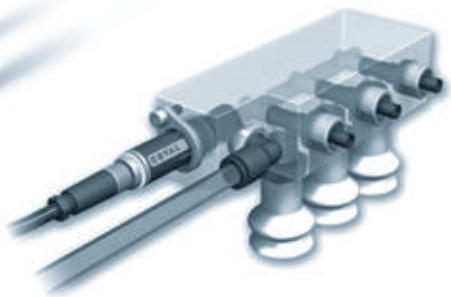

❶ Solenoid valve.

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

# CBP

## Pilot Control Cartridge

Implementation, Technical Data and Ordering

## Implementation

**1**

1. Recess is machined to integrate the cartridge.

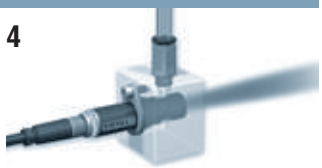
**2**

2. Cartridge is installed. Two mounting solutions are available: flange or threaded ring (see below).

**3**

3. Peripheral equipment is assembled.

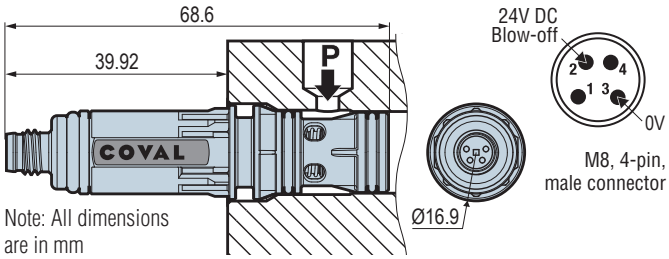
**4**



4. Pneumatic and electrical 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**

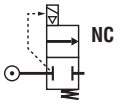
## Dimensions and electrical connections




Note: All dimensions are in mm

## Characteristics

| Model | Type | Nominal flow rate at 6 bar Δp1 (SCFM) | Nominal diameter (mm) |
|---|---|---|---|
| CBP300 | 2/2 | 12.5 | 3 |




## Overall characteristics

- C.A. supply 5µ 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 ±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 32 to 122 °F.
- Materials: PA 6-6 15 % GF, brass, aluminum, NBR.

## To place an order

| CBP | 300 |
|---|---|

| FLOW RATE | |
|---|---|
| 12.5 SCFM | 300 |

## Capacity

One CBP pilot control cartridge can be used to control several CVP vacuum cartridges:

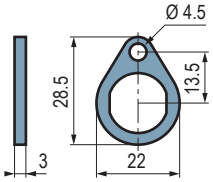
- CVP90X12 > 5 cartridges
- CVP90X14 > 3 cartridges
- CVP90X16 > 2 cartridges
- CVP90X22 > 1 cartridge
- CVP90X27 > 1 cartridge

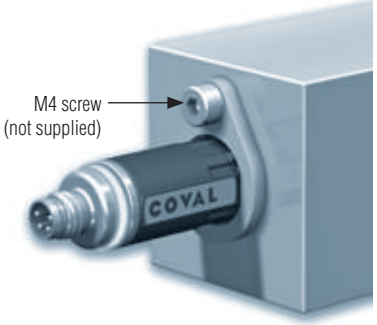
## Mounting accessories

There are two mounting solutions for the CBP Pilot Control Cartridge:

**Option CVPCFIX1**

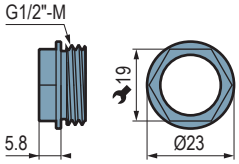
- Flange mounting.

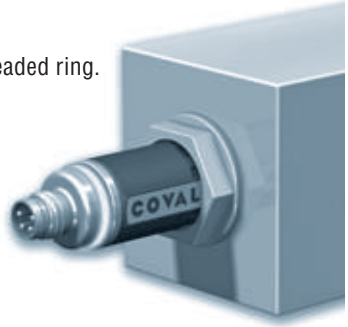



**Option CVPCFIX2**

- Mounting with G1/2"-M threaded ring.




6

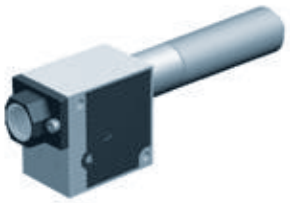
CBP

6

# Vacuum Pumps without control

Chapter 7

## GVP

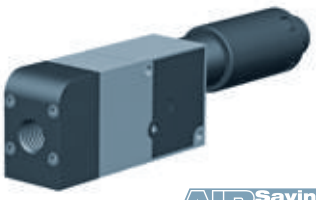


### Vacuum Pumps

- Nozzle Ø: 1.2 ; 1.5 ; 2 ; 2.5 ; 3 mm
- Suction flow rate: 1.59 to 15.9 SCFM
- 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 7/2

## GEMP




### 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: 2.54 to 13.6 SCFM
- 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 7/8

## GVEC

### "Easy Clean" Vacuum Pumps

- Nozzle Ø: 1.5 ; 2.5 ; 3 mm
- Suction flow rate: 3.35 to 11.65 SCFM
- 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 7/11

## LEMP

### 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: 1.02 to 3.25 SCFM
- Integrated supply pressure regulator (ASR)
- With or without vacuum switch
- Stand-alone or island module
- Integrated silencer
- For airtight and porous objects
- Ultra compact and lightweight
- Energy savings in all networks > 4 bar
- Reduced installation time
- Adaptable to all industries

P 7/14

# GVP
## Vacuum Pumps

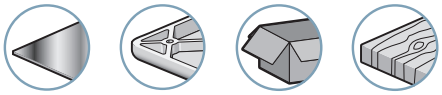
The GVP series vacuum pumps are the simplest in the range. They exist in 5 levels of power (suction rate) and 3 different levels of maximum vacuum:

- 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 (SCFM) | Max. vacuum (%) | | | Air drawn in (SCFM) | | | At air pressure (bar) |
|---|---|---|---|---|---|---|---|---|---|
| | | | X | T | N | X | T | N | |
| **GVP 12** | 1.2 | 2.37 | 40 | 75 | 85 | 5.30 | 2.22 | 1.59 | 4 |
| **GVP 15** | 1.5 | 3.53 | 50 | 75 | 85 | 6.36 | 3.35 | 2.47 | 4 |
| **GVP 20** | 2 | 6.36 | 50 | 75 | 85 | 8.83 | 5.65 | 4.41 | 4 |
| **GVP 25** | 2.5 | 9.53 | 50 | 75 | 85 | 12.71 | 8.48 | 7.06 | 4 |
| **GVP 30** | 3 | 14.13 | 50 | 75 | 85 | 15.90 | 11.65 | 9.36 | 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

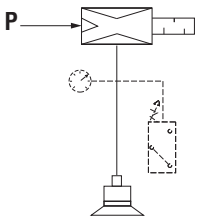
7 GVP

### 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** | 32 to 176 °F |



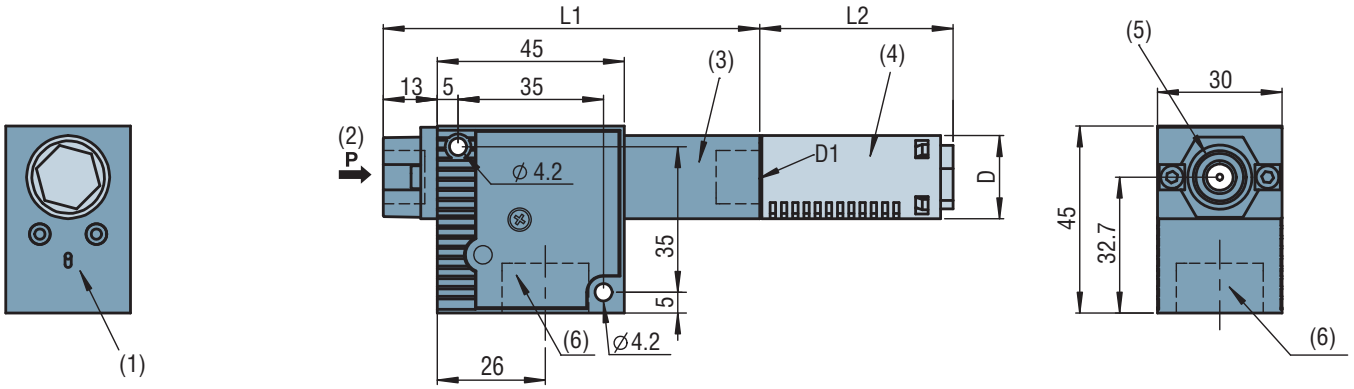

### For all orders, please specify:
### Model + Nozzle Ø + % vacuum + Silencer + C.A. fitting
### e.g.: GVP30NK14

| 1: Model | 2: Nozzle diameter | | 3: % vacuum | | 4: Silencer | | 5: C.A. fitting | |
|---|---|---|---|---|---|---|---|---|
| **GVP** | **12** | 1.2 mm | **X** | 50 % vacuum | **-** | Without silencer | **14** | G1/4" Female |
| | **15** | 1.5 mm | **T** | 75 % vacuum | **S** (1) | Diffuser | | |
| | **20** | 2 mm | **N** | 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

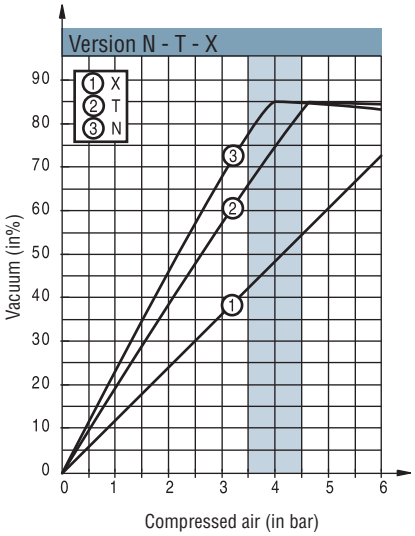
**Options**
- Vacuum switches see pages 7/5 and 7/6.
- Other options see pages 7/6 and 7/7.
- Silencer see page 11/11.

**Curves**
See page 7/4.

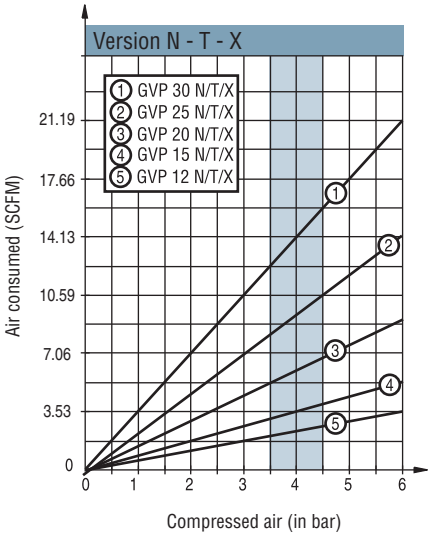
Note: all dimensions are in mm

# GVP
## Vacuum Pumps
Performance Curves

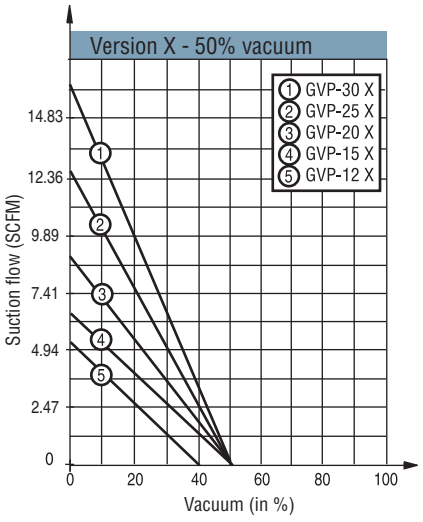
### Vacuum Generated - Supply pressure 4 bar

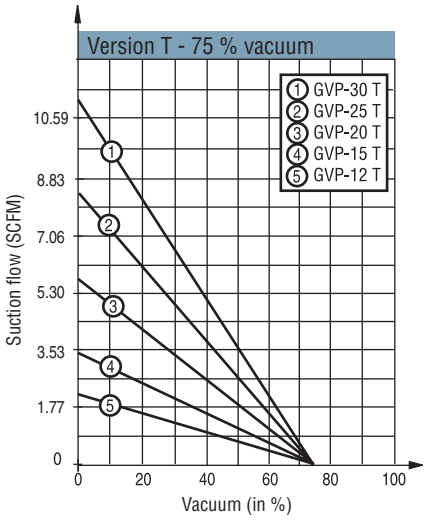


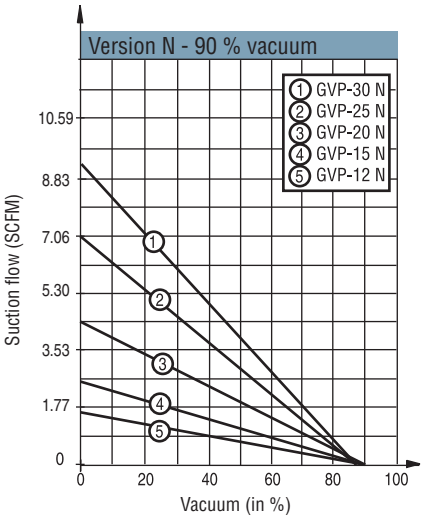

### Air Consumed - Supply pressure 4 bar



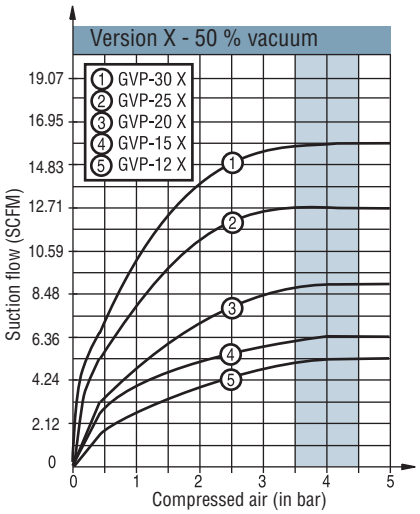

### Suction Flow Rate/Vacuum Curves - Supply pressure 4 bar

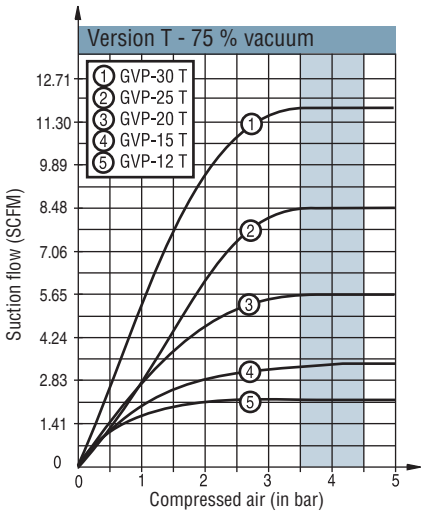


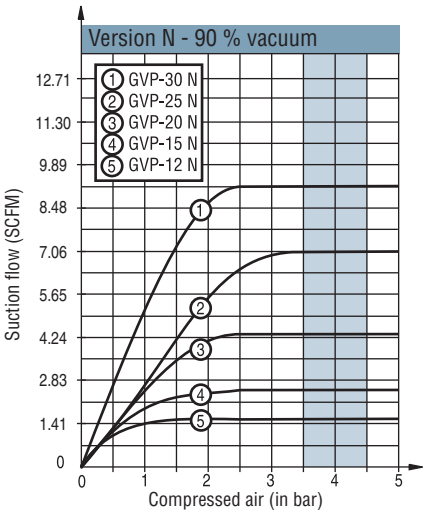




### Suction Flow Rate Generated - Supply pressure 4 bar



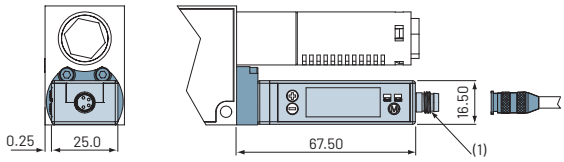



# Customer-mounted
Vacuum Pump Options

## 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

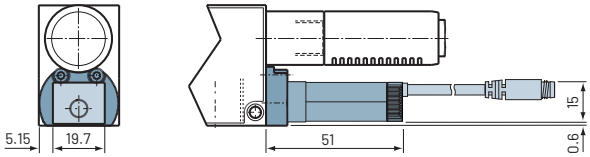
Our top-of-the-range electronic vacuum switch, the PSA 100C has an LED display showing the vacuum value in different units. It also has two separate outputs with independently regulated hysteresis, NO or NC

- 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

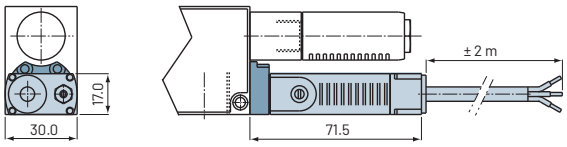
The vacuum data collected is always very reliable even with a large number of suction pads, thanks to the precision of the PSP100CX. It has one output with hysteresis adjustment.

- PNP as standard
- M8 connector.
- Connection cable, see page 11/12.

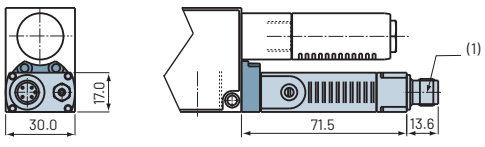
## Vacuum Switch with Electrical Signal

**GVO PSE 100 E or EC option**

(See characteristics page 12/9)




GVO PSE 100 E with cable (length 2 metres)

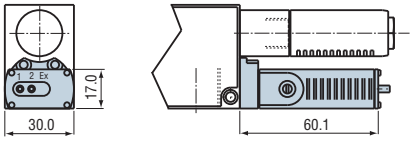



GVO PSE 100 EC with M12 connector (delivered without connection cable)
(1) M12 male connector

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.

## Vacuum Switch with Pneumatic Signal

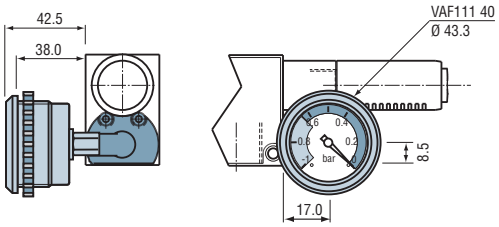
**GVO PSE 100 P NO or NC option** (see characteristics page 12/10)




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

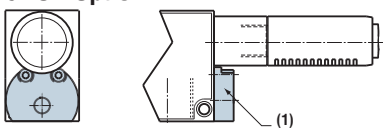
**GVO VAF 111 40 option** (See characteristics page 12/12)




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.

## Plug to Shut off Vacuum Data

**GVOB Option**



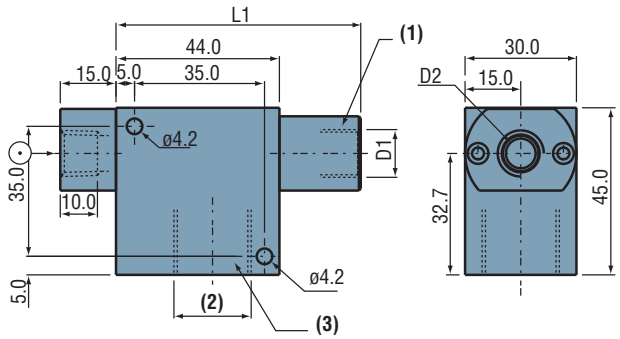

(1) Plug

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.

## 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)

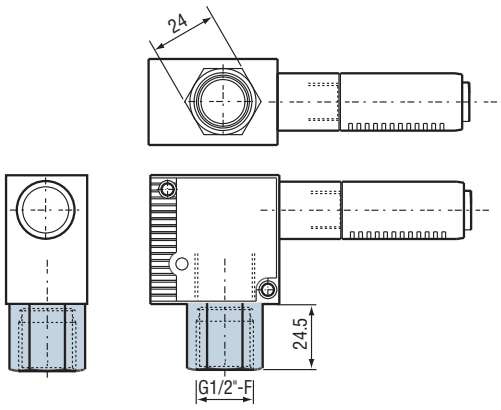
(**1**) Exhaust
(**2**) G1/2"-F
(**3**) Vacuum

## GVO P Option

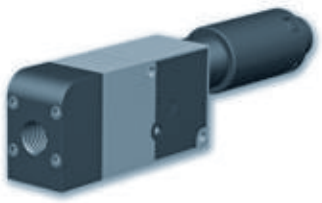
With G1/2"-F protective extension.

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.



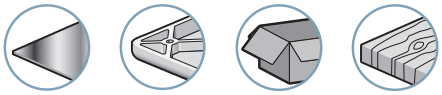
# GEMP
## Simple Vacuum Pump with ASR



AIR Saving Regulator

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 (SCFM) | Maximum vacuum (%) | Air drawn in (SCFM) | At air pressure (bar) |
|---|---|---|---|---|---|
| **GEMP60x12** | 1.2 | 2.30 | 60 | 2.54 | 4 |
| **GEMP60x15** | 1.5 | 3.43 | 60 | 3.88 | 4 |
| **GEMP60x20** | 2.0 | 6.32 | 60 | 6.67 | 4 |
| **GEMP60x25** | 2.5 | 9.18 | 60 | 9.71 | 4 |
| **GEMP60x30** | 3.0 | 13.60 | 60 | 13.60 | 4 |
| **GEMP90x12** | 1.2 | 2.30 | 85 | 1.77 | 4 |
| **GEMP90x15** | 1.5 | 3.43 | 85 | 2.65 | 4 |
| **GEMP90x20** | 2.0 | 6.32 | 85 | 4.41 | 4 |
| **GEMP90x25** | 2.5 | 9.18 | 85 | 7.06 | 4 |
| **GEMP90x30** | 3.0 | 13.60 | 85 | 8.65 | 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** | 32 to 176 °F |

### Vacuum Switch Characteristics

See pages 7/9.

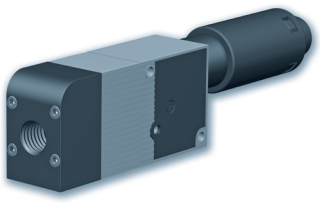
**For all orders, please specify:**
**Model + % vacuum + X + Ø Nozzle + Vacuum switch.**
**e.g.: GEMP90X12VA**

| 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 |
| | | | | **15** | 1.5 mm | **VB** | electronic |
| | **90** | max. 85% vacuum (air-tight objects) | | **20** | 2 mm | **VC** | with electrical contact |
| | | | | **25** | 2.5 mm | **VO** | without vacuum switch |
| | | | | **30** | 3 mm | | |

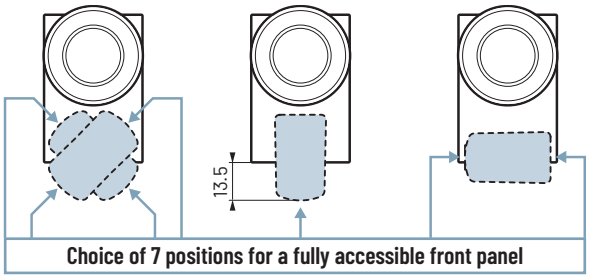
# GEMP

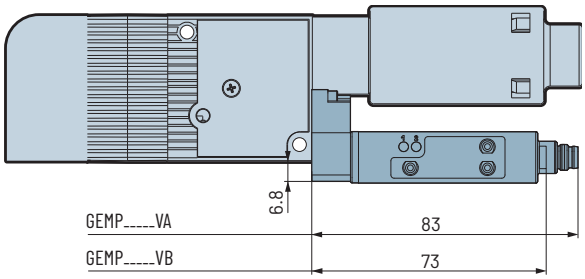
## Simple Vacuum Pump with ASR

Vacuum Switch Functions and Connections



## 1 - Modules with Electronic Indexable Vacuum Switch GEMP-----VA or GEMP-----VB



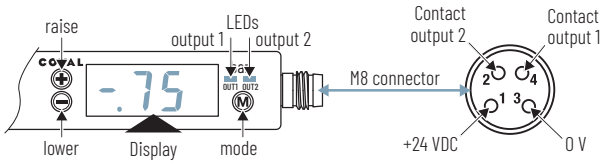



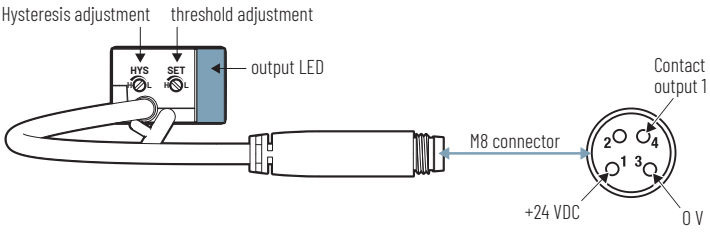

### Vacuum switch with display, 2 outputs, GEMP-----VA

- compatible fluids: non-cor osive gas, dry, non-lubricated air.
- measuring range: -1 ... 0 bar
- hysteresis: configu able.
- 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: 32 to 122 °F

### 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 exsess 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: 32 to 122 °F

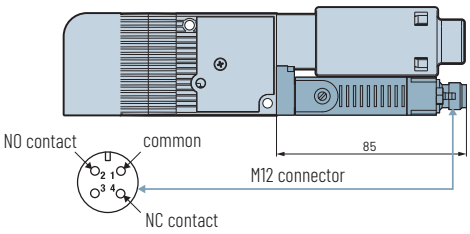



## 2 - Modules with Electrical Contact Vacuum Switch GEMP-----VC

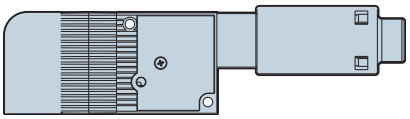
### Contact vacuum switch, GEMP-----VC

- 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: 14 to 122° F.
- number of operations: 5 million cycles.
- maximum throughput: 30 cycles perminute.




## 3 - Modules without Vacuum Switch GEMP-----VO

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.

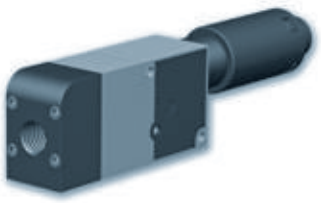


**Note:**
Screw-on electrical connectors, straight and angled M8 and M12 shown p. 11/12.

# GEMP

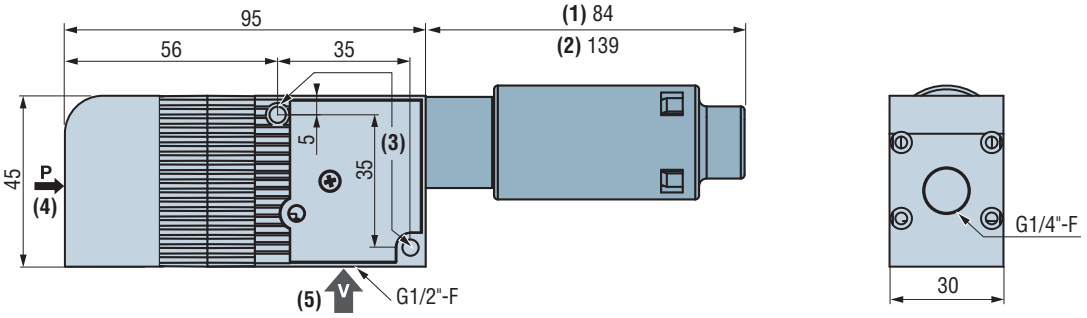
## Simple Vacuum Pump with ASR

Dimensions and Performance Curves



AIR Saving Regulator

### Dimensions

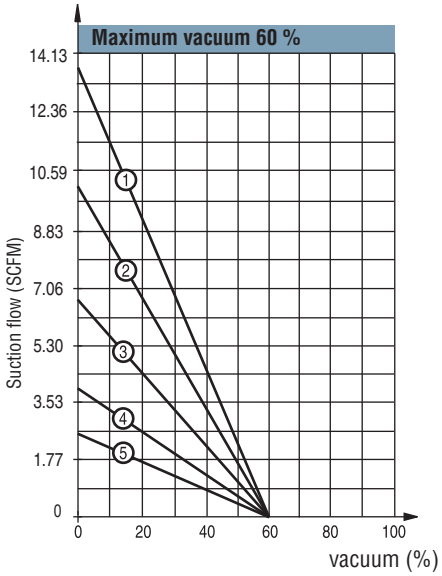




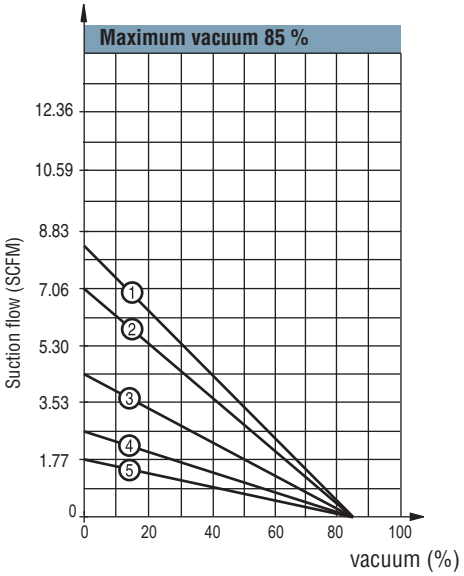


(**1**) silencer for nozzles Ø 1.2 or 1.5 mm (GEMP--X12--, GEMP--X15--)
(**2**) silencer for nozzles Ø 2 - 2.5 or 3 mm (GEMP--X20--, GEMP--X25--, GEMP--X30--)
(**3**) fittings Ø 4.2 mm
(**4**) G1/4"-F pressure fitting: pressure at 4 bar
(**5**) G1/2"-F vacuum fitting

### 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

# GVEC
## “Easy Clean” Vacuum Pumps

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.

Industry-specific applications

### Characteristics

| Model | Ø Nozzle (mm) | Air consumed (SCFM) | Max. vacuum (%) | Air drawn in (SCFM) | At air pressure (bar) |
|---|---|---|---|---|---|
| **GVEC15T18** | 1.5 | 3.53 | 75 | 3.35 | 4 |
| **GVEC25T14** | 2.5 | 9.53 | 75 | 8.48 | 4 |
| **GVEC30T14** | 3 | 14.13 | 75 | 11.65 | 4 |

### Advantages

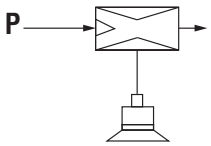
- Plastic and stainless steel materials: meet the requirements of splash zones, are resistant to cleaning agents and corrosion.
- Compact and light design: installation as close as possible to suction cups to improve the evacuation times and production rate.
- Easy disassembly: quick and precise cleaning.

### 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 32 to 122°F | |
| **Cleaning temperature** | max. 212°F | |




**Specify the part number e.g.: GVEC25T14**
**Please refer to the characteristics table above**

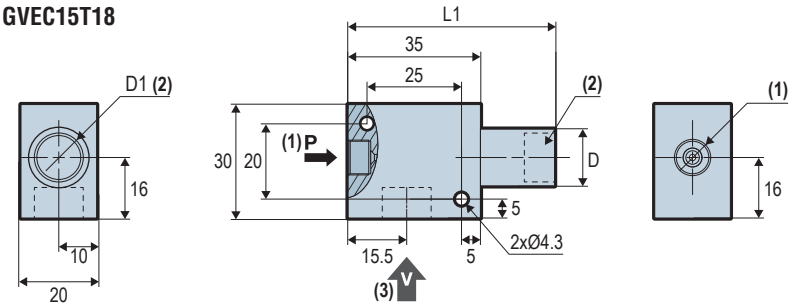
# GVEC

## "Easy Clean" Vacuum Pumps

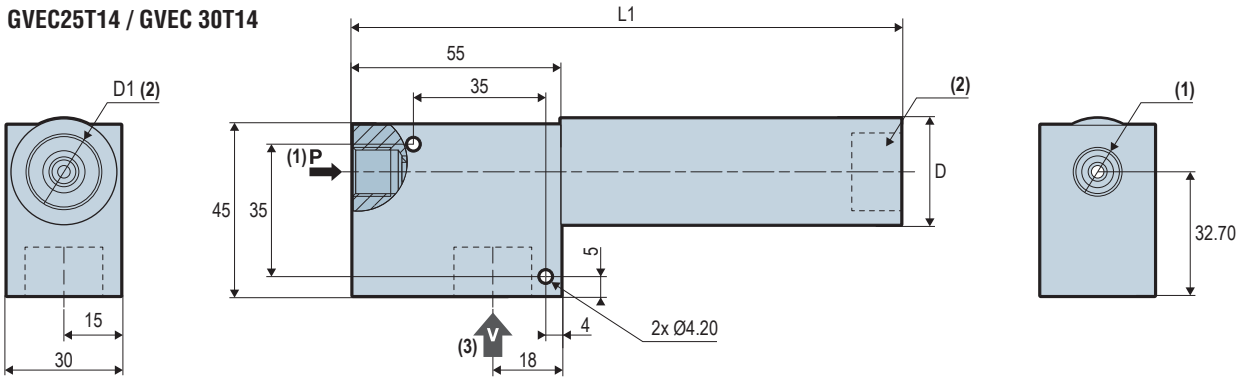
Dimensions

## 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

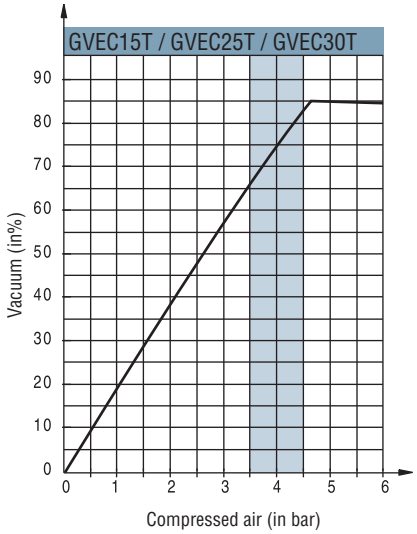
Note: all dimensions are in mm

# GVEC

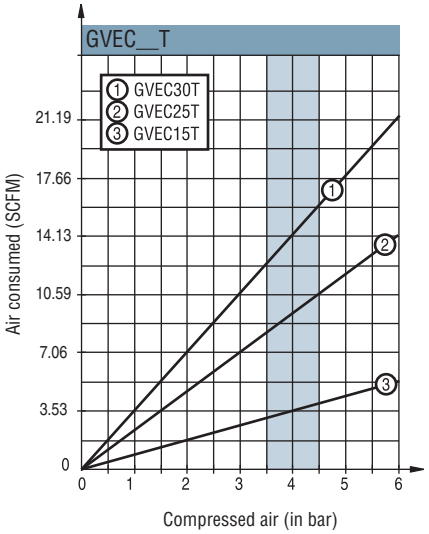
## "Easy Clean" Vacuum Pumps

Performance Curves

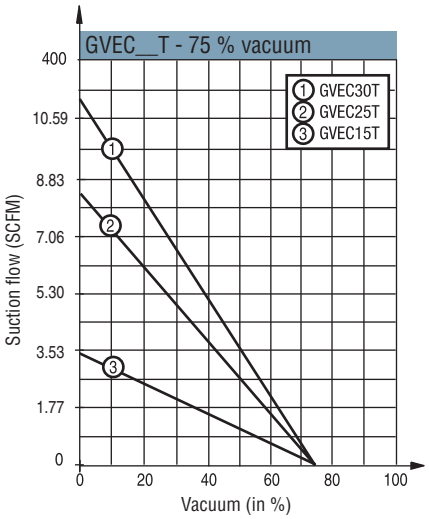
### Vacuum Generated - Supply pressure 4 bar



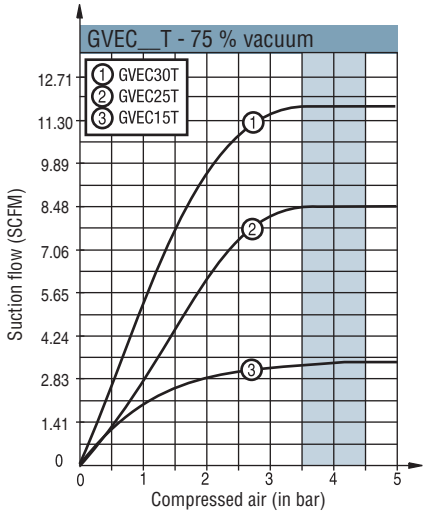

### Air Consumed - Supply pressure 4 bar




### Suction Flow Rate/Vacuum Curves - Supply pressure 4 bar




### Suction Flow Rate Generated - Supply pressure 4 bar



# LEMP

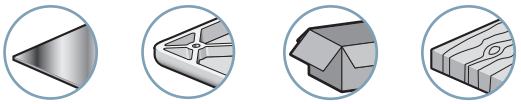
## Mini Vacuum Pumps without control with ASR
(Air Saving Regulator)

AIR Saving Regulator

### 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.

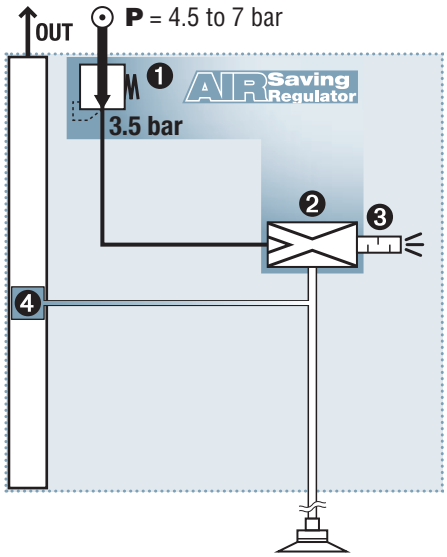
Industry-specific applications



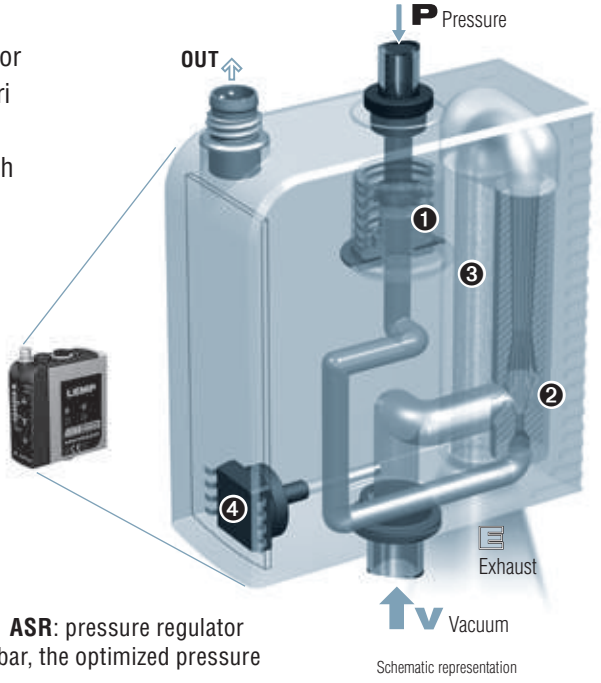
For all objects, porous or airtight

### 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** (≅ 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

AIR Saving Regulator

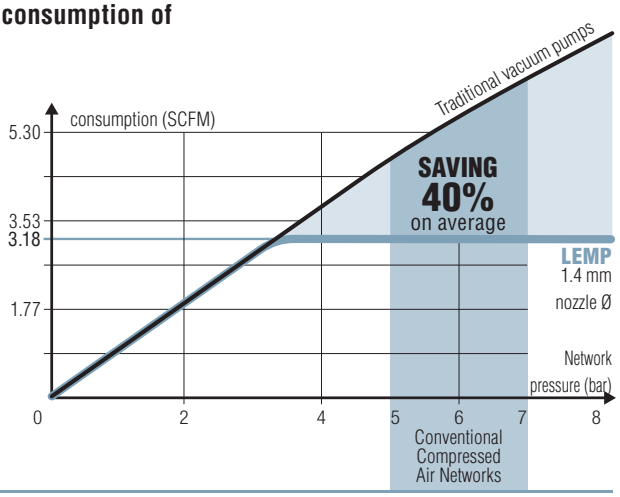
**40%** Energy savings

Combined "venturi regulator" **ASR**: pressure regulator ❶ feeds venturi ❷ with 3.5 bar, the optimized pressure for its operation.

➔ **No more unnecessary consumption of compressed air.**

### 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.



# LEMP

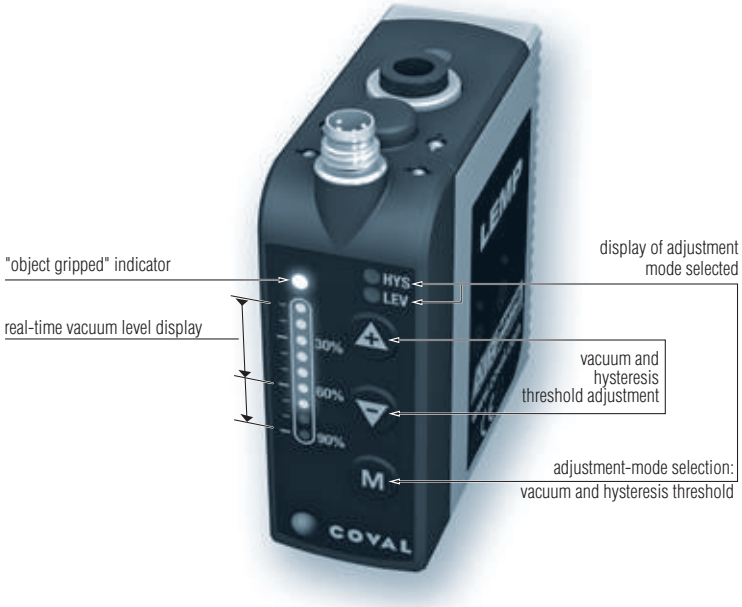
## Mini Vacuum Pumps without control with ASR

Optional Vacuum Switch/Stand-alone and Island Modules

AIR Saving Regulator

### 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.

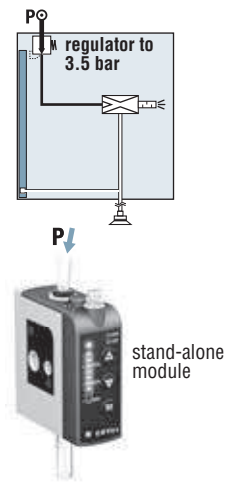



### Stand-alone or Island Modules?

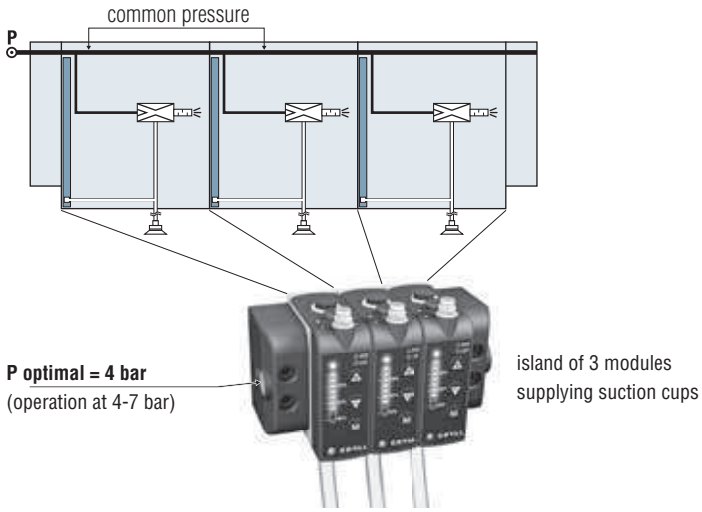
Stand-alone modules are suitable for the most common applications; one module controls one or more suction cups which all operate according to the same sequence.
When several suction cups are operating according to different sequences, multiple modules are required, which can be:
- several stand-alone 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**



# LEMP

## Mini Vacuum Pumps without control with ASR

Selection Guide

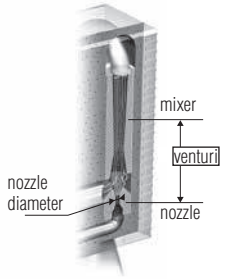
AIR Saving Regulator

## 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.

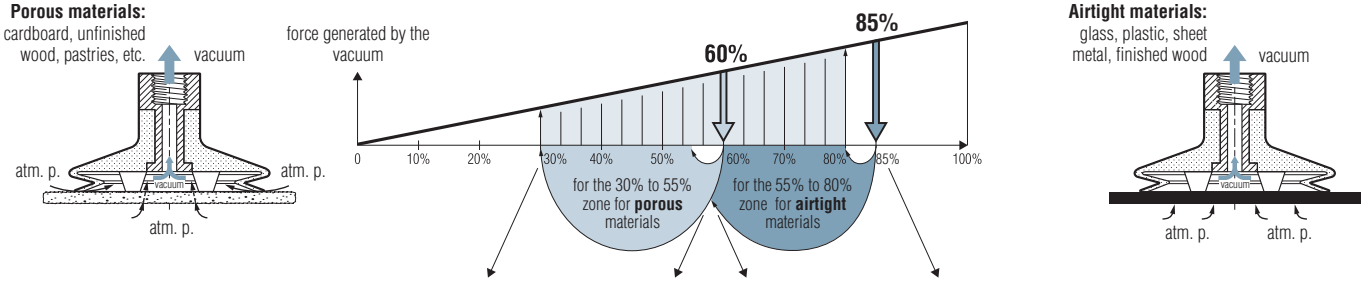
Taking into account the volume to be emptied and the response time to do so, the chart below is a guide towards the most economical nozzle and gives the air suction flow.




■ **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 Objects ▸ Maximum Vacuum Level: 60%

**Time to create vacuum** (seconds) **for a volume of 1 liter**

| ø nozzle \ vacuum achieved | 30% | 35% | 40% | 45% | 50% | 55% | Air consumed (SCFM) | Air drawn in (SCFM) |
|---|---|---|---|---|---|---|---|---|
| **1.0 mm** | 0.66 | 0.83 | 1.04 | 1.31 | 1.70 | 2.35 | **1.55** | **1.34** |
| **1.2 mm** | 0.41 | 0.52 | 0.66 | 0.83 | 1.07 | 1.49 | **2.30** | **2.54** |
| **1.4 mm** | 0.27 | 0.34 | 0.43 | 0.54 | 0.70 | 0.97 | **3.18** | **3.25** |

### Airtight Objects ▸ Maximum Vacuum Level: 85%

**Time to create vacuum** (seconds) **for a volume of 1 liter**

| ø nozzle \ vacuum achieved | 55% | 60% | 65% | 70% | 75% | 80% | Air consumed (SCFM) | Air drawn in (SCFM) |
|---|---|---|---|---|---|---|---|---|
| **1.0 mm** | 1.76 | 2.04 | 2.38 | 2.80 | 3.33 | 4.09 | **1.55** | **1.02** |
| **1.2 mm** | 1.13 | 1.31 | 1.53 | 1.80 | 2.15 | 2.64 | **2.30** | **1.59** |
| **1.4 mm** | 0.73 | 0.85 | 0.99 | 1.16 | 1.38 | 1.70 | **3.18** | **2.47** |

## Select with or without Vacuum Switch

For common applications, the vacuum switch is needed, with the dialogue face for digital display and adjustment.

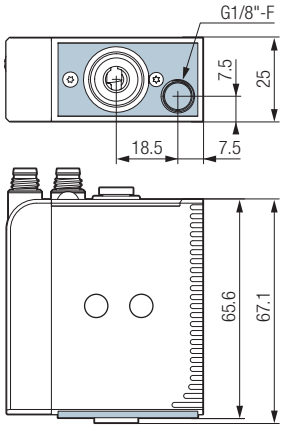
However, some applications may just require a simple operation, without an "object gripped" return signal. The simplified version may then be chosen, with no vacuum switch, display, or adjustment.

## 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.



# LEMP

## Mini Vacuum Pumps without control 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**

| LEMP | 60 | X | 12 | VA | | – | | B3 |
|---|---|---|---|---|---|---|---|---|

### VACUUM LEVEL

| | |
|---|---|
| 60% max. vacuum ➔ porous objects | 60 |
| 85% max. vacuum ➔ airtight objects | 90 |

### NOZZLE DIAMETER

| | |
|---|---|
| Ø 1 mm nozzle | 10 |
| Ø 1.2 mm nozzle | 12 |
| Ø 1.4 mm nozzle | 14 |

### VACUUM SWITCH

| | | |
|---|---|---|
| VA | ■ Electronic vacuum switch with digital display and adjustment | |
| V0 | ■ No vacuum switch and no adjustment | |

### EXHAUST

| | |
|---|---|
| Open (integrated silencer) | – |
| Exhaust manifold (G1/8''-F) | E |

### ISLAND ASSEMBLIES

| | | |
|---|---|---|
| B2 | | LEMP__X____**B2** island assembly with 2 identical modules. |
| B3 | | LEMP__X____**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 | | LEMP__X____**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. **PART NO.: LEMSETA** |

**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**

→ 3 LEMP modules for a group, of different types.

■ **LEMSETA** → 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.

# LEMP

## Mini Vacuum Pumps without control with ASR

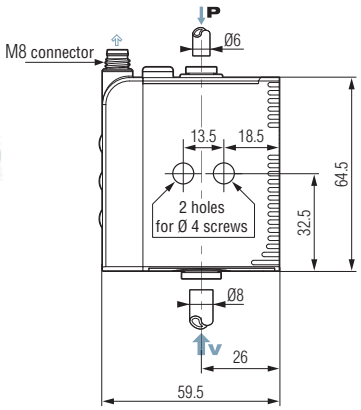
Dimensions / Mounting options

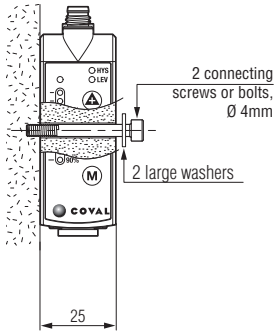
AIR Saving Regulator

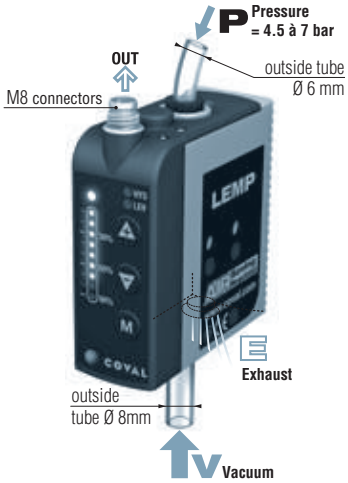


## Stand-alone Modules

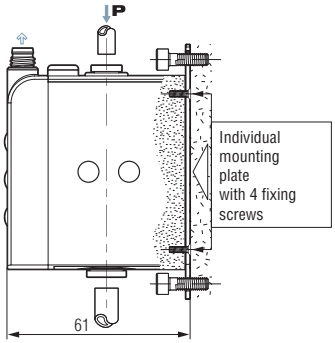
**Side mounting**

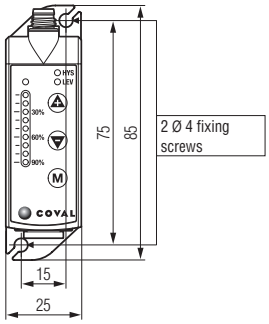


**Front mounting**

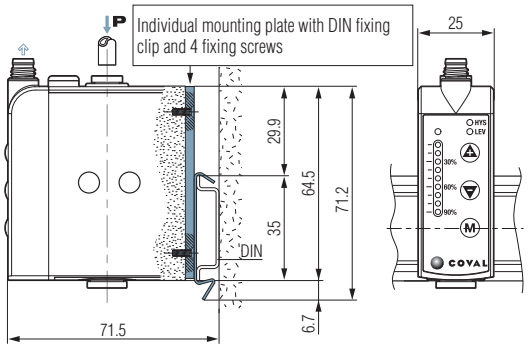



For front mounting, order the necessary kit, in addition to the module:

| Front mounting kit: 1 plate + 4 screws |
|---|
| **Part No.: LEMFIXA** |

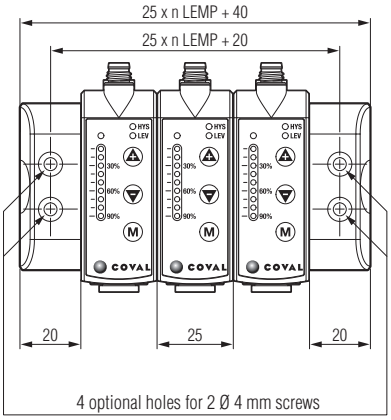
**Mounting on DIN rail**



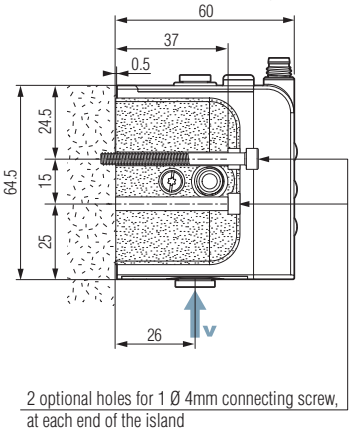

A module can be clipped onto a DIN rail. For this purpose, the module must first be equipped with an individual DIN installation plate, ordered separately:

| DIN rail mounting kit: 1 plate/clip + 4 screws |
|---|
| **Part No.: LEMFIXB** |

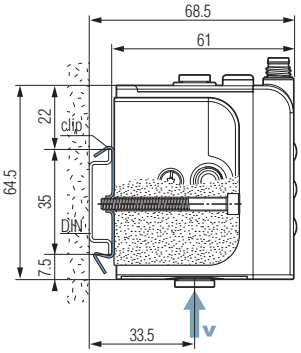
## Islands




**Front mounting**




**Mounting on DIN rail**




| DIN rail mounting kit: 2 clips + 2 screws |
|---|
| **Part No.: LEMFIXC** |

# LEMP

## Mini Vacuum Pumps without control with ASR

Characteristics / Assembling an Island

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: P = 4 bar.
- Maximum vacuum: 60% or 85% depending on model.
- Suction rate: 1.02 to 3.25 SCFM depending on model.
- Air consumption: 1.55 to 3.18 SCFM depending on model.
- Electrical protection level: IP 65.
- Weight: 90 to 110 g, depending on model.
- Operating temperature: 32 to 122 °F.
- Materials: PA 6-6 15 %FV, brass, aluminum, NBR.

### Integrated Vacuum Switch Characteristics

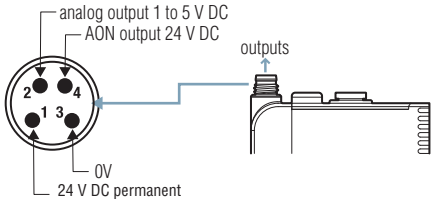
- Measuring range: -1 to 0 bar.
- Precision: ± 1.5% of the range.
- Hysteresis: adjustable from 0% to 100%.
- Output threshold: 1 x T.O.R. in NO.
- Analog output: 1 V DC to 5 V DC on the measuring range.
- Switching power: 125 mA, PNP.
- Threshold status display: 1 green LED.
- Supply voltage 24V DC (regulated ± 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**

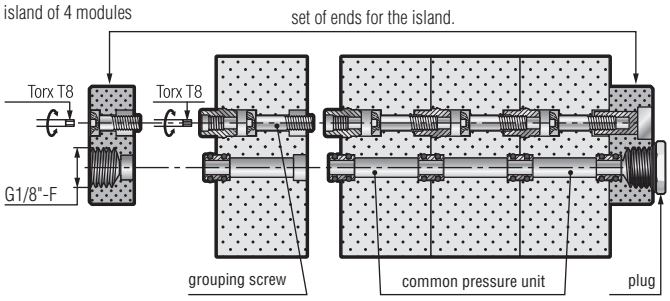


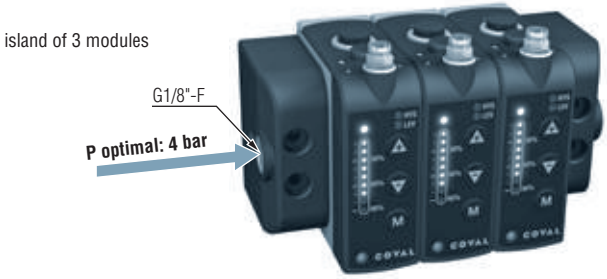

### Accessories

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

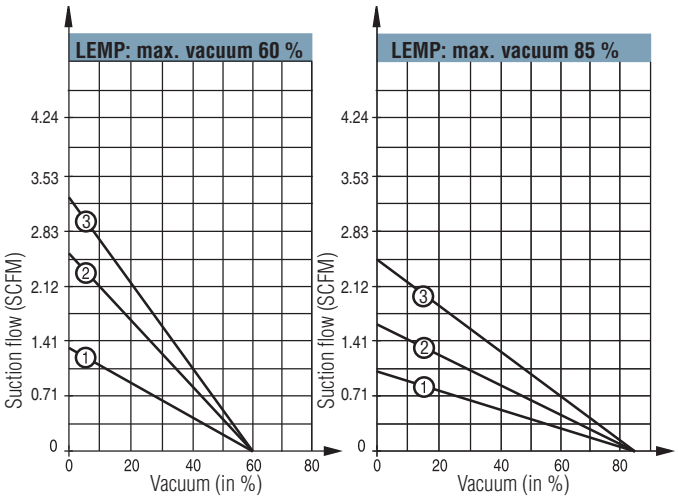



**Maximum number of modules in an island:**

- 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

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LEMP

# Intelligent Vacuum Pumps

Chapter 8

## LEM

AIR Saving Regulator

### 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 3.25 SCFM
- 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

AIR Saving Control

### 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 2.47 SCFM
- 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

IO-Link AIR Saving Control

### Mini Vacuum Pumps Communicating via Industrial Field Bus

- Nozzle Ø: 1 ; 1.2 ; 1.4 mm
- Vacuum level: 85%
- Suction flow rate up to 2.47 SCFM
- 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

AIR Saving Control

PROFINET EtherNet/IP

### 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 3.25 SCFM
- 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+

AIR Saving Regulator

### 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 9.71 SCFM
- 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 bar
- Reduced wiring
- Reduced installation time
- Adaptable to all industries

P 8/39

# Intelligent Vacuum Pumps

Chapter 8

## 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 7.06 SCFM
- 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

NFC IO-Link AIR Saving Control

### Heavy Duty Communicating Vacuum Pumps

- Nozzle Ø: 2.5 ; 3 mm
- Vacuum level: 85%
- Suction flow rate up to 8.05 SCFM
- 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

P 8/51

## CMS HD

NFC IO-Link

### Heavy Duty Multi-stage Vacuum Pumps

- 3 powerful suction flow rates from 24.72 to 56.50 SCFM
- 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

P 8/65

# LEM

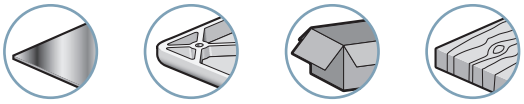
## Integrated Mini Vacuum Pumps with ASR
(Air Saving Regulator)

AIR Saving Regulator

### 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.

Industry-specific applications

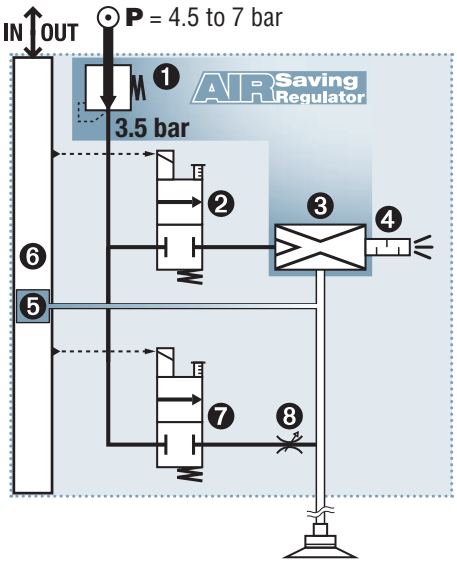


For all objects, porous or airtight

### Compact Integration

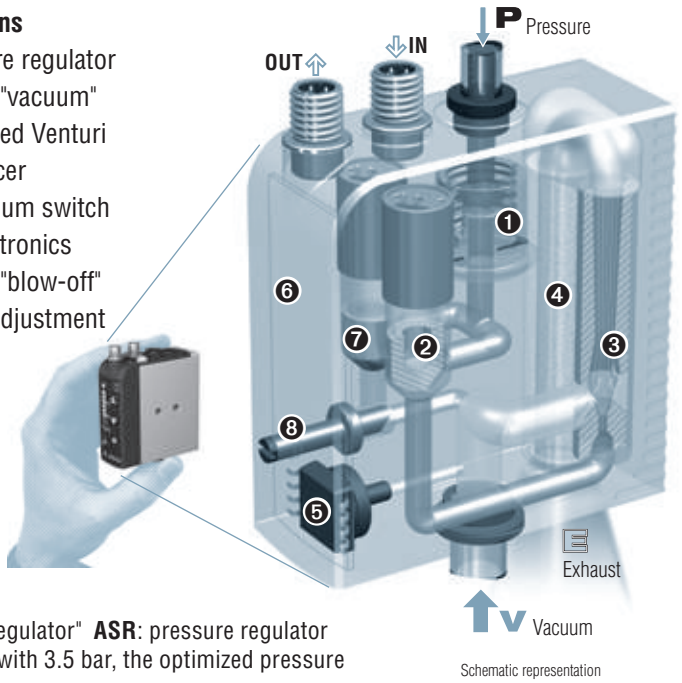
The illustrations below demonstrate the 8 functions integrated in the mini-module, and their respective roles in operation.
The result of this COVAL innovation is:

- **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




Schematic representation

AIR Saving Regulator

**40%** Energy savings

Combined "venturi regulator" **ASR**: pressure regulator ❶ feeds venturi ❸ with 3.5 bar, the optimized pressure for its operation.

➔ **No more unnecessary consumption of compressed air.**

### AIR Saving Regulator (ASR): Air Saving Regulator

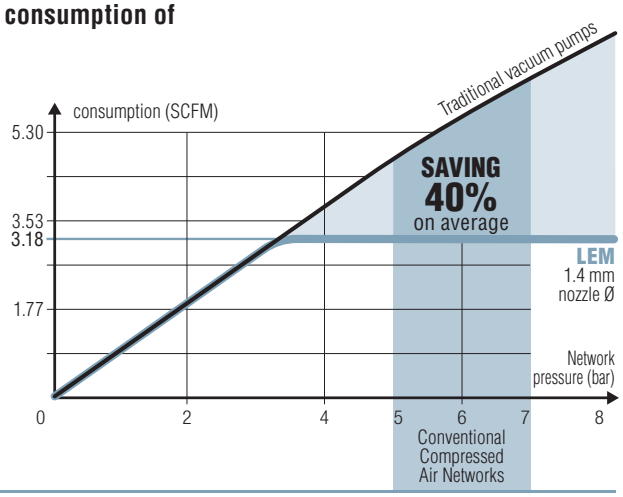
The LEM vacuum pumps, which integrate an **ASR** "venturi regulator" combination, maintain ideals that COVAL values greatly: reducing both compressed air consumption and noise generation.

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.



# LEM

## Integrated Mini Vacuum Pumps with ASR

Smart Dialogue / Stand-alone and Island Modules

AIR Saving Regulator

### 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 3.25 SCFM.
- 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

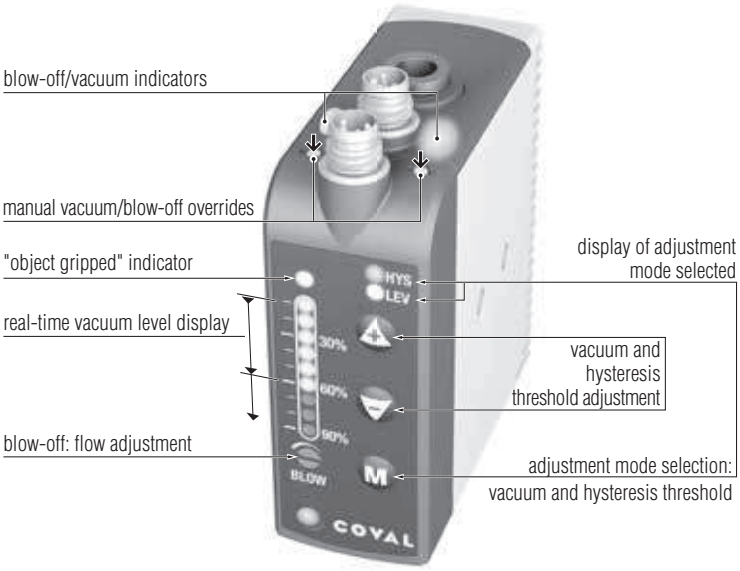
with blow-off (LEM__X__**SVO**)

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

8

LEM

# LEM

## Integrated Mini Vacuum Pumps with ASR

Stand-alone and Island Modules / Option

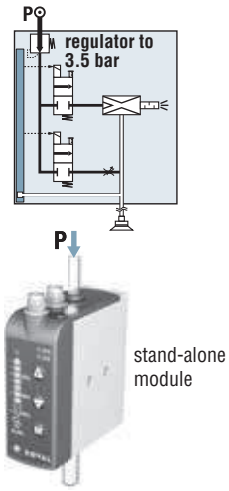
AIR Saving Regulator

### Stand-alone or Island Modules?

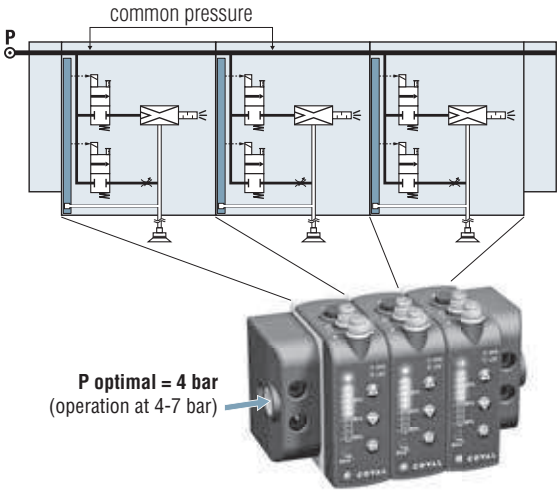
Stand-alone modules are suitable for the most common applications; one module controls one or more suction cups which all operate according to the same sequence.
When several suction cups are operating according to different sequences, multiple modules are required, which can be:
- several stand-alone 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**



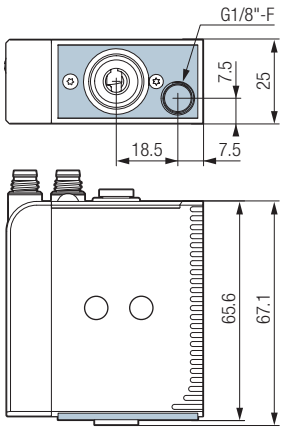

island of 3 modules supplying suction cups according to different sequences

### 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.



# LEM

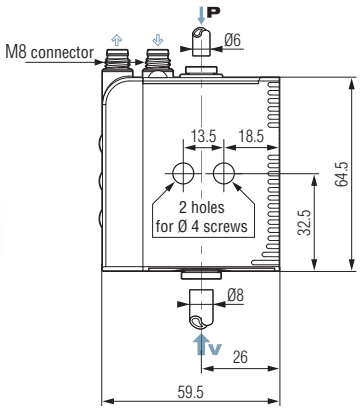
## Integrated Mini Vacuum Pumps with ASR

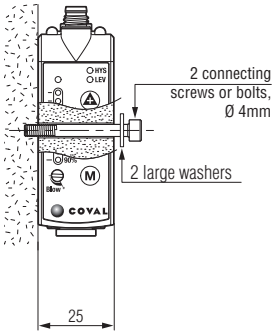
Dimensions / Mounting options

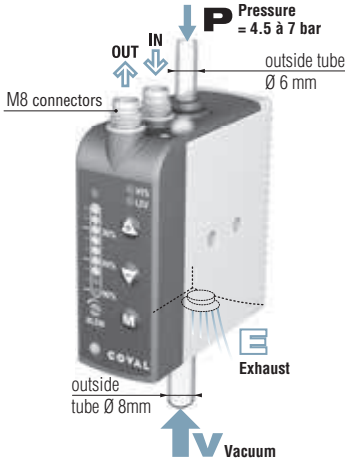
AIR Saving Regulator

### Stand-alone Modules

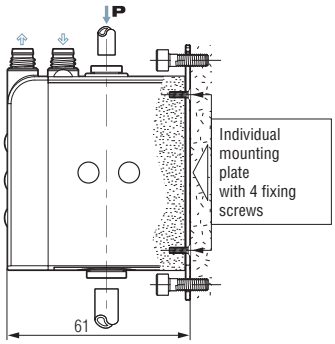
**Side mounting**

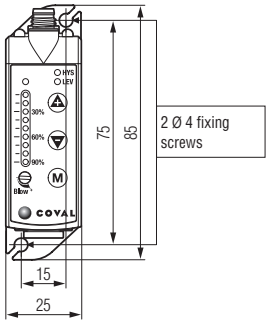


**Front mounting**

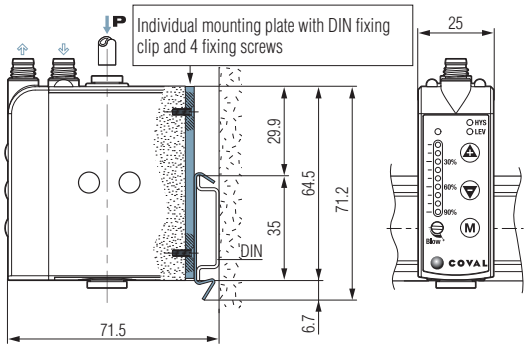



For front mounting, order the necessary kit, in addition to the module:

| Front mounting kit:<br>1 plate + 4 screws |
|---|
| **Part No.: LEMFIXA** |

**Mounting on DIN rail**



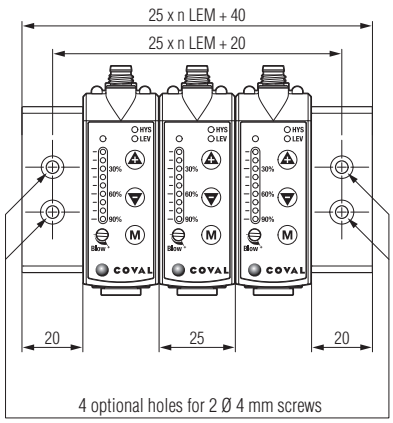

A module can be clipped onto a DIN rail. For this purpose, the module must first be equipped with an individual DIN installation plate, ordered separately:

| DIN rail mounting kit:<br>1 plate/clip + 4 screws |
|---|
| **Part No.: LEMFIXB** |

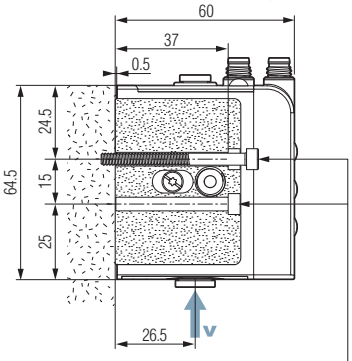
8

LEM

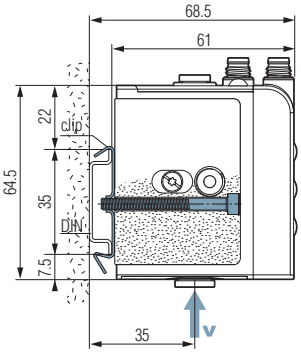
### Islands




**Front mounting**




**Mounting on DIN rail**




| DIN rail mounting kit:<br>2 clips + 2 screws |
|---|
| **Part No.: LEMFIXC** |

# LEM

## Integrated Mini Vacuum Pumps with ASR

Selection Guide

AIR Saving Regulator

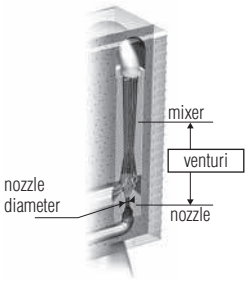
### LEM: Versatile Series for all Applications

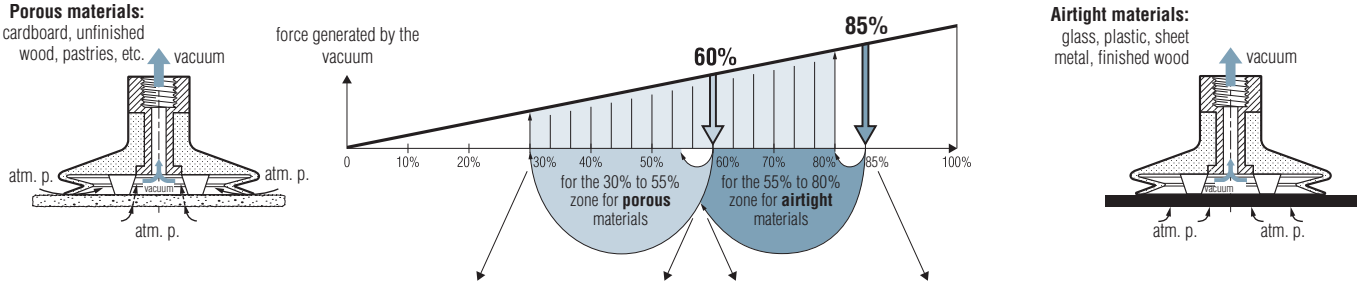
The opposite page demonstrates the versatility of this series. In addition to a very wide range of complete, stand-alone, or island vacuum pumps, there are the options of no blow-off and/or no vacuum switch, and for specific applications.

### 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 Objects ▸ Maximum Vacuum Level: 60%

**Time to create vacuum** *(seconds)* **for a volume of 1 liter**

| ø nozzle \ vacuum achieved | 30% | 35% | 40% | 45% | 50% | 55% | Air consumed *(SCFM)* | Air drawn in *(SCFM)* |
|---|---|---|---|---|---|---|---|---|
| **1.0 mm** | 0.66 | 0.83 | 1.04 | 1.31 | 1.70 | 2.35 | **1.55** | **1.34** |
| **1.2 mm** | 0.41 | 0.52 | 0.66 | 0.83 | 1.07 | 1.49 | **2.30** | **2.54** |
| **1.4 mm** | 0.27 | 0.34 | 0.43 | 0.54 | 0.70 | 0.97 | **3.18** | **3.25** |

#### Airtight Objects ▸ Maximum Vacuum Level: 85%

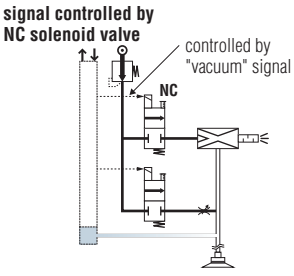
**Time to create vacuum** *(seconds)* **for a volume of 1 liter**

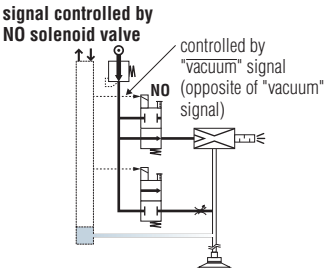
| ø nozzle \ vacuum achieved | 55% | 60% | 65% | 70% | 75% | 80% | Air consumed *(SCFM)* | Air drawn in *(SCFM)* |
|---|---|---|---|---|---|---|---|---|
| **1.0 mm** | 1.76 | 2.04 | 2.38 | 2.80 | 3.33 | 4.09 | **1.55** | **1.02** |
| **1.2 mm** | 1.13 | 1.31 | 1.53 | 1.80 | 2.15 | 2.64 | **2.30** | **1.59** |
| **1.4 mm** | 0.73 | 0.85 | 0.99 | 1.16 | 1.38 | 1.70 | **3.18** | **2.47** |

### 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 "$\overline{\text{vacuum}}$".




### 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.

# LEM

## 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 | 60 |
| 85% max. vacuum ➔airtight objects | 90 |

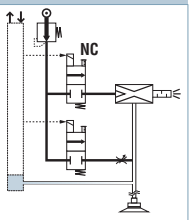
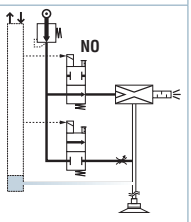
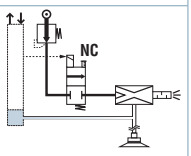
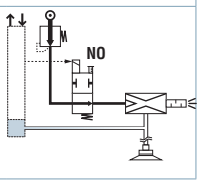
### NOZZLE DIAMETER

| | |
|---|---|
| Ø 1 mm nozzle | 10 |
| Ø 1.2 mm nozzle | 12 |
| Ø 1.4 mm nozzle | 14 |

### VACUUM SWITCH

| | | |
|---|---|---|
| VA | Electronic vacuum switch with digital display and adjustment | |
| VO | No vacuum switch and no adjustment | |

### COMPOSITION OF THE MODULE

| | | |
|---|---|---|
| S | ■ Vacuum controlled by NC solenoid valve ➔ if the electricity is shut off, the vacuum is interrupted.<br>■ Blow-off controlled by a specific signal |   |
| V | ■ Vacuum controlled by NO solenoid valve ➔ vacuum is maintained if electricity is shut off<br>■ Blow-off controlled by a specific signal |   |
| R | ■ Vacuum controlled by NC solenoid valve<br>■ No blow-off |   |
| U | ■ Vacuum controlled by NO solenoid valve<br>■ No blow-off |   |

### EXHAUST

| | |
|---|---|
| Open (integrated silencer) | – |
| Exhaust manifold (G1/8''-F) | E |

### ISLAND ASSEMBLIES

| | | |
|---|---|---|
| B2 | | LEM__X_____**B2** island assembly with 2 identical modules. |
| B3 | | LEM__X_____**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 | | LEM__X_____**B**<br>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.<br>**PART NO.: LEMSETA** |

**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.

**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**

→ 3 LEM modules for a group, of different types.

- **LEMSETA** → 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.

# LEM

## Integrated Mini Vacuum Pumps with ASR

Characteristics / Assembling an Island

AIR Saving Regulator

### Overall Characteristics

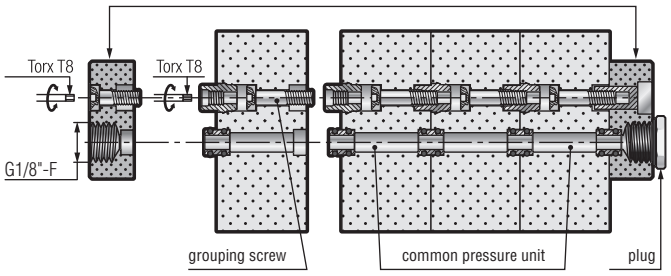
- Supply: non-lubricated air filtered to 5 microns according to standard ISO 8573-1:2010 [4:5:4].
- Operating pressure: 4.5 to 7 bar.
- Mini dynamic pressure: - stand-alone module: P = 4.5 bar.
  - island modules: 4 bar.
- Blow-off: adjustable flow: - stand-alone version: P = 3.5 bar.
  - island version: P network.
- Maximum vacuum: 60% or 85% depending on model.
- Suction rate: 1.02 to 3.25 SCFM depending on model.
- Air consumption: 1.55 to 3.18 SCFM depending on model.
- Electrical protection level: IP 65.
- Control voltage: 24 V DC (regulated ± 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: 32 to 122 °F.
- Materials: PA 6-6 15 %FV, brass, aluminum, NBR.

### Integrated Vacuum Switch Characteristics

- Measuring range: -1 to 0 bar.
- Precision: ± 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 ± 10%).
- Current draw: < 20 mA.
- Protection: against polarity inversions.

### Characteristics and Connecting an Island

*island of 4 modules*




*island of 3 modules*

**Maximum number of modules in an island:**

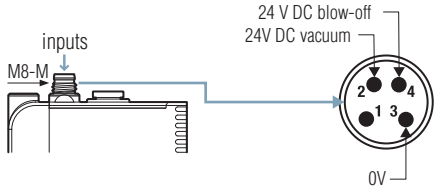
- Ø 1.4 mm nozzle ➔ 5 modules
- Ø 1.2 mm nozzle ➔ 7 modules
- Ø 1 mm nozzle ➔ 9 modules

### Integrated Silencer Characteristics

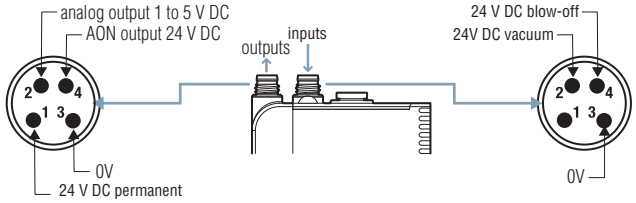
- Noise level: approximately 68 dBA.
- Clog-free silencer.

### Electrical Connections

**MODULES WITHOUT VACUUM SWITCH FUNCTION**




**MODULES WITH VACUUM SWITCH FUNCTION**




### Accessories

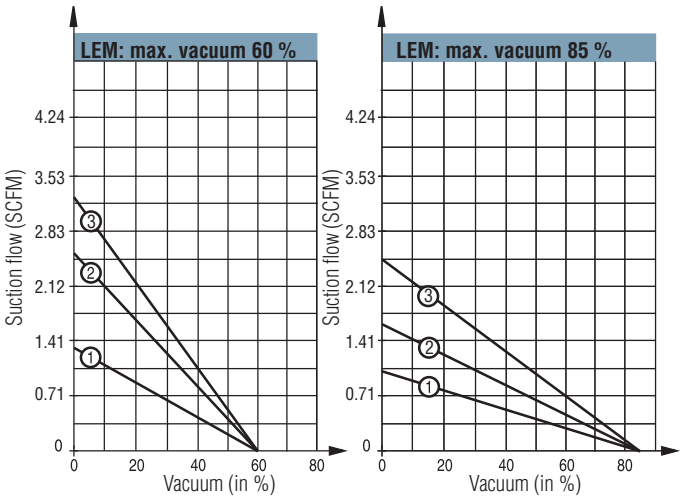
Power supply cable M8, straight, female, 4-pin – open end:

- **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.

# LEMAX

## Integrated Mini Vacuum Pumps with "ASC"
(Air Saving Control)

### 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.

Industry-specific applications

For all objects, airtight or not very porous

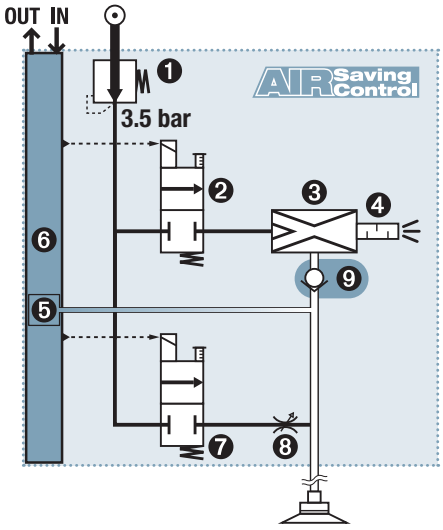
### Compact Integration

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:

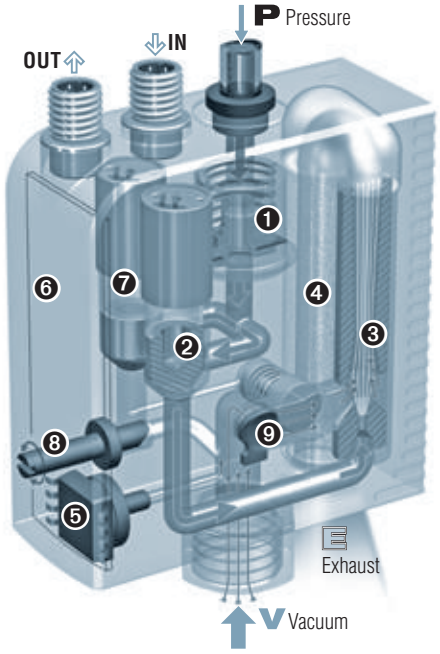
❶ **3.5 bar** pressure regulator
❷ Solenoid valve "vacuum"
❸ **3.5 bar** optimized Venturi
❹ Through-type silencer
❺ Electronic vacuum switch
❻ Integrated electronics
❼ Solenoid valve "blow-off"
❽ Blow-off flow adjustment
❾ Check valve on vacuum

**90%** energy savings (on average).




Combination of non-return ❾ and advanced electronics ❻ ensures the **ASC's** automatic performance.

➔ **Once desired vacuum level is reached, the LEMAX no longer consumes air when gripping the product.**

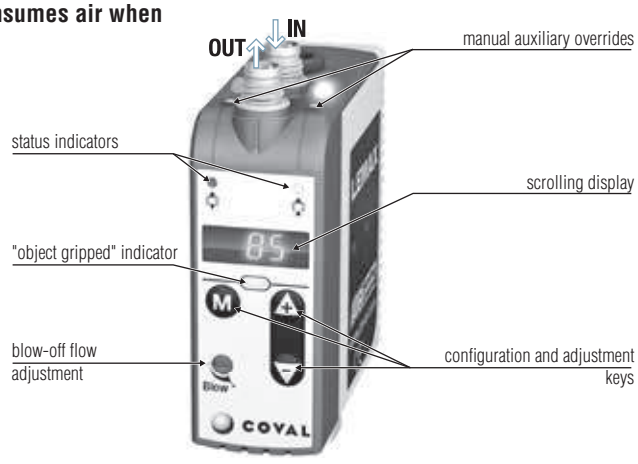



Schematic representation

### 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.

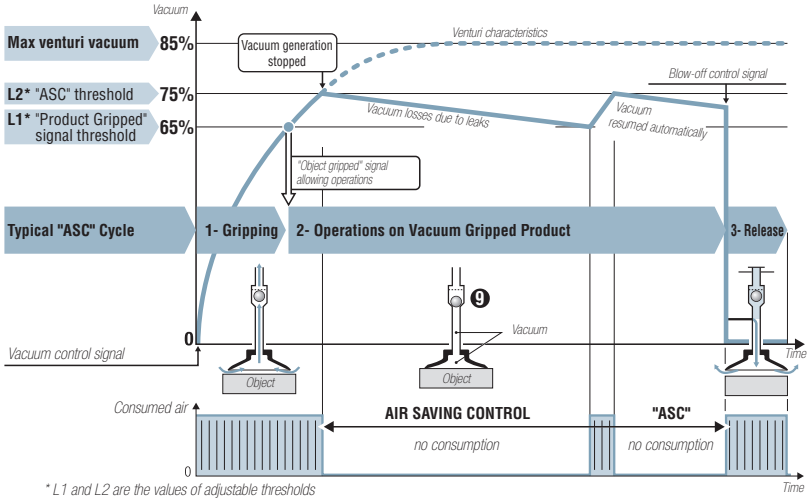


# LEMAX

## Integrated Mini Vacuum Pumps with "ASC"

Energy Savings

## "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 ❷ starts the cycle by supplying the venturi ❸ 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 ❺. 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 ❷ is cut off ➔ consumption is halted. The object remains held by the retained vacuum thanks to the closed valve ❾. 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 ❼ generates a stream of air which closes the isolation valve ❽, blows on the object to release it quickly.

### 1- Gripping + Transfer *(Ø 1.4 mm nozzle, 0.2 l of vacuum)*

| Phase | Duration | Air consumption | | |
|---|---|---|---|---|
| | | "ASC" off | "ASC" on | |
| Gripping | 0.28 s | 0.014 ft³ | 0.014 ft³ | Energy savings achieved |
| Transfer | 1.20 s | 0.063 ft³ | 0 | |
| Release | 0.14 s | 0.007 ft³ | 0.007 ft³ | |
| | | 0.084 ft³ | 0.021 ft³ | → 75 % |

### 2- Clamping + Operations *(Ø 1.4 mm nozzle, 0.4 l of vacuum)*

| Phase | Duration | Air consumption | | |
|---|---|---|---|---|
| | | "ASC" off | "ASC" on | |
| Clamping | 0.55 s | 0.028 ft³ | 0.028 ft³ | Energy savings achieved |
| Operations | 60 s | 3.178 ft³ | 0 | |
| Release | 0.14 s | 0.007 ft³ | 0.007 ft³ | |
| | | 3.213 ft³ | 0.035 ft³ | → 99 % |

### 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:

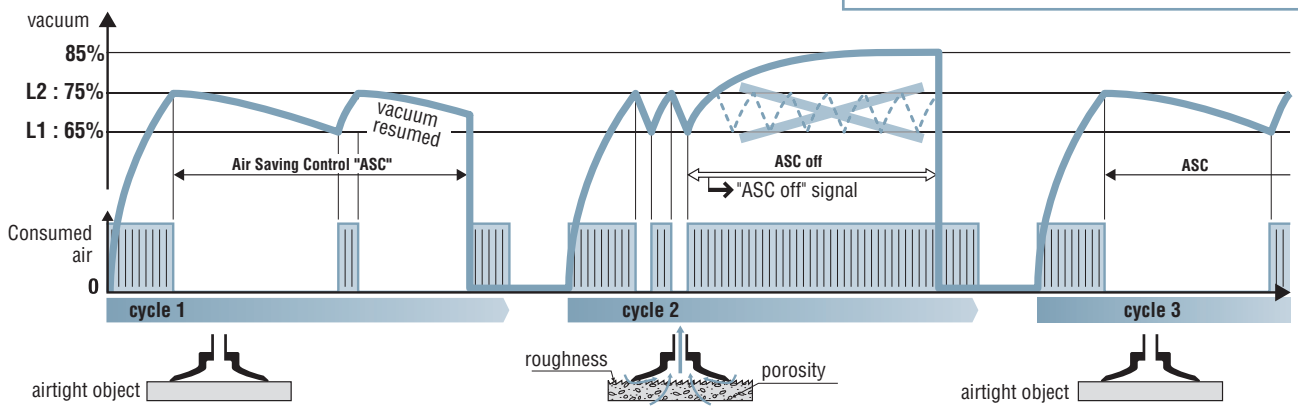
**1- No specific adjustment:** The initial setting (L1 = 65%, L2 = 75%) is suitable for most applications.

**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.

## 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.




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..

# LEMAX

## Integrated Mini Vacuum Pumps with "ASC"

Selection Guide

AIR Saving Control

## 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.

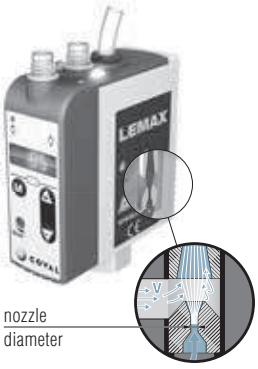
On the other hand, during "**ASC**" operation, a large nozzle quickly reaches the vacuum threshold generating power shut-off.

In conclusion:

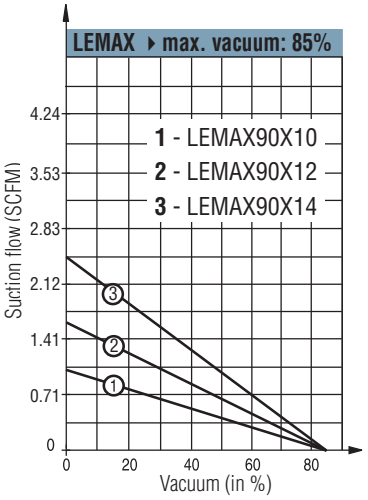
- A large nozzle enables quicker gripping without consuming more during "**ASC**" operation.
- A small nozzle consumes less only when operating continues without "**ASC**".

**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 (SCFM) | air consumed (SCFM) | grip time (s) (65% vacuum) | time (s) up to 75% vacuum | air consumed ($ft^3$) |
| **1.4 mm** | **2.47** | **3.18** | **0.99** | **1.38** | **0.077** |
| **1.2 mm** | **1.59** | **2.30** | **1.53** | **2.15** | **0.077** |
| **1.0 mm** | **1.02** | **1.55** | **2.38** | **3.33** | **0.077** |




## Suction Flow Rate / Vacuum Curves




## Select Vacuum Controlled by NC or NO Solenoid Valve

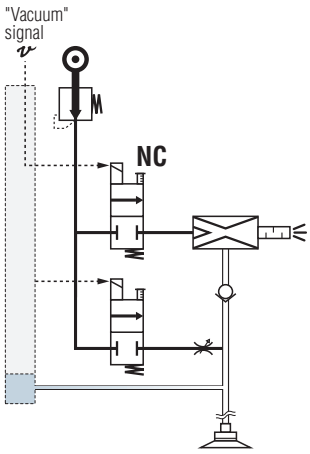
Vacuum controlled by a NC (Normally Closed) solenoid valve remains the simplest standard option to use. In the event of an electricity shutoff, the vacuum is interrupted and the object is released. On the contrary, with vacuum control by NO (Normally Open) solenoid valve, the vacuum continues to be generated in the event of an electrical shut-off: positive object-holding security.

The diagrams opposite show that both versions are controlled by the same "vacuum" signal $v$:

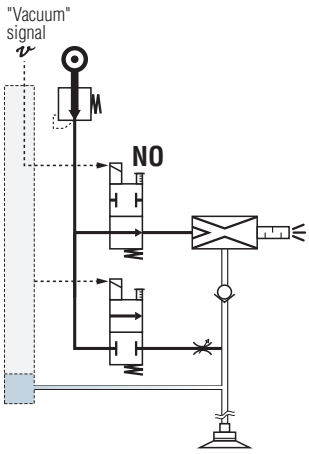
- NC version, the signal $v$ controls the vacuum generation.
- NO version, the signal $v$ controls the vacuum shutdown.

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?

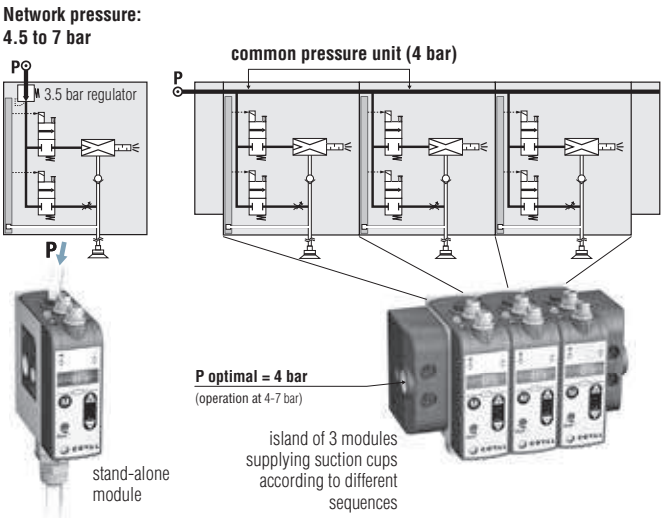
Stand-alone modules are suitable for the most common applications: one module controls one or more suction cups which all operate according to the same sequence.

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.




8

LEMAX

# LEMAX

## 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

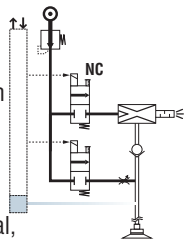
| | |
|---|---|
| **Ø 1.4 mm nozzle** | **14** |
| **Ø 1.2 mm nozzle** | **12** |
| **Ø 1 mm nozzle** | **10** |

### COMPOSITION OF THE MODULE

**Vacuum pump controlled by a Normally Closed (NC) solenoid valve** — **S**

LEMAX90X__**S**__

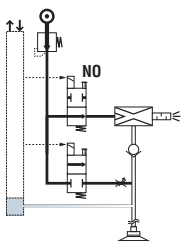
- In the event of an electrical shut-off, vacuum is no longer generated.
- Optional configured blow-off:
  - by specific signal,
  - automatic, timed 0 to 9.9 sec. (➔ a single control signal vacuum and blow-off).




**Vacuum pump controlled by a Normally Open (NO) solenoid valve** — **V**

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**

→ 3 LEMAX modules for an island, of different types.

- **LEMSETA** → Set of ends for island.

# LEMAX

## Integrated Mini Vacuum Pumps with "ASC"

Dimensions, Mounting Options

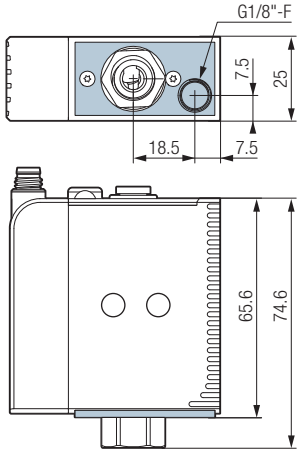
AIR Saving Control

### 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).

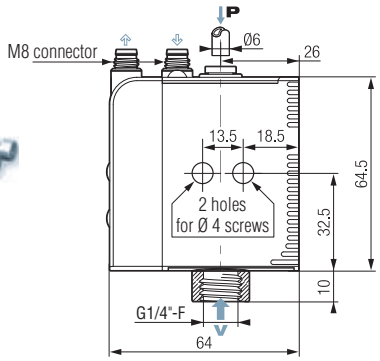
This option must be specified at time of ordering as it cannot be added later.

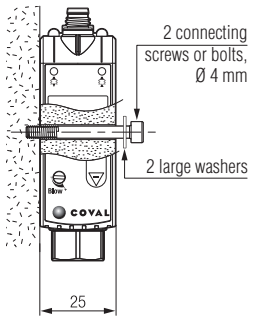
**Note**: The design of the exhaust manifold and vacuum pumps do not guarantee the complete sealing of the exhaust and therefore cannot be used in a "clean room" environment.

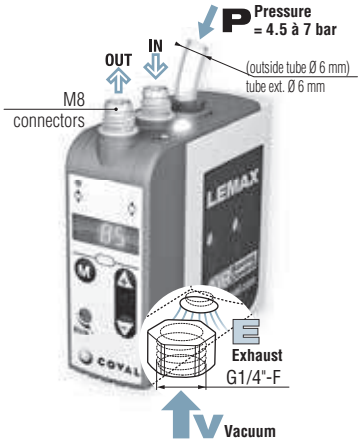



### Stand-alone Modules

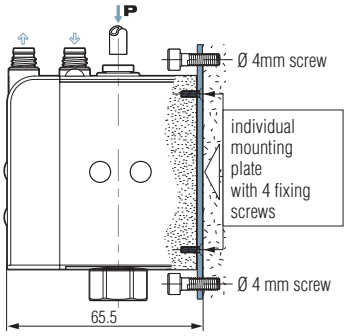
**Side mounting**

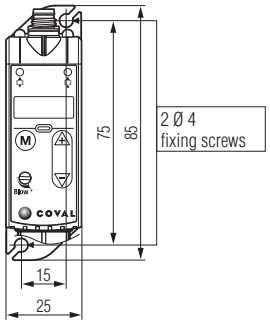


**Front mounting**

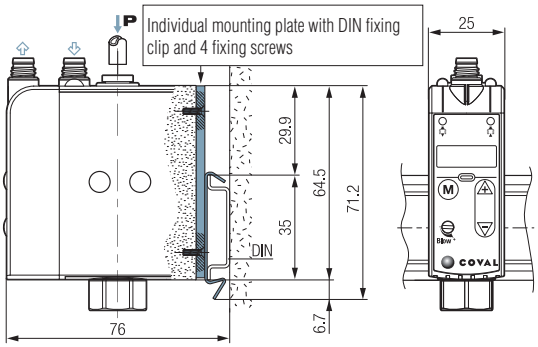



For front mounting, order the necessary kit, in addition to the module:

| Front mounting kit:<br>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:<br>1 plate/clip + 4 screws |
|---|
| **Part No.: LEMFIXB** |

8

LEMAX

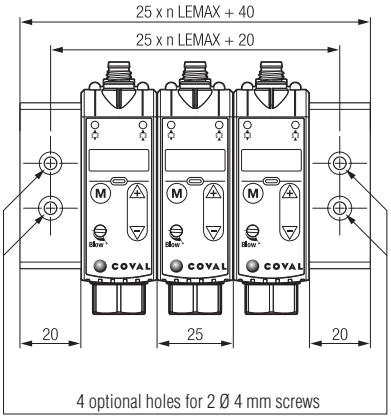
# LEMAX

## Integrated Mini Vacuum Pumps with "ASC"

Dimensions, Mounting Options

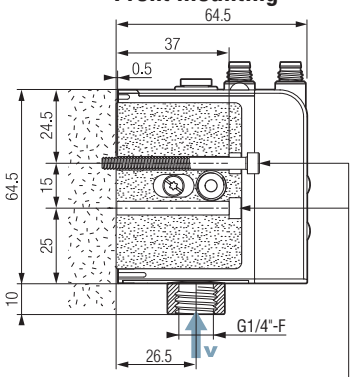
AIR Saving Control

## Islands



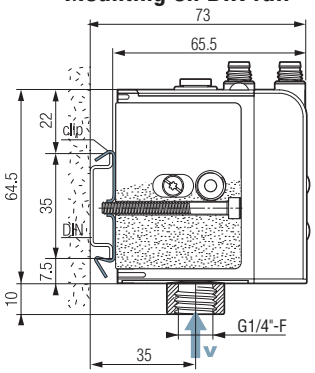

4 optional holes for 2 Ø 4 mm screws

### Front mounting




2 optional holes for 1 Ø 4 mm connecting screw, at each end of the island

### Mounting on DIN rail

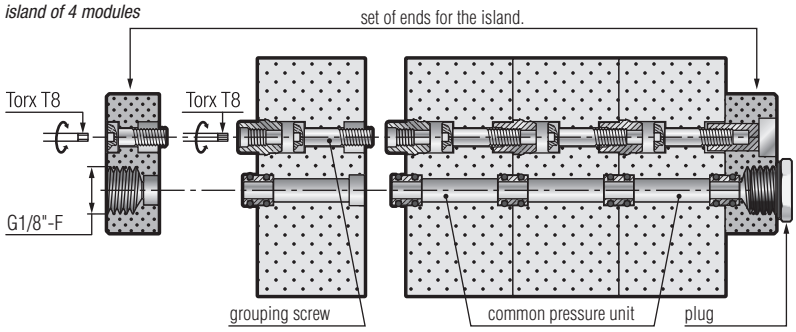



DIN rail mounting kit: 2 clips + 2 screws

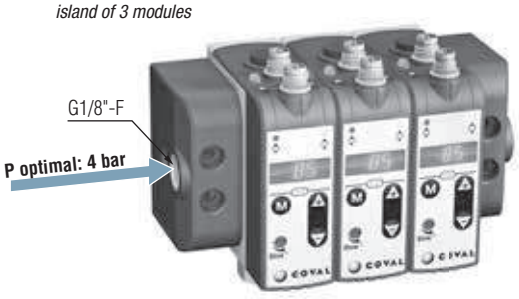
**Part No.: LEMFIXC**

## Assembling and Connecting an Island

*island of 4 modules*




*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.

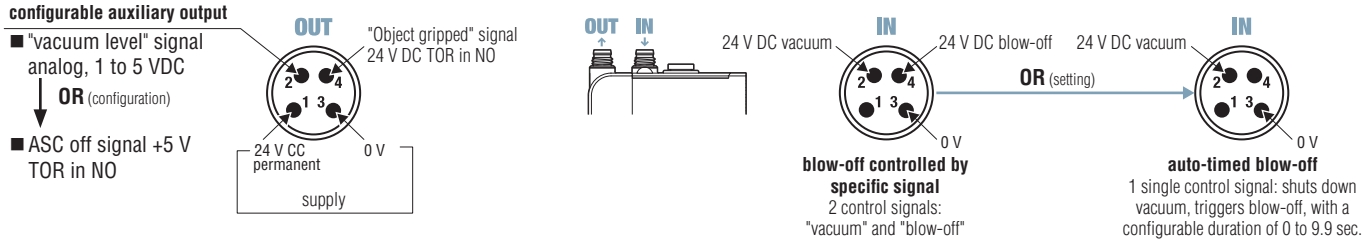
# LEMAX

## Integrated Mini Vacuum Pumps with "ASC"

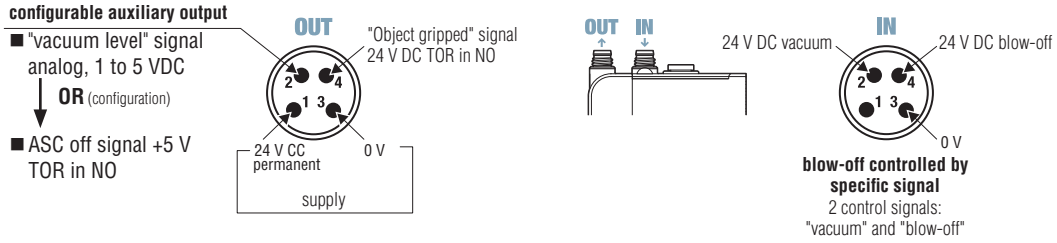
Connectors

AIR Saving Control

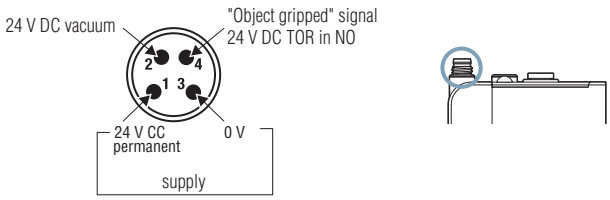
### For NC Vacuum Pumps with 2 M8 4-pin connectors, model LEMAX90X..S..




### For NO Vacuum Pumps with 2 M8 4-pin connectors, model LEMAX90X..V..




### For NC Vacuum Pumps with 1 M8 4-pin connector, model LEMAX90X..SC14




8

LEMAX

### 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

# LEMAX

## Integrated Mini Vacuum Pumps with "ASC"

Characteristics

AIR Saving Control

### 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: 1.02 to 2.47 SCFM.
- Air consumption: 1.55 to 3.18 SCFM 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: 32 to 122 °F.
- Materials: PA 6-6 15%FV, brass, aluminum, NBR.

#### Electrical controls

- Control voltage: 24 V DC (regulated ± 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: ± 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.

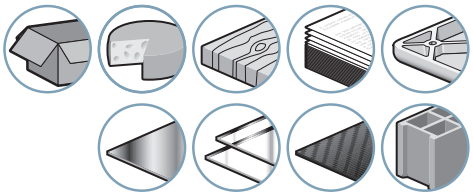
# LEMAX IO

## Mini Vacuum Pumps with Communication IO-Link

General Information

AIR Saving Control  IO-Link

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.

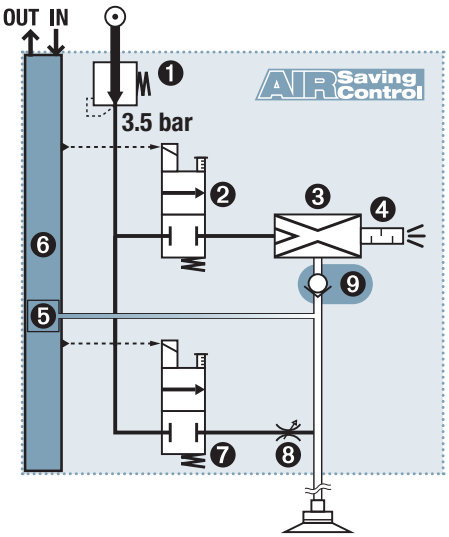
### Compact Integration

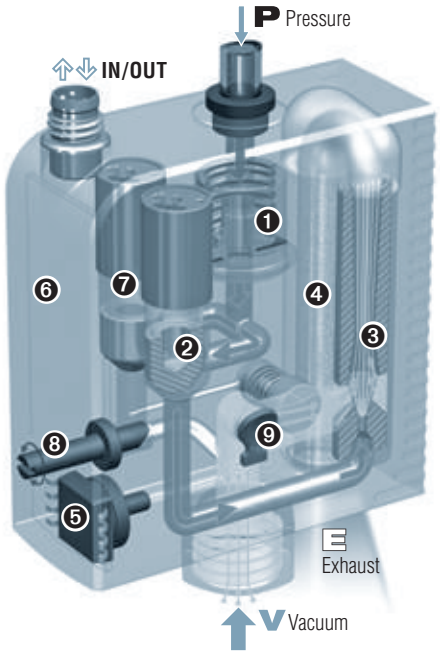
The illustrations below show the 9 functions integrated into the mini-module, and their respective roles in operation.
The result of this COVAL performance is:

– **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:

❶ **3.5 bar** pressure regulator
❷ Solenoid valve "vacuum"
❸ **3.5 bar** optimized Venturi
❹ Through-type silencer
❺ Electronic vacuum switch
❻ Integrated electronics
❼ Solenoid valve "blow-off"
❽ Blow-off flow adjustment
❾ Check valve on vacuum




Schematic representation

AIR Saving Control

**90%** energy savings (on average).

Combination of non-return ❾ and advanced electronics ❻ ensures the **ASC's** automatic performance.

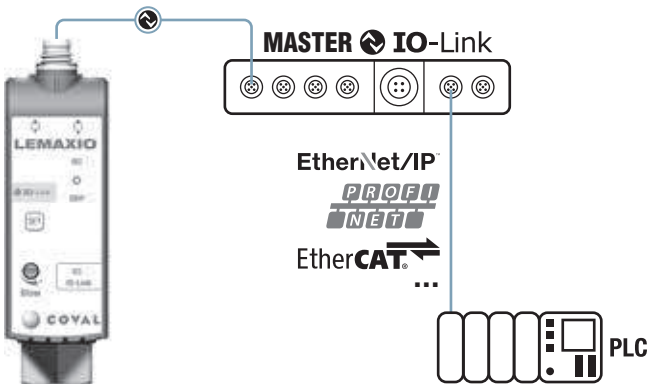
➔ **Once desired vacuum level is reached, the LEMAX IO no longer consumes air when gripping the product.**

### IO-Link

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



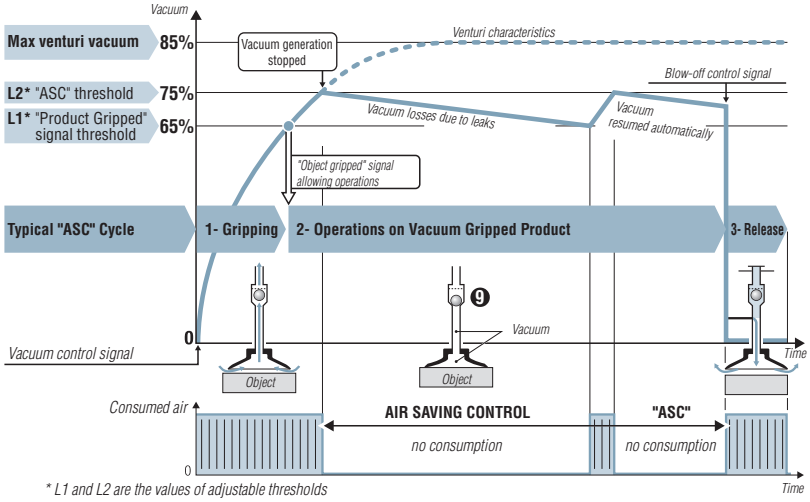
# LEMAX IO

## Mini Vacuum Pumps with Communication IO-Link

Energy Savings

AIR Saving Control — IO-Link

## AIR Saving Control "Air Saving Control" Cycle




**1- Gripping + Transfer** *(Ø 1.4 mm nozzle, 0.2 l of vacuum)*

| Phase | Duration | Air consumption | | |
|---|---|---|---|---|
| | | "ASC" off | "ASC" on | |
| Gripping | 0.28 s | 0.014 ft³ | 0.014 ft³ | Energy savings achieved |
| Transfer | 1.20 s | 0.063 ft³ | 0 | |
| Release | 0.14 s | 0.007 ft³ | 0.007 ft³ | |
| | | 0.084 ft³ | 0.021 ft³ | → 75 % |

**2- Clamping + Operations** *(Ø 1.4 mm nozzle, 0.4 l of vacuum)*

| Phase | Duration | Air consumption | | |
|---|---|---|---|---|
| | | "ASC" off | "ASC" on | |
| Clamping | 0.55 s | 0.028 ft³ | 0.028 ft³ | Energy savings achieved |
| Operations | 60 s | 3.178 ft³ | 0 | |
| Release | 0.14 s | 0.007 ft³ | 0.007 ft³ | |
| | | 3.213 ft³ | 0.035 ft³ | → 99 % |

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 ❷ starts the cycle by supplying the venturi ❸ 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 ❺. 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 ❷ is cut off ➔ consumption is halted. The object remains held by the retained vacuum thanks to the closed valve ❾. 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 ❼ generates a stream of air which closes the isolation valve ❽, blows on the object to release it quickly.

### 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:

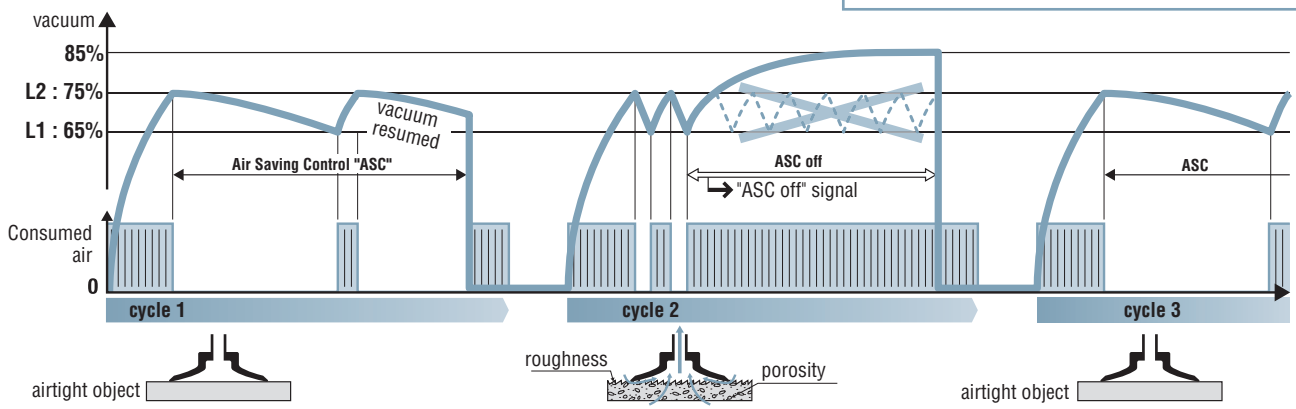
**1- No specific adjustment:** The initial setting (L1 = 65%, L2 = 75%) is suitable for most applications.

**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.

### 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.




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.

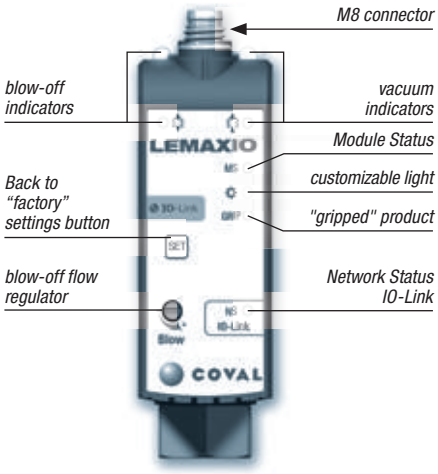
# LEMAX IO

## Mini Vacuum Pumps with Communication IO-Link

Communication / Selection Guide

AIR Saving Control  IO-Link

## 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.

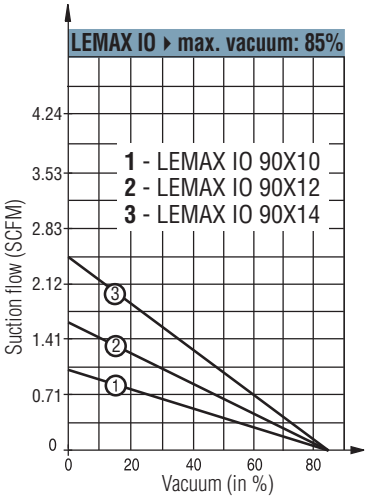
### PROCESS OUTPUT DATA

- 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 (SCFM) | air consumed (SCFM) | grip time (s) (65% vacuum) | time (s) up to 75% vacuum | air consumed ($ft^3$) |
| 1.4 mm | 2.47 | 3.18 | 0.99 | 1.38 | 0.077 |
| 1.2 mm | 1.59 | 2.30 | 1.53 | 2.15 | 0.077 |
| 1.0 mm | 1.02 | 1.55 | 2.38 | 3.33 | 0.077 |

## 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.

# LEMAX IO

## Mini Vacuum Pumps with Communication IO-Link

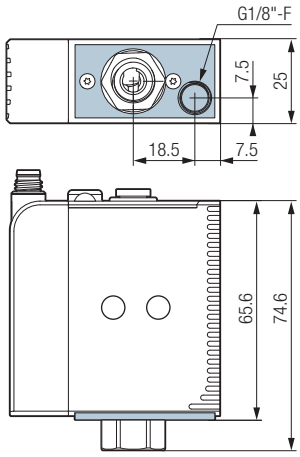
Option, Choice of Layout

### 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.

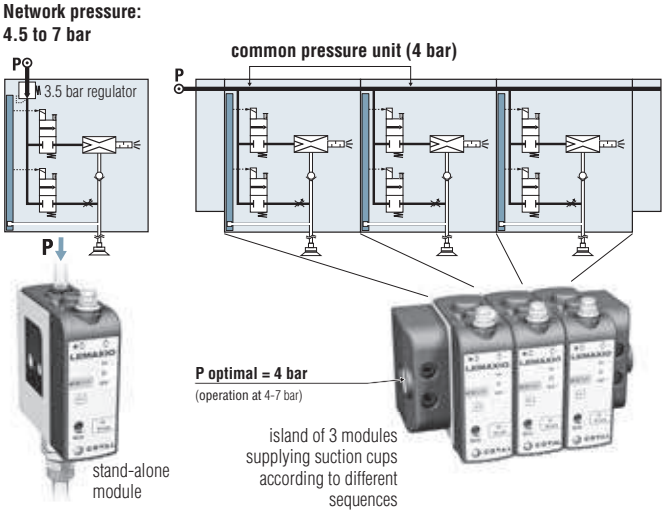



### Stand-alone or Island Modules?

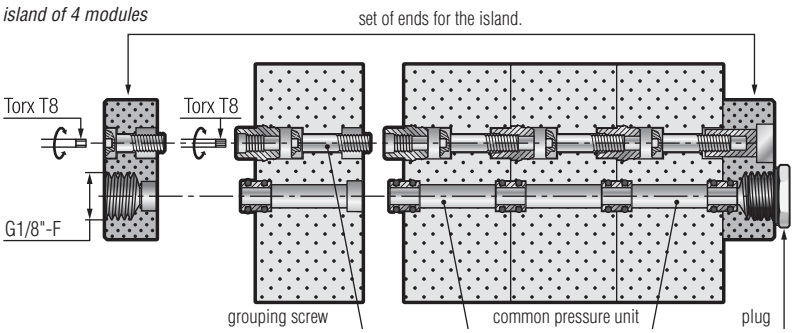
Stand-alone modules are suitable for the most common applications: one module controls one or more suction cups which all operate according to the same sequence.

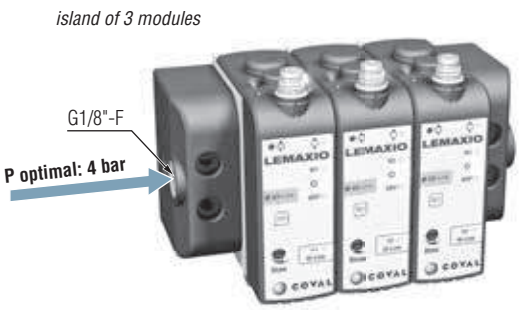
When several suction cups are operating according to different sequences, multiple modules are required, which can be:
- several autonomous modules;
- a group of these modules with an internal common pressure unit.

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.




### Assembling 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

# LEMAX IO

## Mini Vacuum Pumps with Communication IO-Link

## Configuring a Vacuum Pump

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** |

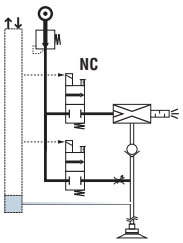
### NOZZLE DIAMETER

| | |
|---|---|
| **Ø 1.4 mm nozzle** | **14** |
| **Ø 1.2 mm nozzle** | **12** |
| **Ø 1 mm nozzle** | **10** |

### COMPOSITION OF THE MODULE

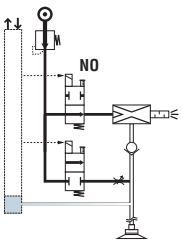
**Vacuum pump controlled by a Normally Closed (NC) solenoid valve** — **S**

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.




### 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** | ... |

*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**

→ 3 LEMAX IO modules for an island, of different types.

■ **LEMSETA** → Set of ends for island.

# LEMAX IO

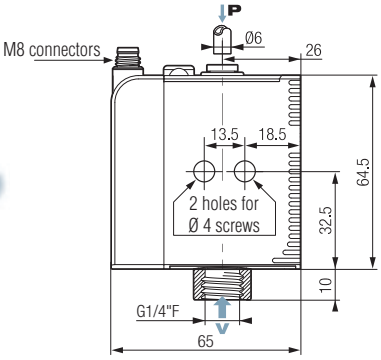
## Mini Vacuum Pumps with Communication IO-Link

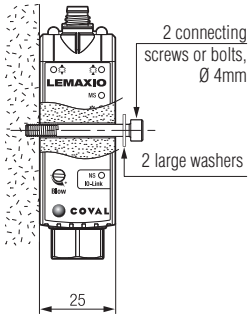
Dimensions, Mounting Options

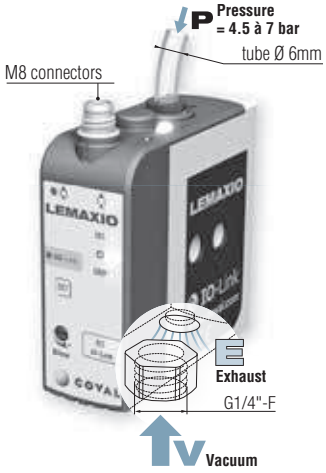
AIR Saving Control — IO-Link

## 1- Stand-alone Modules

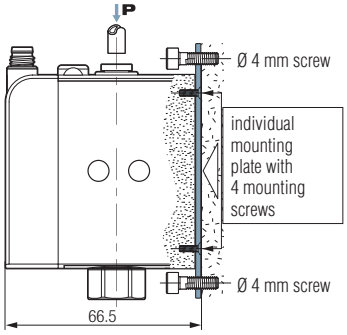
### Mounting from side

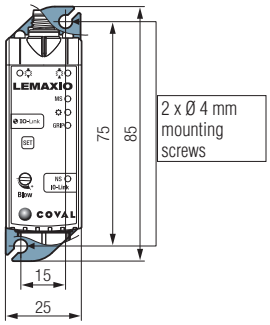



### Mounting from front



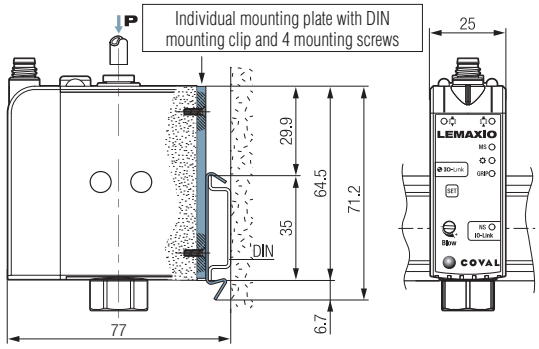




To mount from front, in addition to the module, a mounting kit must be ordered:

Kit for mounting from front:
1 plate + 4 screws

**Part No.: LEMFIXA**

### Mounting on DIN rail

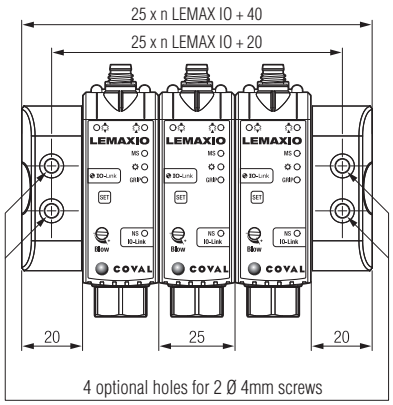



For static mounting (for example, in a cabinet), a module can be clipped onto a DIN rail. For this purpose, the module must first be equipped with an individual plate for mounting onto a DIN rail

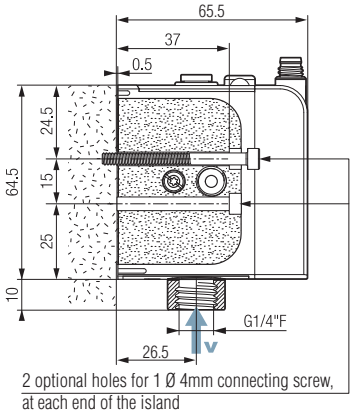
DIN rail mounting kit:
1 plate/clip + 4 screws

**Part No.: LEMFIXB**

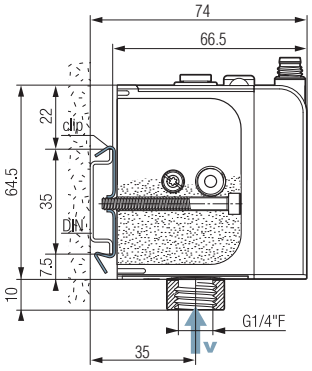
## 2- Islands




### Mounting from front




### Mounting on DIN rail




DIN rail mounting kit:
2 clips + 2 screws

**Part No.: LEMFIXC**

8

LEMAX IO

# LEMAX IO

## Mini Vacuum Pumps with Communication IO-Link

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: 1.02 to 2.47 SCFM.
- Air consumption: 1.55 to 3.18 SCFM 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 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 ± 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: ±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.

### 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.

### 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

# LEMCOM

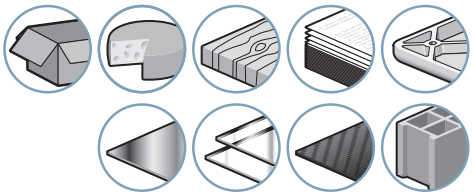
## 1st Mini Vacuum Pump on Industrial Fieldbus

General Points

PROFINET EtherNet/IP

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.

Industry-specific applications

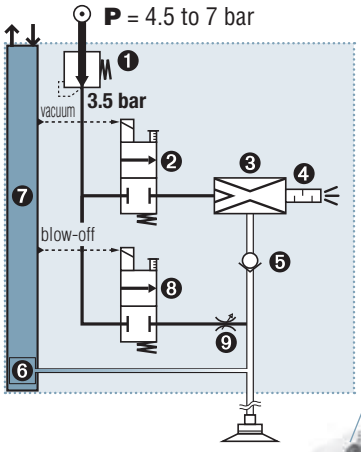


## Compact Integration: The COVAL Technique

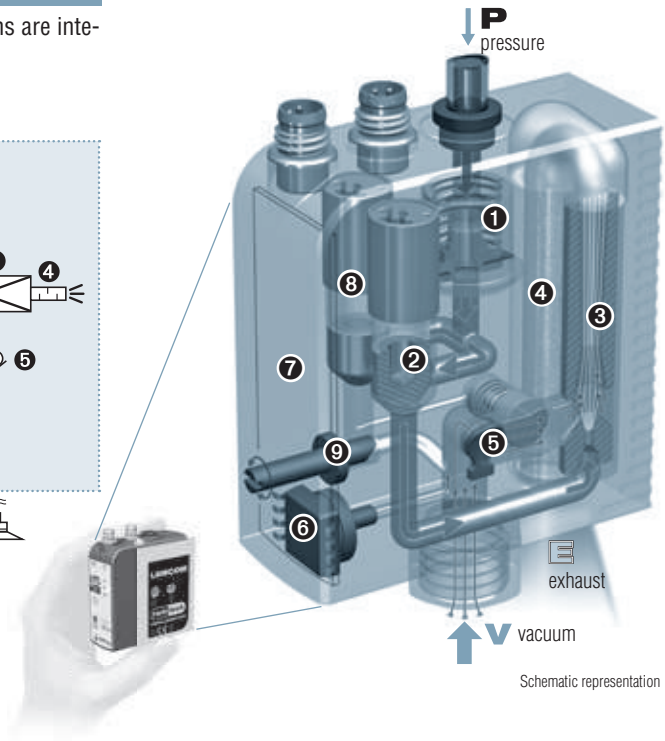
The illustrations demonstrate the COVAL advantage: all necessary functions are integrated into a complete and self-governing mini-module.

**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



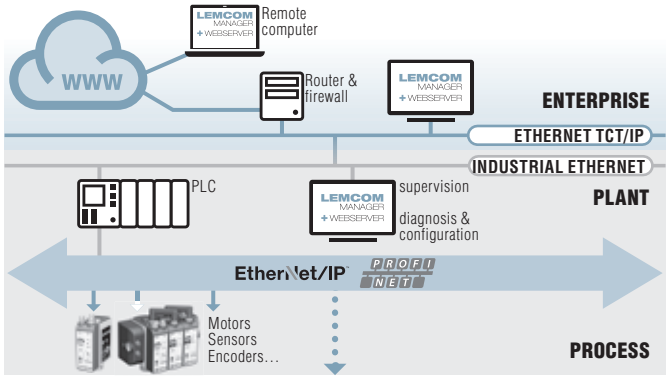
PROFINET EtherNet/IP




Schematic representation

## 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:
  AIR Saving Regulator **ASR**: 40% savings for porous products.
  AIR Saving Control **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.

# LEMCOM

## 1st Mini Vacuum Pump on Industrial Fieldbus

Vacuum Levels and Energy-saving

PROFINET 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 (SCFM):

| Nozzle Ø \ max. vacuum | 60% |
|---|---|
| **1.0 mm** | 1.34 |
| **1.2 mm** | 2.54 |
| **1.4 mm** | 3.25 |

**VERSION 90** (Max. 85% vacuum)
To enable a high vacuum level and thus increase the holding force for gripping airtight materials.

Suction flow rate (SCFM):

| Nozzle Ø \ max. vacuum | 85% |
|---|---|
| **1.0 mm** | 1.02 |
| **1.2 mm** | 1.59 |
| **1.4 mm** | 2.47 |

| | Porous Materials, Rough Surfaces | | | | Airtight & Semi-Porous Materials | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Cardboard | Food | Wood | Paper | Plastic | Metal | Glass | Composites | Concrete/Stone |
| **LEMCOM 60** | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| **LEMCOM 90** | | | | | ■ | ■ | ■ | ■ | ■ |

● Air Saving Regulator ➔ **40%** of energy savings on average.

■ Air Saving Control ➔ **90%** of energy savings on average.

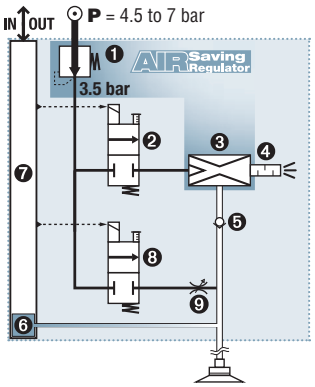
## Integrated Energy-saving Technologies

AIR Saving Regulator

**40%** energy savings (on average, see below).

Combined "venturi regulator" **ASR**: pressure regulator ❶ feeds venturi ❸ with 3.5 bar, the optimized pressure for operation.

➔ **No more unnecessary consumption of compressed air.**

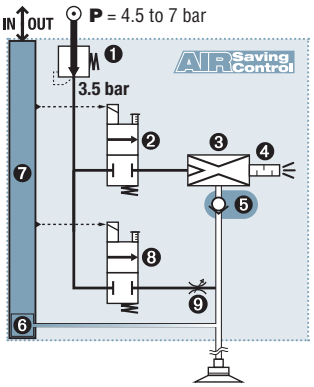



AIR Saving Control

**90%** energy savings (on average)

Combination of non-return valve ❺ and advanced electronics ❼ 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

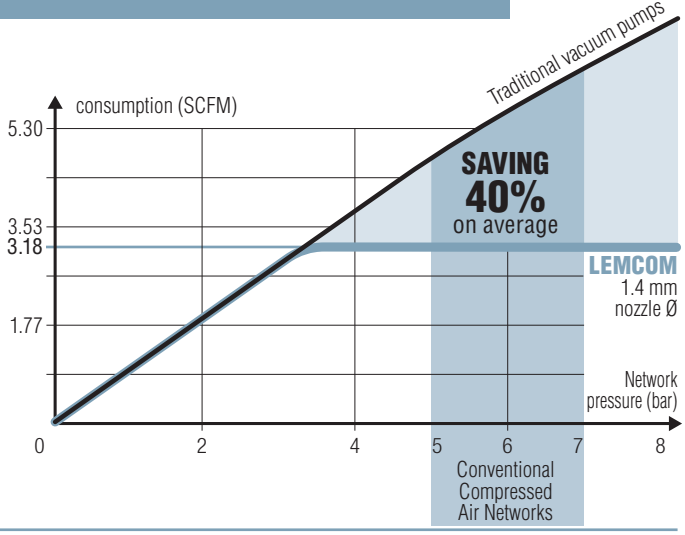
LEMCOM series vacuum pumps, which integrate an **ASR** "venturi regulator" combination, maintain ideals that COVAL values greatly: reducing both compressed air consumption and noise generation.

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.




8 LEMCOM

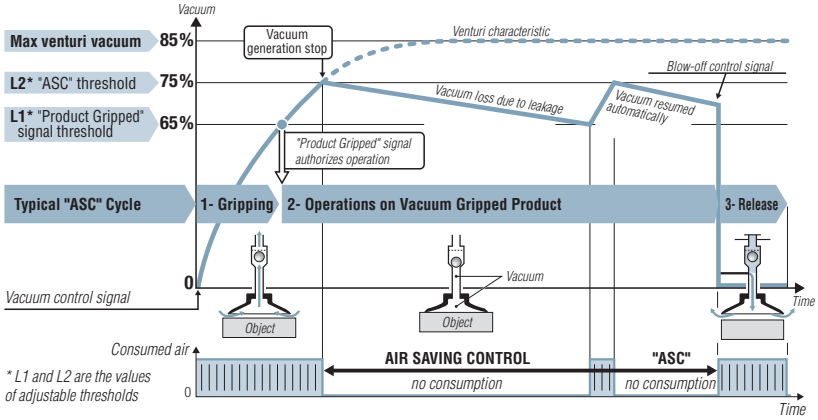
# LEMCOM

## 1st Mini Vacuum Pump on Industrial Fieldbus

Energy Savings

PROFINET EtherNet/IP

## AIR Saving Control "Air Saving Control" Cycle




**1- Gripping + Transfer** *(1.4 mm nozzle Ø, emptying 0.2 l)*

| Phase | Duration | Air consumption | | |
|---|---|---|---|---|
| | | without "ASC" | with "ASC" | Energy savings achieved |
| Gripping | 0.28 s | 0.014 ft³ | 0.014 ft³ | |
| Transfer | 1.20 s | 0.063 ft³ | 0 | |
| Release | 0.14 s | 0.007 ft³ | 0.007 ft³ | |
| | | 0.084 ft³ | 0.021 ft³ | 75 % |

**2- Clamping + Operations** *(1.4 mm nozzle Ø, emptying 0.4 l)*

| Phase | Duration | Air consumption | | |
|---|---|---|---|---|
| | | without "ASC" | with "ASC" | Energy savings achieved |
| Clamping | 0.55 s | 0.028 ft³ | 0.028 ft³ | |
| Operations | 60 s | 3.178 ft³ | 0 | |
| Release | 0.14 s | 0.007 ft³ | 0.007 ft³ | |
| | | 3.213 ft³ | 0.035 ft³ | 99 % |

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 ❷ starts the cycle by supplying the venturi ❸ 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 ❻. 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 ❷ is cut off ➔ consumption is halted. The object remains held by the retained vacuum thanks to the closed valve ❺. 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 ❽ generates a stream of air which closes the isolation valve ❾, 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.

## 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

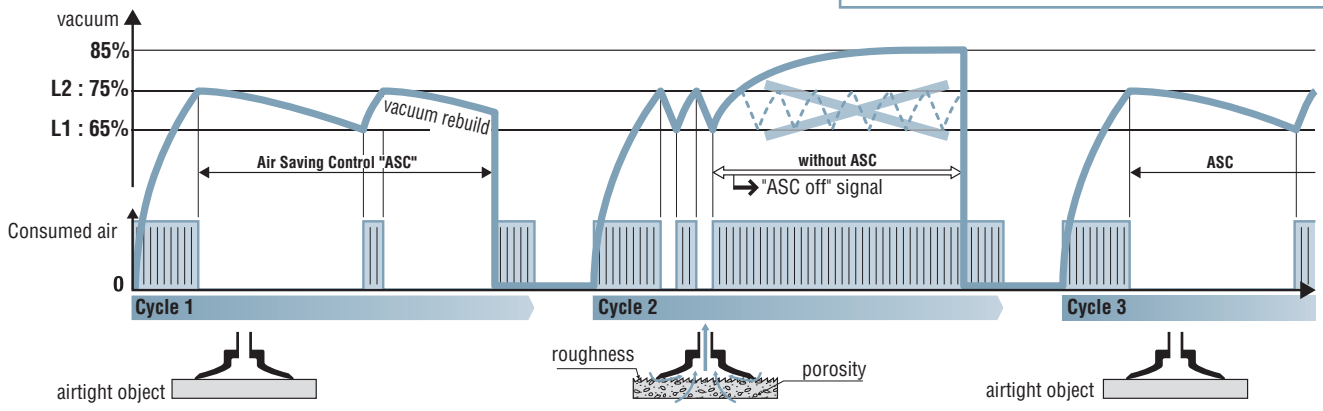
Saving energy has become essential. With LEMCOM, thanks to ASC, energy is saved automatically without interfering with established practices:

**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.**




AIR Saving Regulator LEMCOM series vacuum pumps, which integrate an **ASR** "venturi regulator" combination, maintain ideals that COVAL values greatly: reducing both compressed air consumption and noise generation.

# LEMCOM

## 1st Mini Vacuum Pump on Industrial Fieldbus

PROFINET 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:

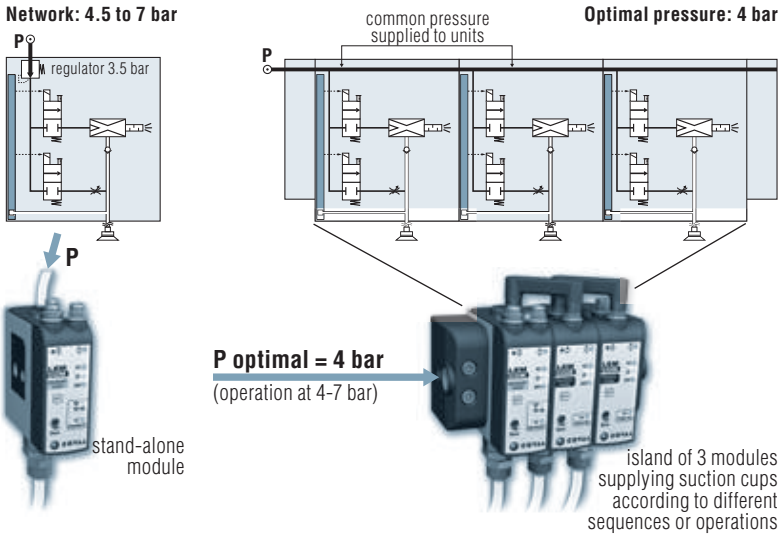
- several autonomous modules, OR
- a group of these modules with an internally shared pressure supply

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:

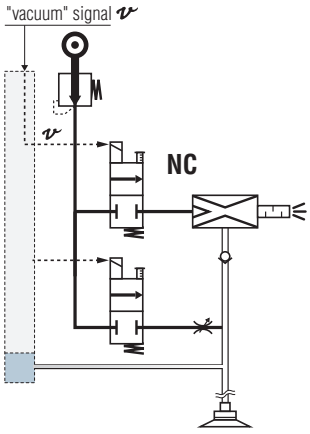
- 5 modules maximum for nozzle 1.4 mm ID.
- 7 modules maximum for nozzle 1.2 mm ID.
- 9 modules maximum for nozzle 1 mm ID.



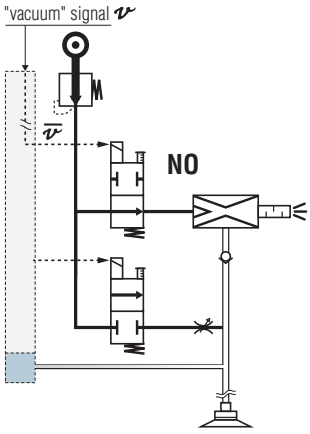

## Vacuum Control by NC or NO Solenoid Valve

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 $v$: The opposite $\overline{v}$ required for control of the NO solenoid valve is automatically obtained internally by the control electronics.

■ NC solenoid valve



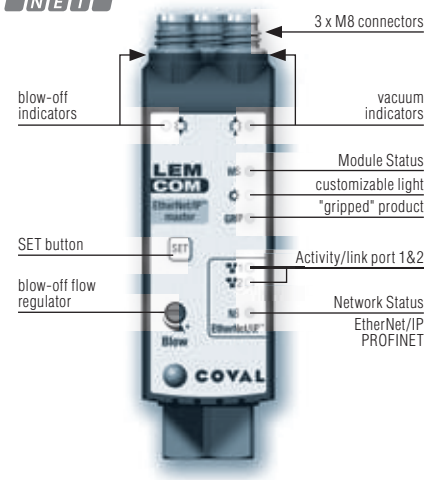

■ NO solenoid valve



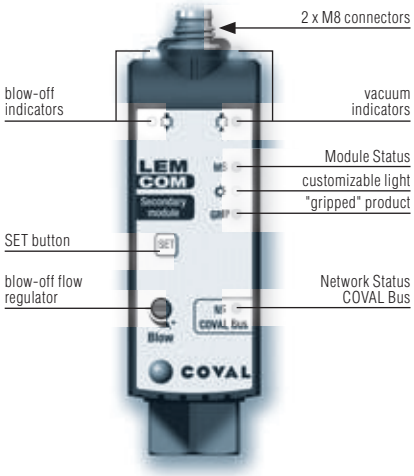

## Communications Panel

**LEMCOM** master

PROFINET EtherNet/IP




**LEMCOM** secondary module

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LEMCOM

# LEMCOM

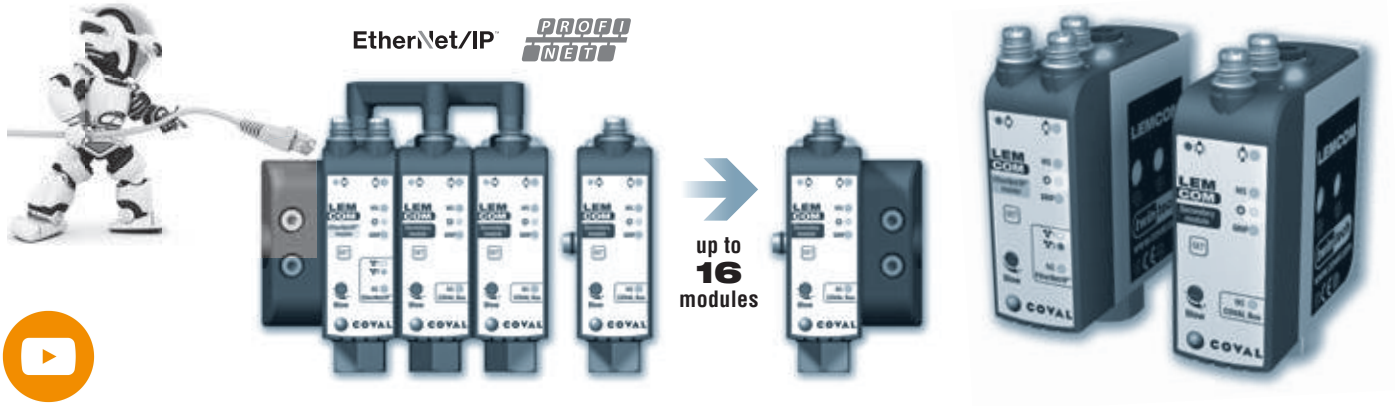
## 1st Mini Vacuum Pump on Industrial Fieldbus

Simplified Communication along the Entire Line

PROFINET 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.
- IP 65 / M8 standard connectors.




### A Simple Product to Utilize

**LEMCOM** master

EtherNet/IP PROFINET

- On-board 2-Port Ethernet Switch.
- On-board web server.
- Dedicated configuration software.
- M8/RJ45 standard connectors.

**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).

# LEMCOM

## 1st Mini Vacuum Pump on Industrial Fieldbus

Simplified Communication along the Entire Line

## 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.

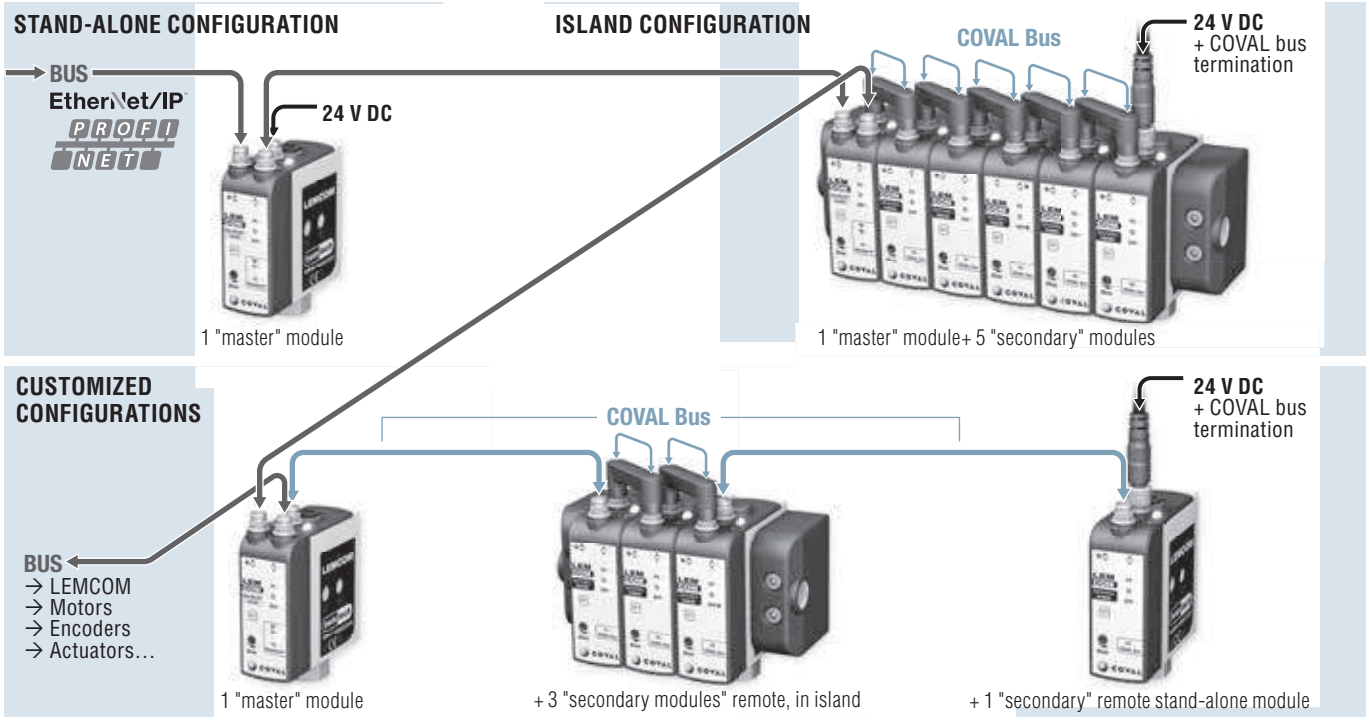
Contact between the "master" module and the "secondary" modules is confirmed by an M8 connecting bridge for island configurations or by a M8/M8 standard cable for configurations based on remote modules.

**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.

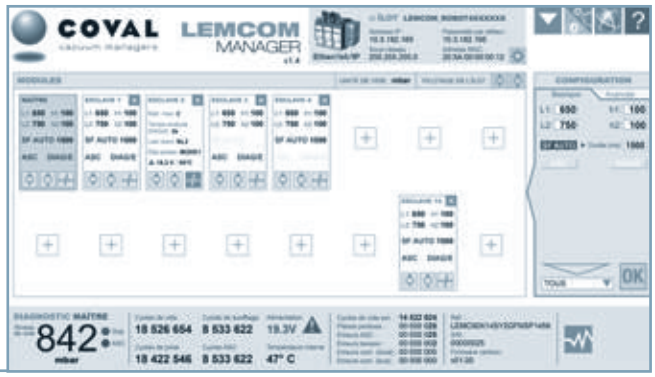
This flexibility enables the LEMCOM user to adapt to all types of applications without direct intervention on the vacuum generator.

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.



# LEMCOM

## 1st Mini Vacuum Pump on Industrial Fieldbus

Selection Guide

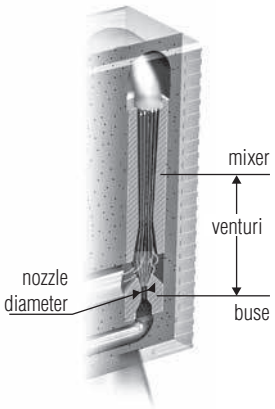
PROFINET EtherNet/IP

## Venturi Specifications

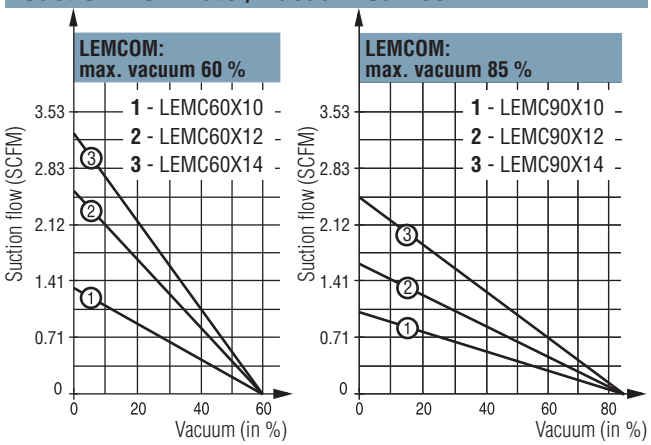
**1- Maximum Vacuum Level**
Dependent upon the mixer profile:

- 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 *(SCFM)* | Vacuum flow *(SCFM)* |
|---|---|---|---|---|---|
| vacuum reached / Nozzle Ø | 35% | 45% | 55% | | |
| **1.0 mm** | 0.83 | 1.31 | 2.35 | 1.55 | 1.34 |
| **1.2 mm** | 0.52 | 0.83 | 1.49 | 2.3 | 2.54 |
| **1.4 mm** | 0.34 | 0.54 | 0.97 | 3.18 | 3.25 |

## 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.

**Working without "ASC":**

| Evacuation time *(in seconds)* of 1 liter volume | | | | Consumed Air *(SCFM)* | Vacuum flow *(SCFM)* |
|---|---|---|---|---|---|
| vacuum reached / Nozzle Ø | 55% | 65% | 75% | | |
| **1.0 mm** | 1.76 | 2.38 | 3.33 | 1.55 | 1.02 |
| **1.2 mm** | 1.13 | 1.53 | 2.15 | 2.3 | 1.59 |
| **1.4 mm** | 0.73 | 0.99 | 1.38 | 3.18 | 2.47 |

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".

**When using "ASC"** (evacuation of 1 liter volume):

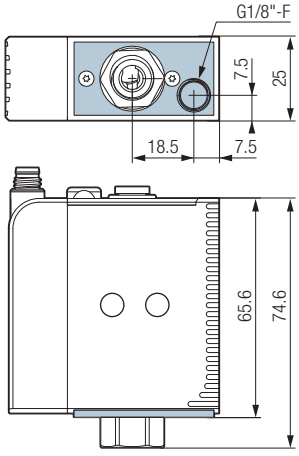
| Ø buse | gripping time (65% vacuum) *(s)* | Time up to 75% vacuum *(s)* | Consumed Air *(ft³)* |
|---|---|---|---|
| **1.0 mm** | 2.38 | 3.33 | 0.077 |
| **1.2 mm** | 1.53 | 2.15 | 0.077 |
| **1.4 mm** | 0.99 | 1.38 | 0.077 |

## 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.



# LEMCOM

## 1st Mini Vacuum Pump on Industrial Fieldbus

Configuring a Vacuum Pump

PROFINET EtherNet/IP

| LEMC | 90 | X | 12 | S | Y2 | | G | | – | | B2 |
|---|---|---|---|---|---|---|---|---|---|---|---|

### VACUUM LEVEL

| | |
|---|---|
| **60 % max. vacuum** is optimal for porous materials | **60** |
| **85 % max. vacuum** is optimal for airtight products | **90** |

### NOZZLE DIAMETER

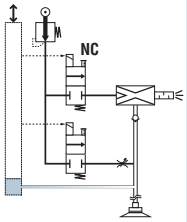
| | |
|---|---|
| 1 mm Ø nozzle | **10** |
| 1.2 mm Ø nozzle | **12** |
| 1.4 mm Ø nozzle | **14** |

### MODULE COMPOSITION

**S** — **NC Vacuum pump with blow-off**

LEMC__X__**S**__G__

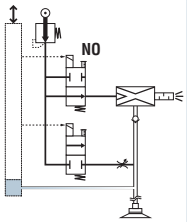
- **NC** vacuum control valve:
  - → in case of electrical cut-off, vacuum generation stops.
- Blow-off configured on site at choice:
  - Blow-off controlled by specific signal;
  - Automatically delayed blow-off time from 0 to 10 s.
- Adjustable blow-off flow rate.




**V** — **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.




### PROTOCOL

**Q2** PROFINET master
LEMC__X___**Q2**G__

- 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___**Y2**G__

- 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___**Z2**G__

- 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) | **–** |
| Exhaust manifold (G1/8''-F) | **E** |

### CONFIGURATION

**_** — 1 stand-alone module

#### Island assemblies

**B2** LEMC__X_____G**B2**

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_____G**B3**

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___**Z2**G**B**_ "Secondary" island modules are delivered without the M8/M8 "COVAL Bus" 120 Ω termination - order separately.

#### Components for island assembly

**B** LEMC__X_____G**B**

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**

NB: If necessary, M8/M8 "COVAL Bus" 120 Ω termination is available in accessories

**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.

# LEMCOM

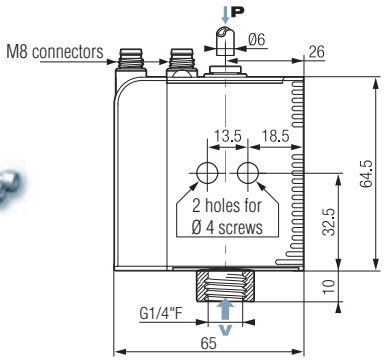
## 1st Mini Vacuum Pump on Industrial Fieldbus

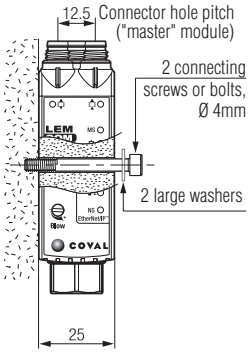
Dimensions, Mounting Options

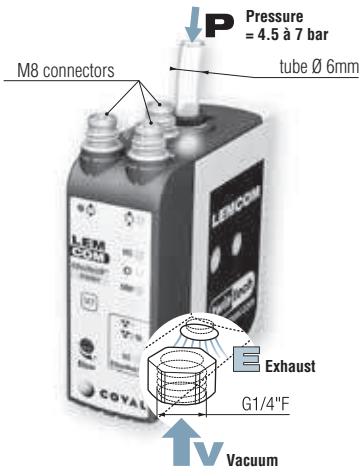
PROFINET EtherNet/IP

## 1- Stand-alone Modules

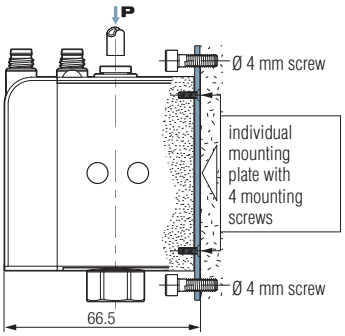
### Mounting from side

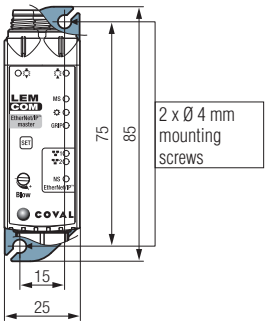



### Mounting from front



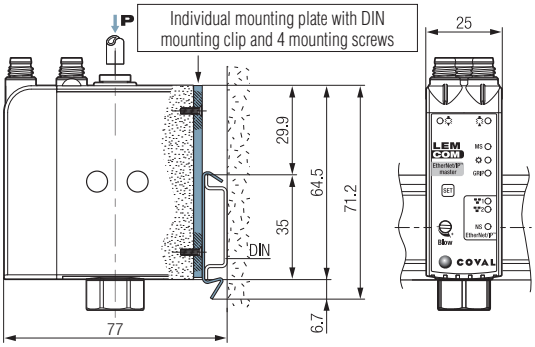




To mount from front, in addition to the module, a mounting kit must be ordered:

Kit for mounting from front:
1 plate + 4 screws

**Part No.: LEMFIXA**

### Mounting on DIN rail

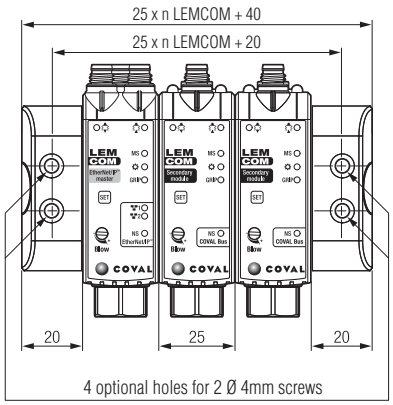



For static mounting (for example, in a cabinet), a module can be clipped onto a DIN rail. For this purpose, the module must first be equipped with an individual plate for mounting onto a DIN rail

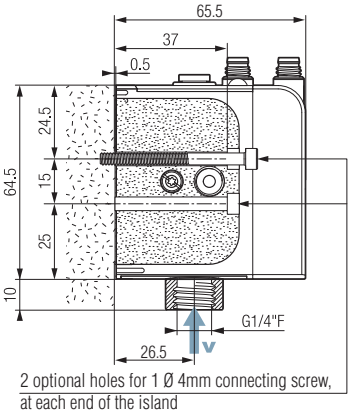
DIN rail mounting kit:
1 plate/clip + 4 screws

**Part No.: LEMFIXB**

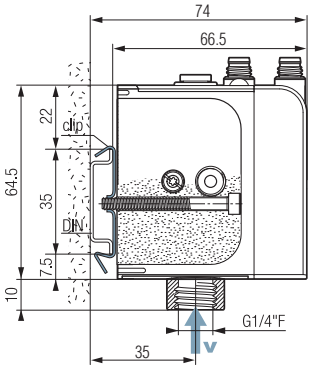
## 2- Islands




### Mounting from front




### Mounting on DIN rail




DIN rail mounting kit:
2 clips + 2 screws

**Part No.: LEMFIXC**

# LEMCOM

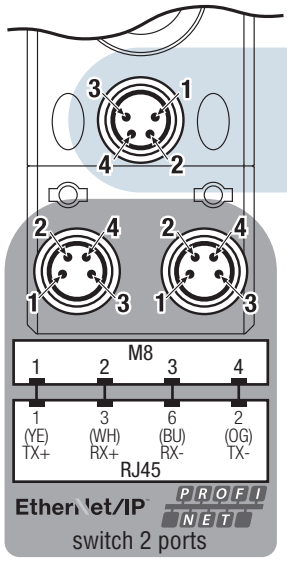
## 1st Mini Vacuum Pump on Industrial Fieldbus

Connections

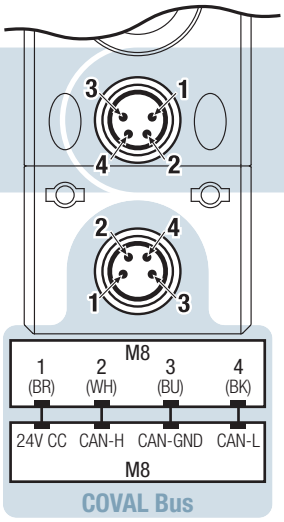
PROFINET EtherNet/IP

### Electrical Connections

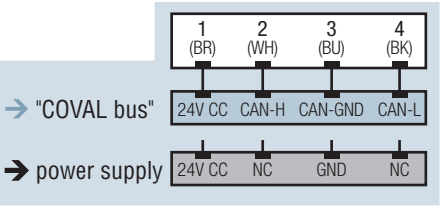
**LEMCOM** master
EtherNet/IP PROFINET




**LEMCOM**
secondary module




*YE: yellow, WH: white, BU: blue, OG: orange, BR: brown, BK: black*




**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.*

# LEMCOM

## 1st Mini Vacuum Pump on Industrial Fieldbus

Specifications

PROFINET 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 1.02 to 3.25 SCFM.
- Air consumption: From 1.55 to 3.18 SCFM, 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 32 to 122°F.
- 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 ± 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: ±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.

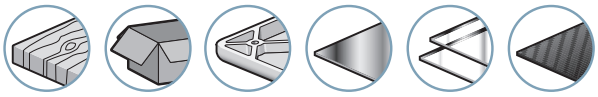
# LEM+

## 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 **LEMAX+ Series**.

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 (SCFM):

| max. vacuum / nozzle Ø | 60% | 85% |
|---|---|---|
| 2.0 mm | 6.67 | 4.41 |
| 2.5 mm | 9.71 | 7.06 |

## Integration

The **LEM+** compact modules integrate all the functions of "industrial vacuum" including simple, efficient, economical compressed air and are adapted for every application:

❶ **3.5 bar** pressure regulator

❷ "Vacuum" solenoid valve

❸ **3.5 bar** optimized venturi

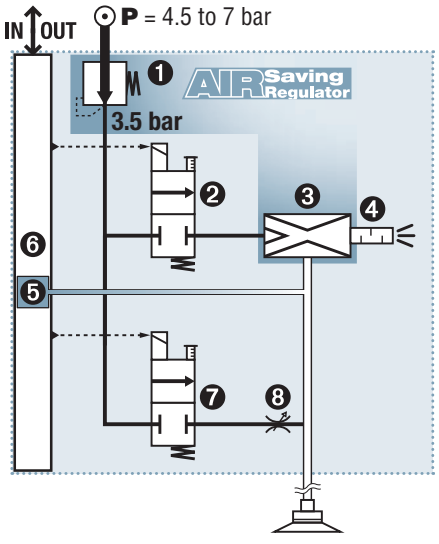
❹ Optimized silencer

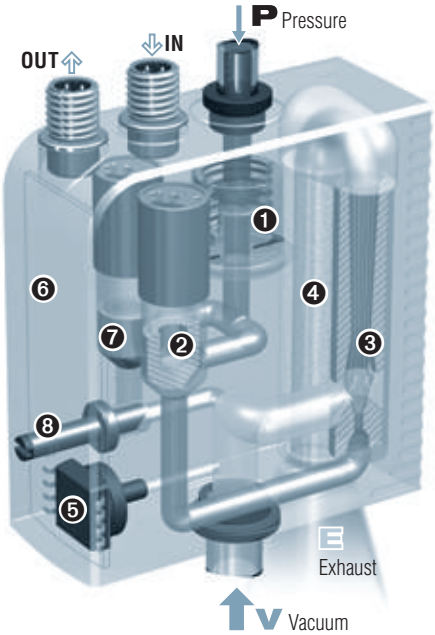
❺ Electronic vacuum sensor

❻ Integrated electronics

❼ "Blow-off" solenoid valve

❽ Blow-off flow rate regulator




Schematic representation

Air Saving Regulator

**40%** **energy savings** (on average).

Combined "venturi regulator" **ASR**: pressure regulator ❶ feeds venturi ❸ 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 (ASR): Air Saving Regulator

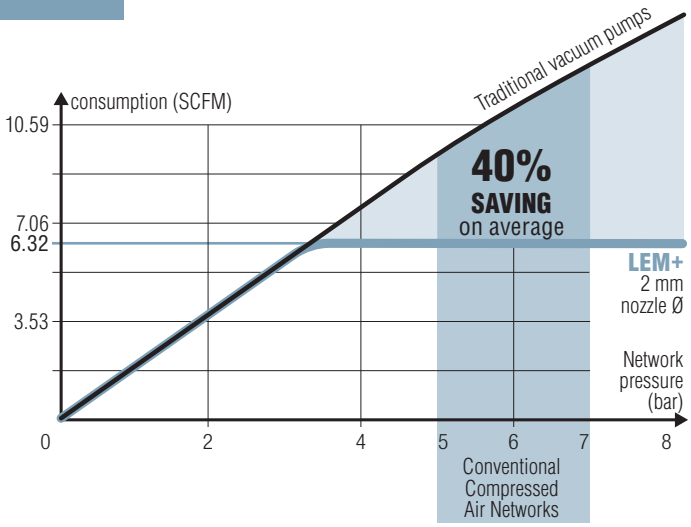
The LEM+ vacuum pumps, which integrate an **ASR** "venturi regulator" combination, maintain ideals that COVAL values greatly: reducing both compressed air consumption and noise generation.

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.

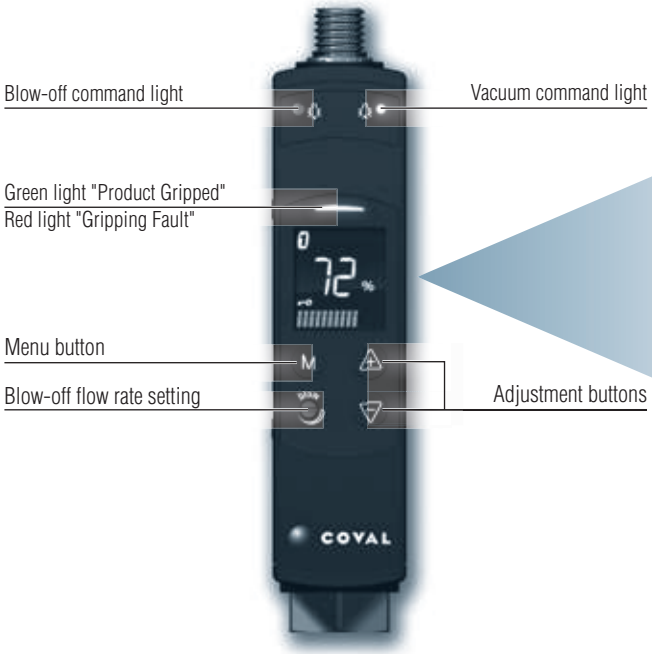
➔ **Simplified & Protected Installation and Operation.**

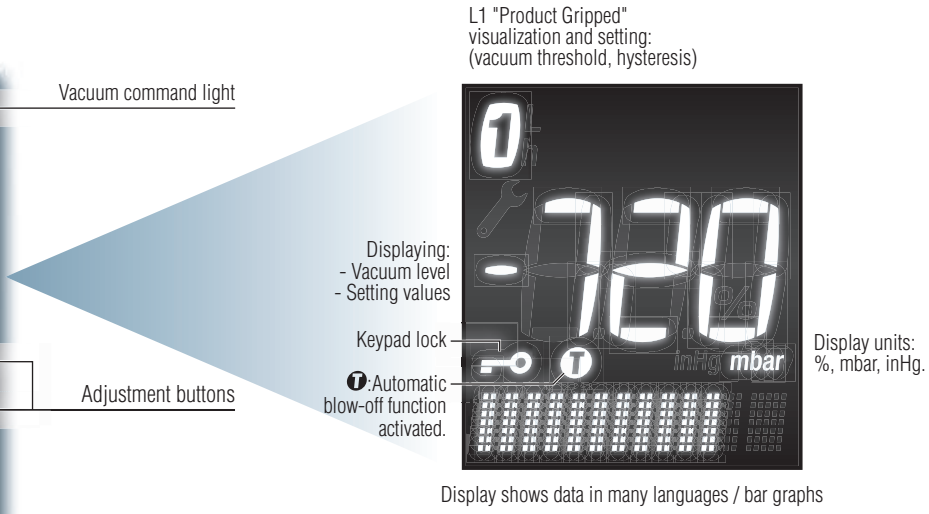
Due to the high visibility display of the **LEM+** modules, all useful information can be seen at a single glance: vacuum level, product gripped, thresholds reached, energy saving mode activated, etc.

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.**




Display shows data in many languages / bar graphs

8

LEM+

# LEM+

## Compact, High Flow Vacuum Pumps

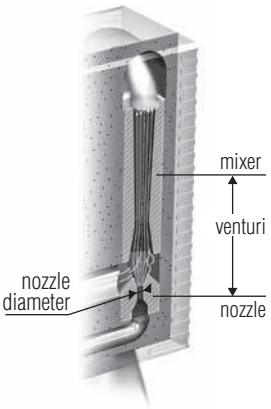
Selection Guide

AIR Saving Regulator

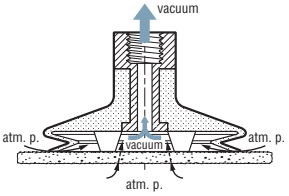
## Select Vacuum Level and Nozzle Diameter

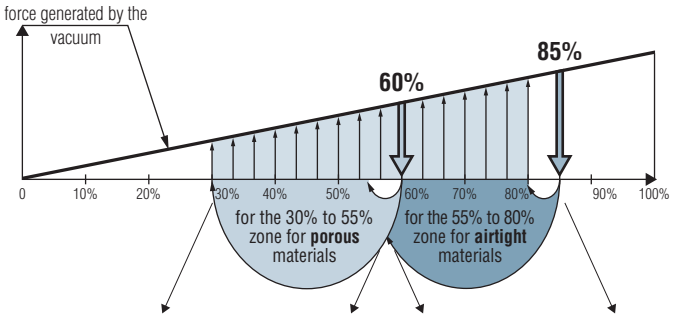
The introductory guide in this catalog shows that for porous objects, a 30-55% vacuum is economical and effective. This is obtained with a 60% maximum vacuum pump.
The table below helps to select the nozzle diameter which generates enough vacuumed air flow to respond in the time required by the application, 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, 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.

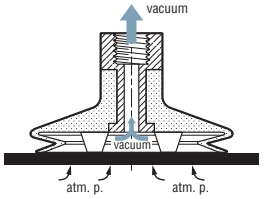



**Porous materials:**
cardboard, unfinished wood, pastries, etc.




**Airtight materials:**
glass, plastic, sheet metal, finished wood

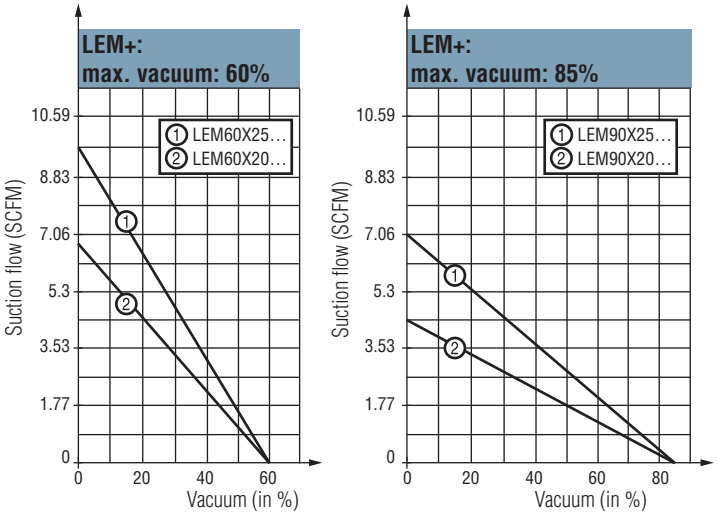



| Porous Objects ▸ Maximum Vacuum Level: 60% | | | | | |
|---|---|---|---|---|---|
| **Time to create vacuum** (seconds) **for a volume of 1 liter** | | | | **Air consumed** (SCFM) | **Air drawn in** (SCFM) |
| vacuum achieved / Ø nozzle | **35 %** | **45 %** | **55 %** | | |
| **2.0 mm** | 0.16 | 0.27 | 0.42 | **6.32** | **6.67** |
| **2.5 mm** | 0.11 | 0.18 | 0.31 | **9.18** | **9.71** |

| Airtight Objects ▸ Maximum Vacuum Level: 85% | | | | | |
|---|---|---|---|---|---|
| **Time to create vacuum** (seconds) **for a volume of 1 liter** | | | | **Air consumed** (SCFM) | **Air drawn in** (SCFM) |
| vacuum achieved / Ø nozzle | **55 %** | **65 %** | **75 %** | | |
| **2.0 mm** | 0.38 | 0.55 | 0.80 | **6.32** ✱ | **4.41** |
| **2.5 mm** | 0.26 | 0.35 | 0.50 | **9.18** ✱ | **7.06** |

✱ To save compressed air, choose **LEMAX+** ➔ **ASC** reduces the air consumption by **90**%

## Suction Flow Rate / Vacuum Curves

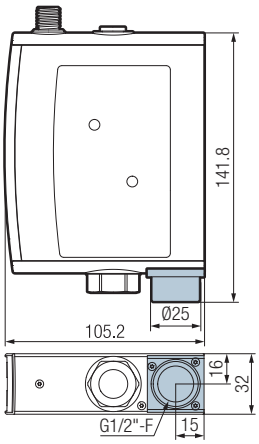



## Exhaust manifold: option E

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.




8

LEM+

# LEM+

## Compact, High Flow Vacuum Pumps

Configuring a Vacuum Pump

AIR Saving Regulator

| LEM | 60 | X | 25 | | S | | VA | C15 | P | G1 | | F | – |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

### VACUUM LEVEL

| | |
|---|---|
| **60 % max. vacuum** is optimal for porous materials | **60** |
| **85 % max. vacuum** is optimal for air-tight products | **90** |

### NOZZLE DIAMETER

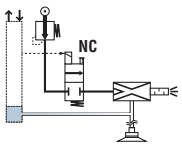
| | |
|---|---|
| **2 mm nozzle Ø** | **20** |
| **2.5 mm nozzle Ø** | **25** |

### MODULE COMPOSITION

**NC Vacuum Pump Without Blow-Off** — **R**

LEM__X__**R**V_C__PG1

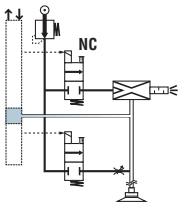
- Single command signal.
- **NC** vacuum command valve.




**NC Vacuum Pump With Blow-Off** — **S**

LEM__X__**S**V_C__PG1

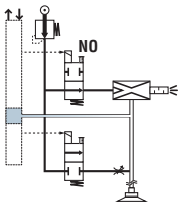
- 2 command signals.
- **NC** vacuum command valve.
- Blow-off configured on site, at choice:
  - Blow-off controlled by specific signal;
  - Automatic blow-off function (blow-off time configurable from 0 to 10s), only with VA option (advantage: reduced PLC I/O requirement).
- Adjustable blow-off flow rate.




**NO Vacuum Pump With Blow-Off** — **V**

LEM__X__**V**V_C__PG1

- 2 command signals.
- **NO** vacuum command valve.
- Blow-off controlled by external signal.
- Adjustable blow-off flow rate.




**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.

### VACUUM SENSOR DIALOGUE

### CONNECTORS

**Vacuum pump without vac. sensor** — **VO C14** — **one M12 connector 4 pins (C14)**

LEM__X___**VOC14**PG1

- Simplified LEM+ without settings and dialogue.
- Automatic operation until maximum vacuum level.

**Vacuum pump with vacuum sensor & dialogue** — **VA C15** — **one M12 connector 5 pins (C15)**

LEM__X___**VAC15**PG1

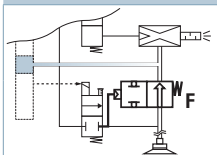
- Electronic vacuum sensor (VA).
- "Gripped product" switching output 24V DC / NO.
- Front face panel and full dialogue.

**Vacuum pump with vacuum sensor & dialogue** — **VA C24** — **two M12 connectors 4 pins (C24)**

LEM__X___**VAC24**PG1

- 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.

### POWERFUL BLOW-OFF




| | |
|---|---|
| Without | – |
| With | **F** |

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__**S**V... and LEM__X__**V**V...
NB: If option **F** is selected, no blow-off flow rate setting is available.

### EXHAUST

| | |
|---|---|
| Open (integrated silencer) | – |
| Exhaust manifold (G1/2''-F) | **E** |

**EXAMPLE OF COMPLETE PART NUMBER: LEM60X25SVAC15PG1**

**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.

# LEM+

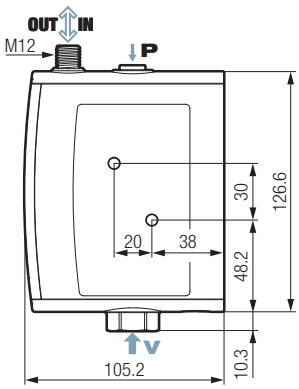
## Compact, High Flow Vacuum Pumps

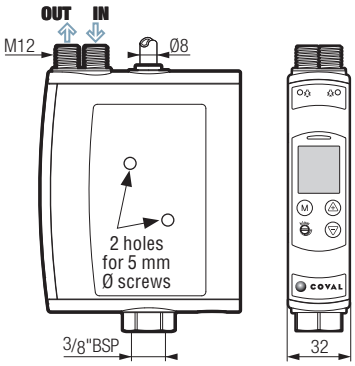
Dimensions, Mounting Options

AIR Saving Regulator

### Side Mounting

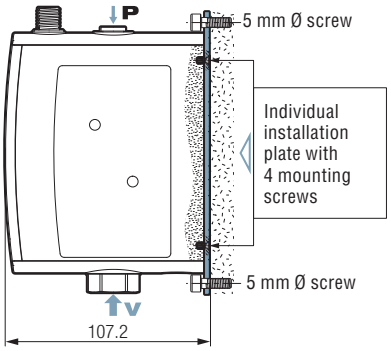
- Version: one M12 connector
- Version: two M12 connectors

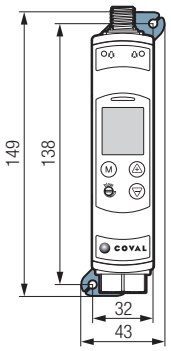



Mounting from the side is the simplest to implement: Two Ø 5 mm through screws or bolts with large washers.

### Mounting from Front

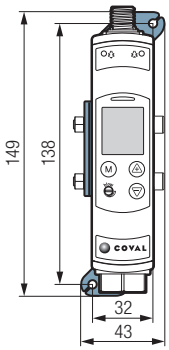


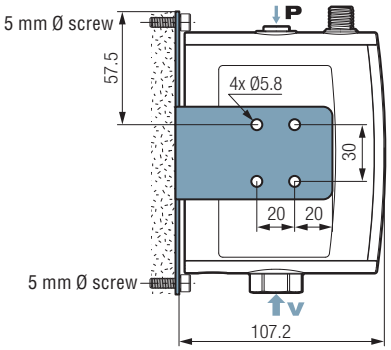




For mounting from the front, in addition to the module, you need to order an additional kit:

Mounting from front kit:
1 plate + 4 screws

**Part No.: LEMFIX2A**



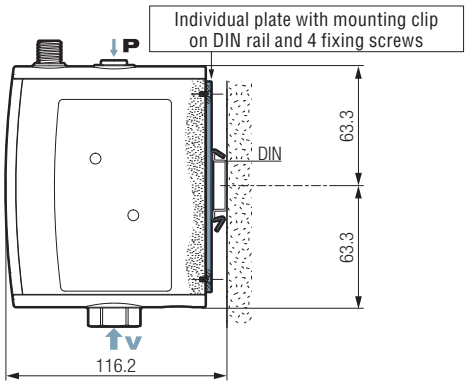



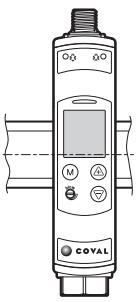

For front installation with side pump mounting this kit is needed in addition to the module:

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**

# LEM+

## Compact, High Flow Vacuum Pumps

Specifications & Connections

AIR Saving Regulator

## 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 4.41 to 9.71 SCFM, depending on model.
- Air consumption: From 6.32 to 9.18 SCFM, 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 32 to 122°F.
- Materials: PA 6-6 15% FG, brass, aluminum, NBR, HNBR, PU.

**Electrical Controls**

- Control voltage: 24V DC (±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 (±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: ±1.5% of range, temperature compensated.

**"Gripped Product" Output Signal**

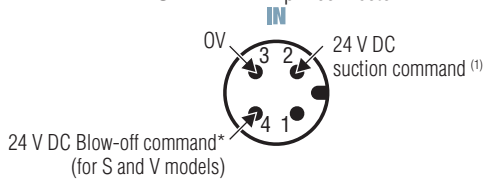
- 24V DC, switching output / NO, switching capacity: 125 mA PNP.

**Auxiliary output** (C24 model only, 2 x M12 4 pins)

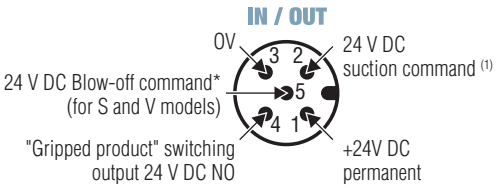
- "Vacuum level" signal, analogic 1 to 5V DC of measuring range.

## Electrical Connections

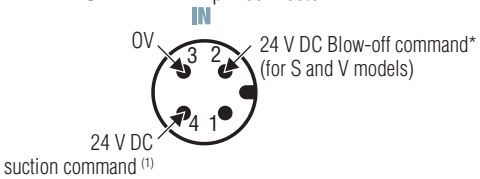
▪ **C14:** 1 M12 4-pin connector

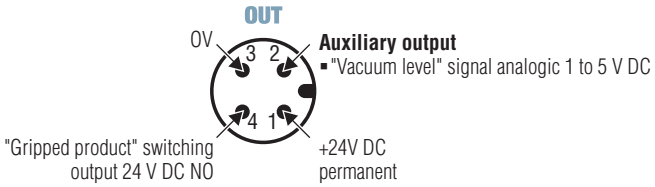



▪ **C15:** 1 M12 5-pin connector




▪ **C24:** 2 M12-4 pin connector



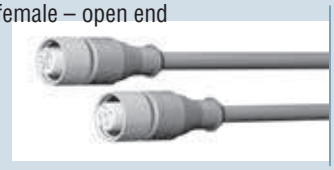

*(1) 24 V DC suction command, depending on version:*
*- for vacuum pumps model **R** and **S** (vacuum control NC valve): 24 V DC vacuum control*
*- for vacuum pumps Model **V** (vacuum control NO valve): 24 V DC vacuum off command*

** **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+

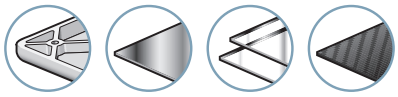
## Compact, High Flow Vacuum Pumps

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**.

Industry-specific applications



## Advantages

- Easy implementation: Plug & Play, multiple choices, every type of application.
- Maximum automatic energy savings:
  AIR Saving Regulator **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

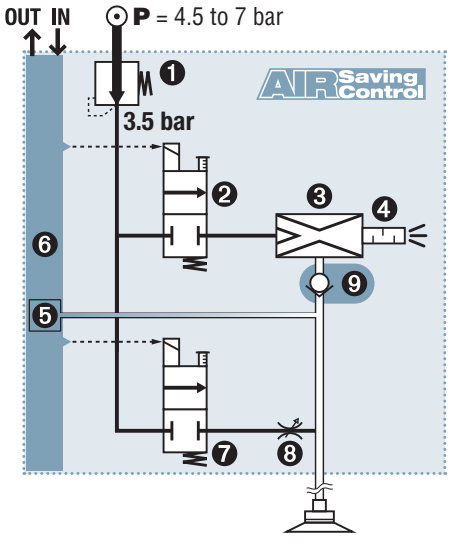
- 85% of maximum vacuum.
- NC or NO, depending on safety.
- ASC advanced electronics.
- High visibility display.
- Integrated vacuum sensor.
- Vacuum non-return valve.
- Combined **ASR** "venturi regulator".
- External blow-off signal or automatic blow-off function.
- Powerful blow-off as option.
- Versions with 1 or 2 M12 connectors.
- Suction flow rate (SCFM):

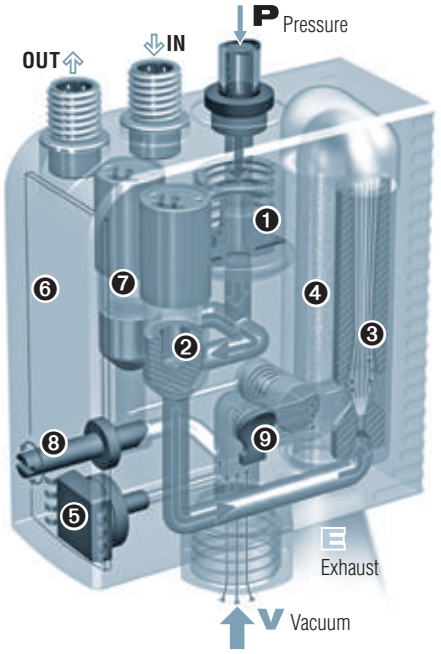
| max. vacuum / nozzle Ø | 85% |
|---|---|
| **2.0 mm** | 4.41 |
| **2.5 mm** | 7.06 |

## 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:

❶ **3.5 bar** pressure regulator
❷ "Vacuum" solenoid valve
❸ **3.5 bar** optimized venturi
❹ Optimized silencer
❺ Electronic vacuum sensor
❻ Integrated electronics
❼ "Blow-off" solenoid valve
❽ Blow-off flow rate regulator
❾ Vacuum non-return valve




Schematic representation

AIR Saving Control

**90%** **energy savings** (on average).

Combination of non-return ❾ and advanced electronics ❻ ensures the ASC's automatic management.

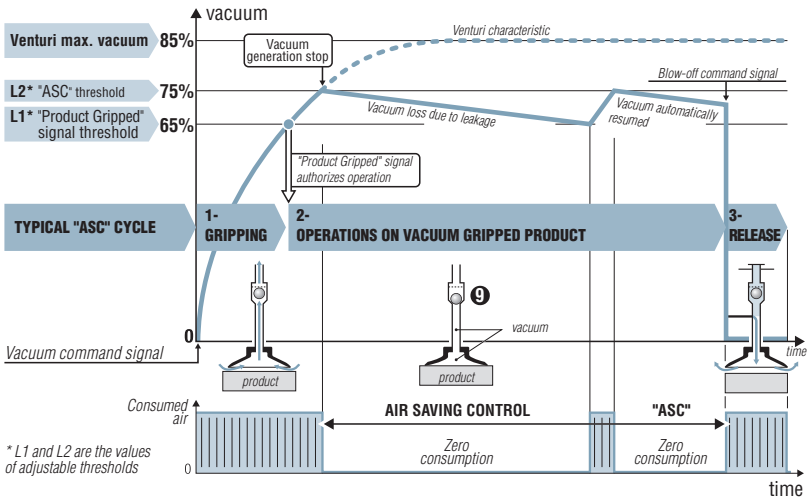
**→ Once vacuum is established, the pump does not continue to consume air to hold the product.**

# LEMAX+

## Compact, High Flow Vacuum Pumps

Energy Saving & Auto-adjustment

## "Air Saving Control" 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 ❷ starts the cycle by supplying the venturi ❸ 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 ❺. 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 ❷ is cut off ➔ consumption is halted. The object remains held by the vacuum maintained thanks to the closed valve ❾.

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%).

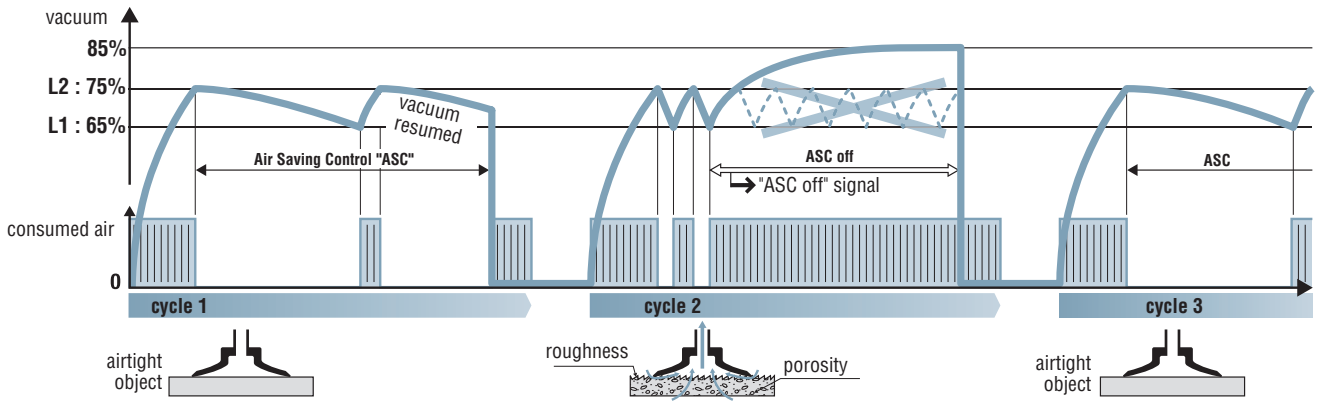
**3- Releasing the object**

At the end of operations, blow-off is ordered. The "blow-off" solenoid valve ❼ generates a stream of air which closes the isolation valve ❽, 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 | 0.016 ft³ | 0.016 ft³ | achieved |
| Transfer | 1.20 s | 0.106 ft³ | 0 | economy |
| Release | 0.14 s | 0.010 ft³ | 0.010 ft³ | |
| | | 0.132 ft³ | 0.027 ft³ | → 80 % |

**2- Clamping + operations** *(2 mm nozzle Ø, emptying 0.4 l)*

| Phase | Duration | Air consumption | | |
|---|---|---|---|---|
| | | without "ASC" | with "ASC" | |
| Clamping | 0.32 s | 0.032 ft³ | 0.032 ft³ | achieved |
| Operations | 60 s | 6.32 ft³ | 0 | economy |
| Release | 0.14 s | 0.010 ft³ | 0.010 ft³ | |
| | | 6.36 ft³ | 0.042 ft³ | → 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.

Specially designed by COVAL, the **LEMAX+** vacuum pumps integrate the **ASR** (regulator-venturi) combination which greatly reduces the compressed air consumption and noise level.

# LEMAX+

## 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.

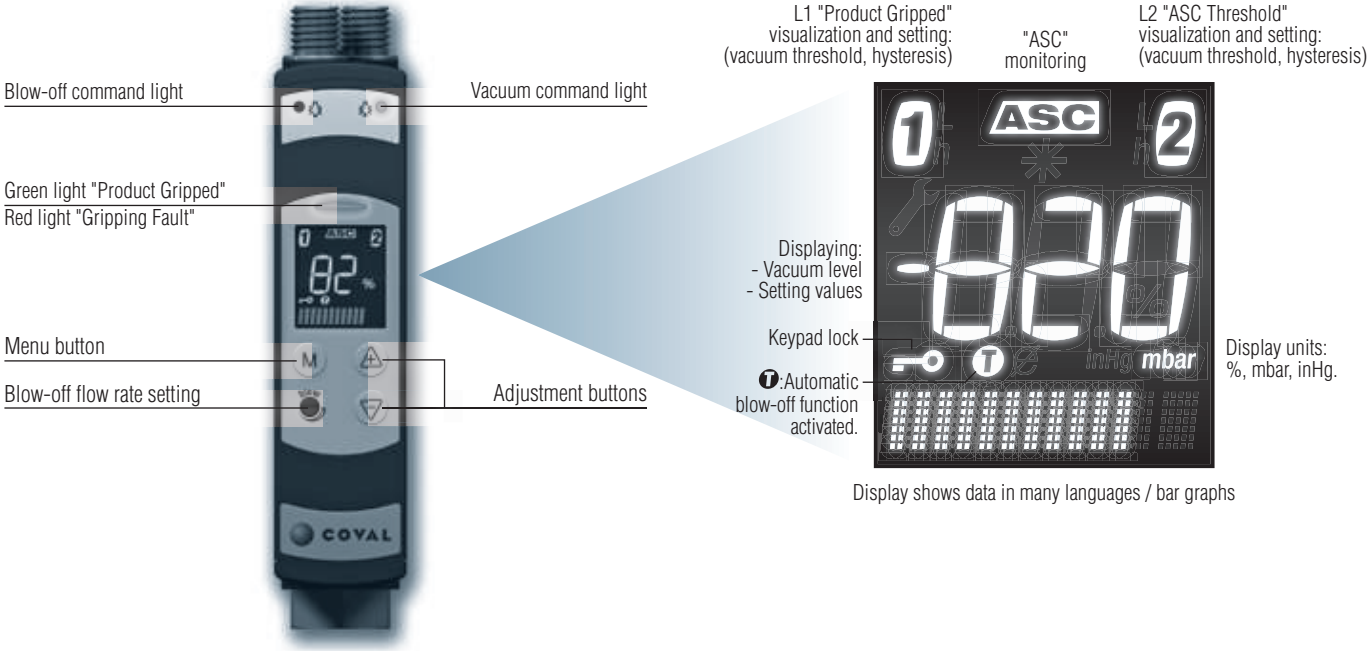
➔ **Simplified & Protected Installation and Operation.**

Due to the high visibility display of the **LEMAX+** 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.**




Display shows data in many languages / bar graphs

## Power Determined by the Venturi Nozzle Diameter

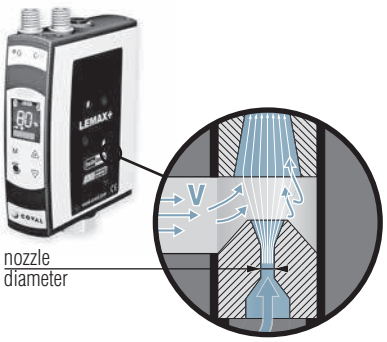
The table shows the power levels generated by each of the nozzle diameters available: when the module is operating "**ASC**" off, a larger nozzle draws and consumes more compressed air.

On the other hand, during "**ASC**" operation, a large nozzle quickly reaches the vacuum threshold generating power shut-off.

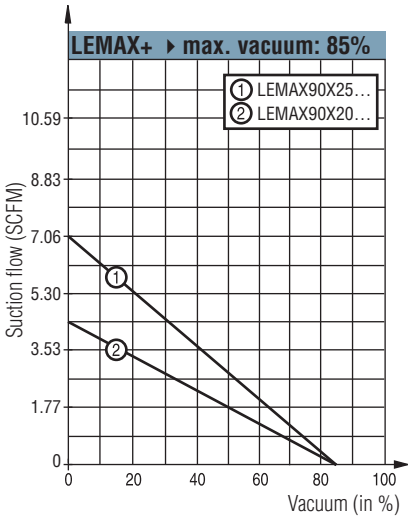
In conclusion:

- 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 (SCFM) | Consumed Air (SCFM) | Gripping Time (65% Vacuum) (s) | Time Until 75% Vacuum (s) | Consumed Air ($ft^3$) |
| 2.0 mm | 4.41 | 6.32 | 0.55 | 0.80 | 0.077 |
| 2.5 mm | 7.06 | 9.18 | 0.35 | 0.50 | 0.077 |




## Suction Flow Rate / Vacuum Curves




8

LEMAX+

# LEMAX+

## Compact, High Flow Vacuum Pumps

Configuring a Vacuum Pump

AIR Saving Control

| LEMAX | 90 | X | 25 | | S | C15 | P* | G1 | | F | | – |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

### VACUUM LEVEL

| | |
|---|---|
| **85 % max. vacuum** is optimal for airtight products | **90** |

### NOZZLE DIAMETER

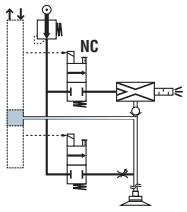
| | |
|---|---|
| **2 mm nozzle Ø** | **20** |
| **2.5 mm nozzle Ø** | **25** |

### MODULE COMPOSITION

**S**

**NC Vacuum Pump With Blow-Off**

LEMAX__X__**S**V_C__PG1

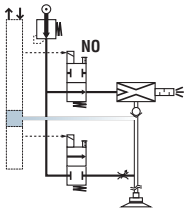



- 2 command signals.
- **NC** vacuum command valve.
- Blow-off configured on site, at choice:
  - Blow-off controlled by specific signal;
  - Automatic blow-off function (blow-off time configurable from 0 to 10s.).
    Advantage: reduced PLC I/O requirement.
- Adjustable blow-off flow rate.

**V**

**NO Vacuum Pump With Blow-Off**

LEMAX__X__**V**V_C__PG1




- 2 command signals.
- **NO** vacuum command valve.
- Blow-off controlled by external signal.
- Adjustable blow-off flow rate.

**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___**C15**PG1

- "Gripped product" switching output 24V DC / NO.

**C24** **Vacuum Pump with 2 M12 4-pin Connectors**
LEMAX90X___**C24**PG1

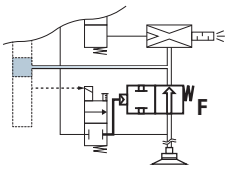
- Stand alone I/O.
- "Gripped product" switching output 24V DC / NO.
- 1 configurable auxiliary output:
  - either "Vacuum level" signal analogic 1 to 5V DC.
  - or "Without ASC" signal +5V DC switching output NO.

***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.

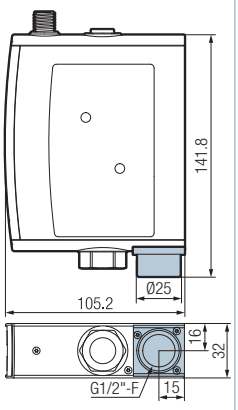
NB: If option **F** is selected, no blow-off flow rate setting is available.

### 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 workpiece. (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+

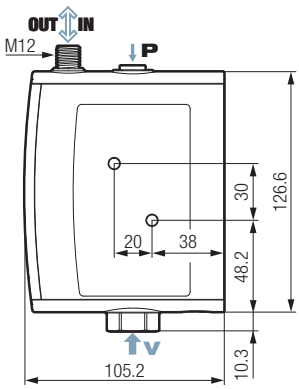
## Compact, High Flow Vacuum Pumps

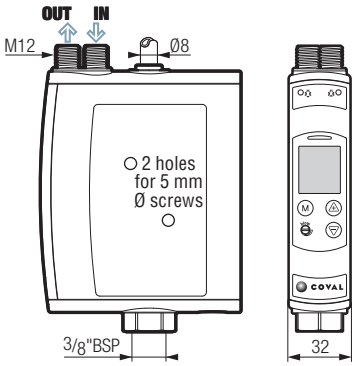
Dimensions, Mounting Options

AIR Saving Control

### Side Mounting

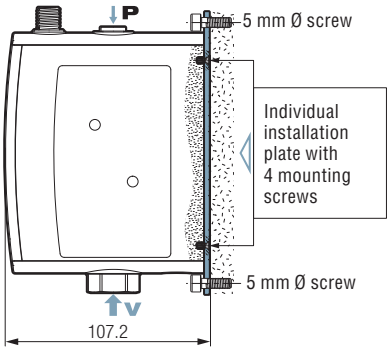
- Version: one M12 connector
- Version: two M12 connectors

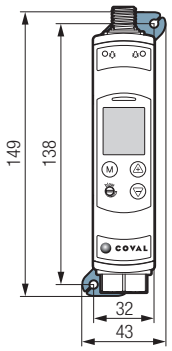



Mounting from the side is the simplest to implement: Two Ø 5 mm through screws or bolts with large washers.

### Mounting from Front

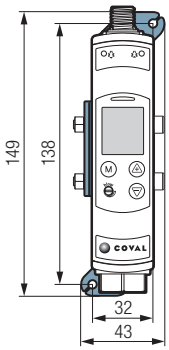


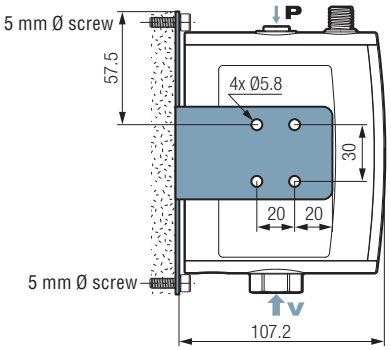




For mounting from the front, in addition to the module, you need to order an additional kit:

Mounting from front kit:
1 plate + 4 screws

**Part No.: LEMFIX2A**



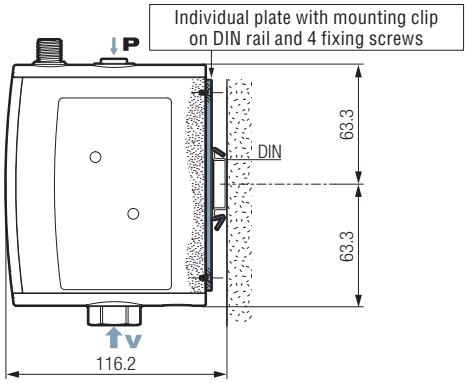



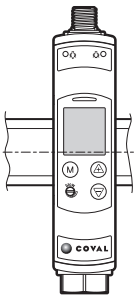

For front installation with side pump mounting this kit is needed in addition to the module:

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**

# LEMAX+

## Compact, High Flow Vacuum Pumps

Specifications & Connections

AIR Saving Control

## 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 4.41 to 7.06 SCFM, depending on model.
- Air consumption: From 6.32 to 9.18 SCFM, 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 32 to 122°F.
- Materials: PA 6-6 15% FG, brass, aluminum, NBR, HNBR, PU.

### Electrical Controls

- Control voltage: 24V DC (±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 (±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: ±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)

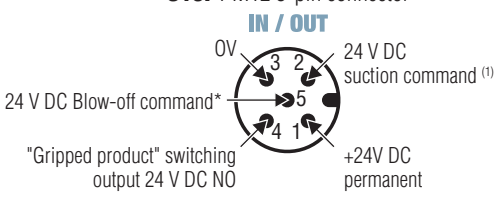
- either "Vacuum level" signal, analogic 1 to 5V DC of measuring range.
- or "without ASC" signal +5V DC NO switching output.

### ASC: Regulation & Self-Adaptation

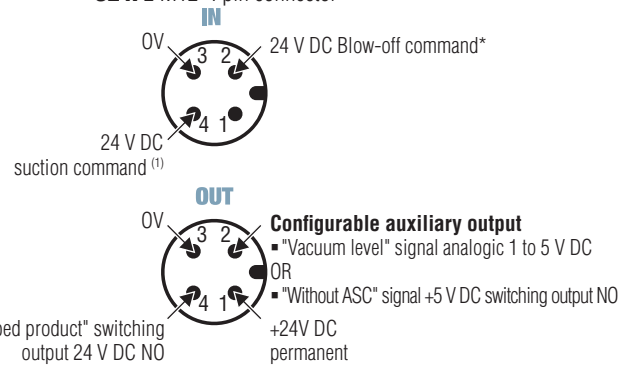
- Continuous monitoring of the leakage level: Back-off or automatic return to operation with ASC.

## Electrical Connections

▪ **C15:** 1 M12 5-pin connector




▪ **C24:** 2 M12-4 pin connector



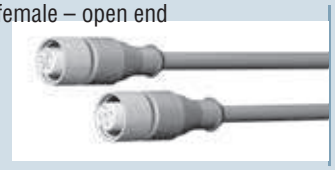

*(1) 24 V DC suction command, depending on version:*
*- for vacuum pumps model **S** (vacuum control NC valve): 24 V DC vacuum control*
*- for vacuum pumps Model **V** (vacuum control NO valve): 24 V DC vacuum off command*

** **S** externally controlled blow-off or automatic blow-off function > economy of an automaton outlet.*

## 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.

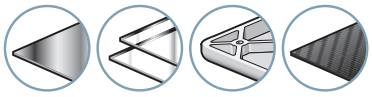
# GVMAX HD

## Heavy Duty Communicating Vacuum Pumps

General Information

NFC
IO-Link
AIR Saving Control

Industry-specific applications



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.

NFC
IO-Link
AIR Saving Control

### 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

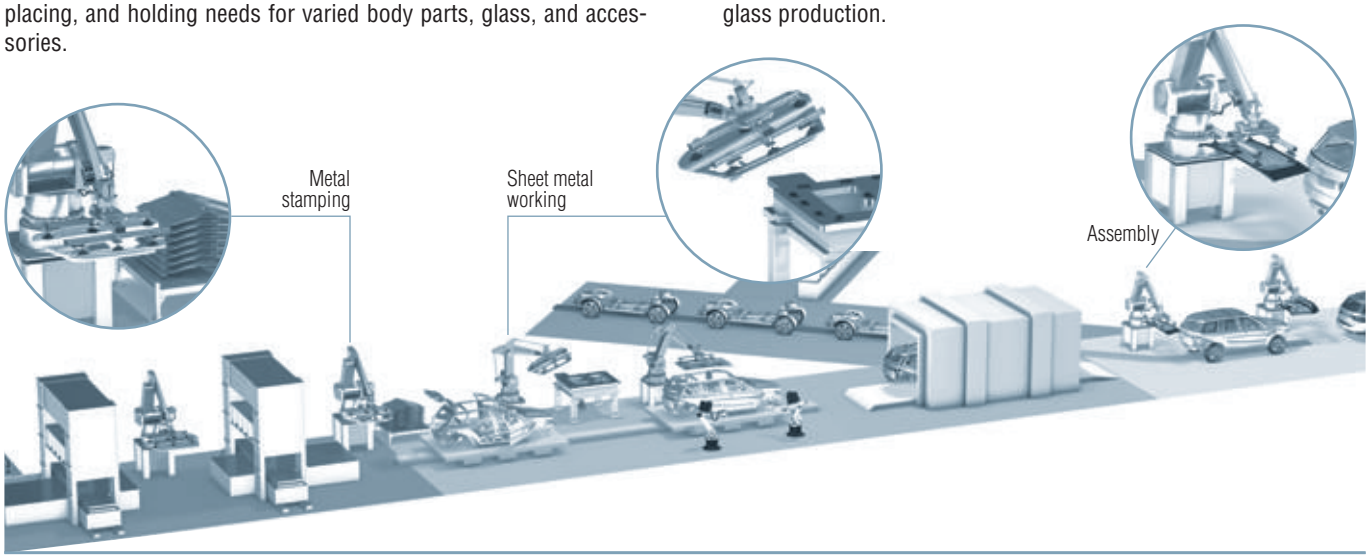
### Main Specifications

- 85% vacuum
- Vacuum control: NC, NO or pulse-triggered bistable control
- Powerful suction flow rates:
  - Dia. 2.5 mm nozzle → 6.48 SCFM
  - Dia. 3.0 mm nozzle → 8.05 SCFM
- 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

### 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

NFC
IO-Link
AIR Saving Control

### 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.

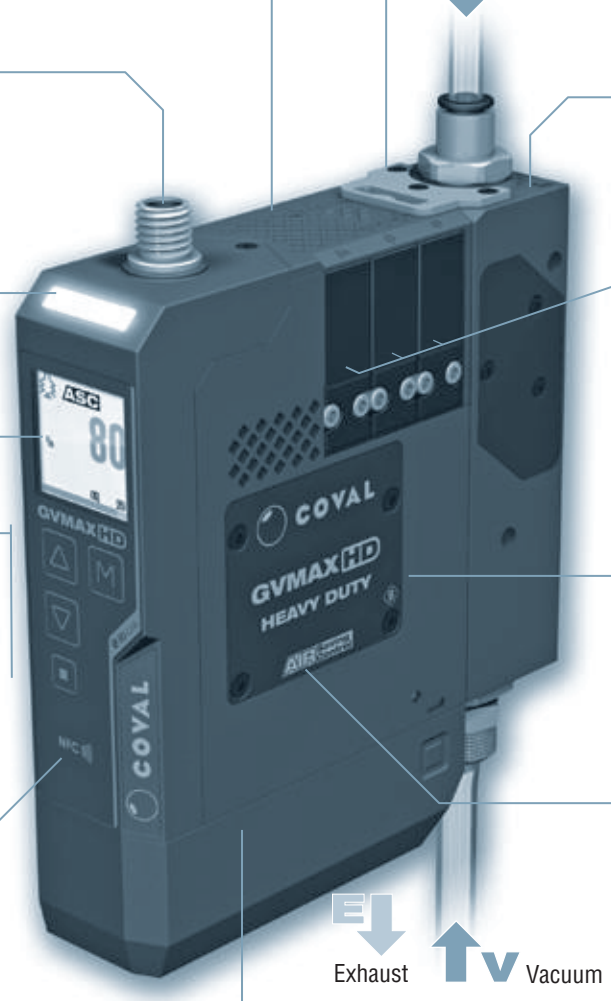
SMART SWAP Quick-mounting system: Allows you to mount the GVMAX HD module onto its pneumatic socket or remove it in the blink of an eye, without needing to disconnect compressed air and vacuum tubes.

Pressure P

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
Air Saving Control (ASC), our smart vacuum control system: Averages 90% energy savings

E Exhaust

V Vacuum

Open clog-free silencer

# GVMAX HD

## Heavy Duty Communicating Vacuum Pumps

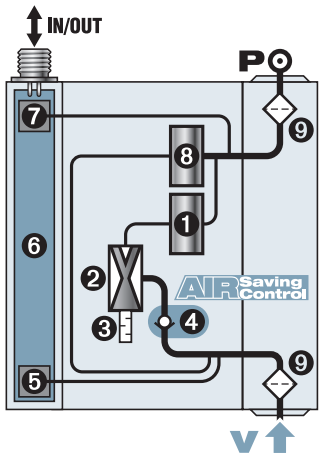
Integration and Performance

NFC
IO-Link
AIR Saving Control

### 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 µm filter screen




+ AIR Saving Control
**90%** energy savings *(on average, see p. 8/56)*

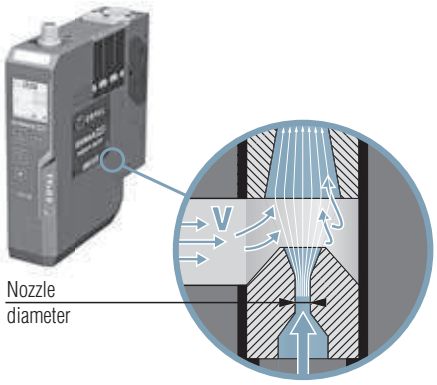
The combined action of the non-return valve ❹ and of the integrated electronics ❻ automatically ensures ASC management.
➔ **Once the vacuum has been established, the pump does not consume any more air to hold the object.**

### Performance determined by the Venturi pump's nozzle diameter

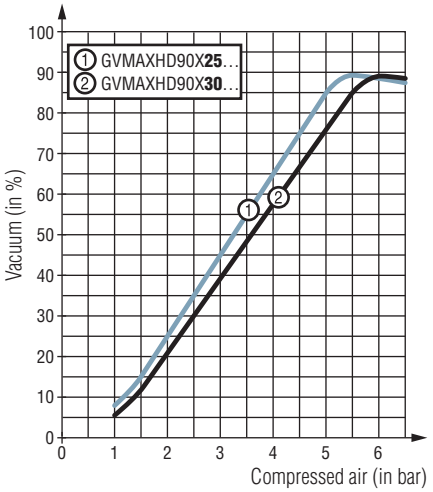
The table specifies the performance levels and evacuation times generated for each nozzle diameter available.

When handling airtight objects, the ASC vacuum control system can help to considerably reduce the consumption of compressed air.

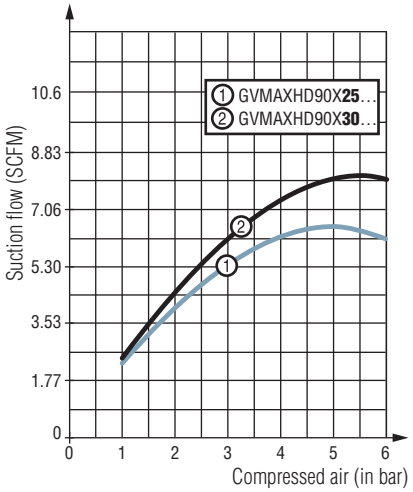
| Nozzle dia. \ Vacuum reached | Evacuation time (seconds) of a volume of 1 liter 45 % | 55 % | 65 % | 75 % | Max. vacuum (%) | Air drawn in (SCFM) | Air consumed (SCFM) | Air pressure level (bar) |
|---|---|---|---|---|---|---|---|---|
| **2.5 mm** | 0.17 | 0.24 | 0.35 | 0.52 | **85** | **6.48** | **10.29** | **5** |
| **3.0 mm** | 0.15 | 0.20 | 0.27 | 0.42 | **85** | **8.05** | **13.3** | **5.5** |



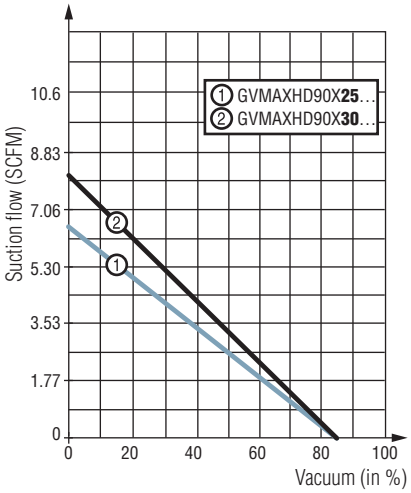

### Vacuum Generated/Compressed Air




### Suction Flow Rate/Compressed Air




### Suction Flow Rate/Vacuum



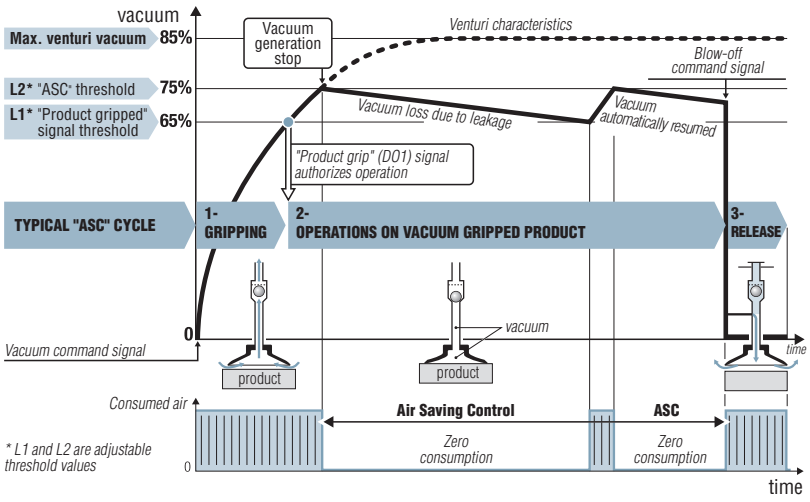
# GVMAX HD

## Heavy Duty Communicating Vacuum Pumps

Energy Savings and Smart Adaptation

NFC
IO-Link
AIR Saving Control

## AIR Saving Control — 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" | Air consumption with "ASC" | |
|---|---|---|---|---|
| Gripping | 0.50 s | 0.085 ft³ | 0.085 ft³ | Achieved |
| Transfer | 2.00 s | 0.34 ft³ | 0 | economy |
| Release | 0.14 s | 0.024 ft³ | 0.024 ft³ | |
| | | 0.45 ft³ | 0.11 ft³ | → 76 % |

**2- Clamping + operations** (nozzle dia. 2.5 mm, emptying 1 l)

| Phase | Duration | Air consumption w/o "ASC" | Air consumption with "ASC" | |
|---|---|---|---|---|
| Clamping | 0.83 s | 0.14 ft³ | 0.14 ft³ | Achieved |
| Operations | 60 s | 10.2 ft³ | 0 | economy |
| Release | 0.14 s | 0.024 ft³ | 0.024 ft³ | |
| | | 10.4 ft³ | 0.17 ft³ | → 98 % |

### → Resulting savings

"**ASC**" energy savings are major as shown in the 2 examples below:

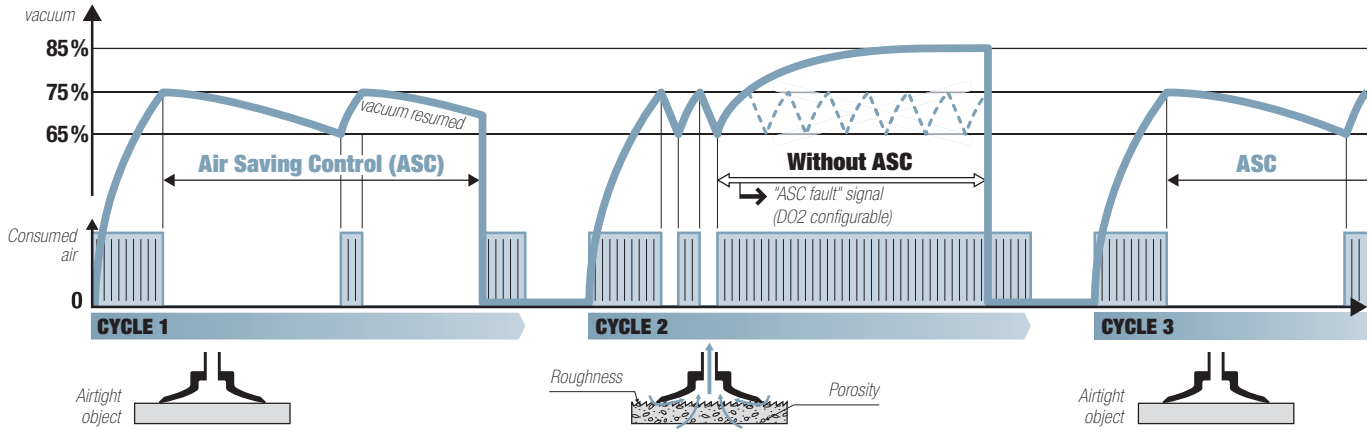
- 76% savings when transferring a object after gripping
- 98% savings when clamping a object during an operation lasting 1 min

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

NFC
IO-Link
AIR Saving Control

### 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

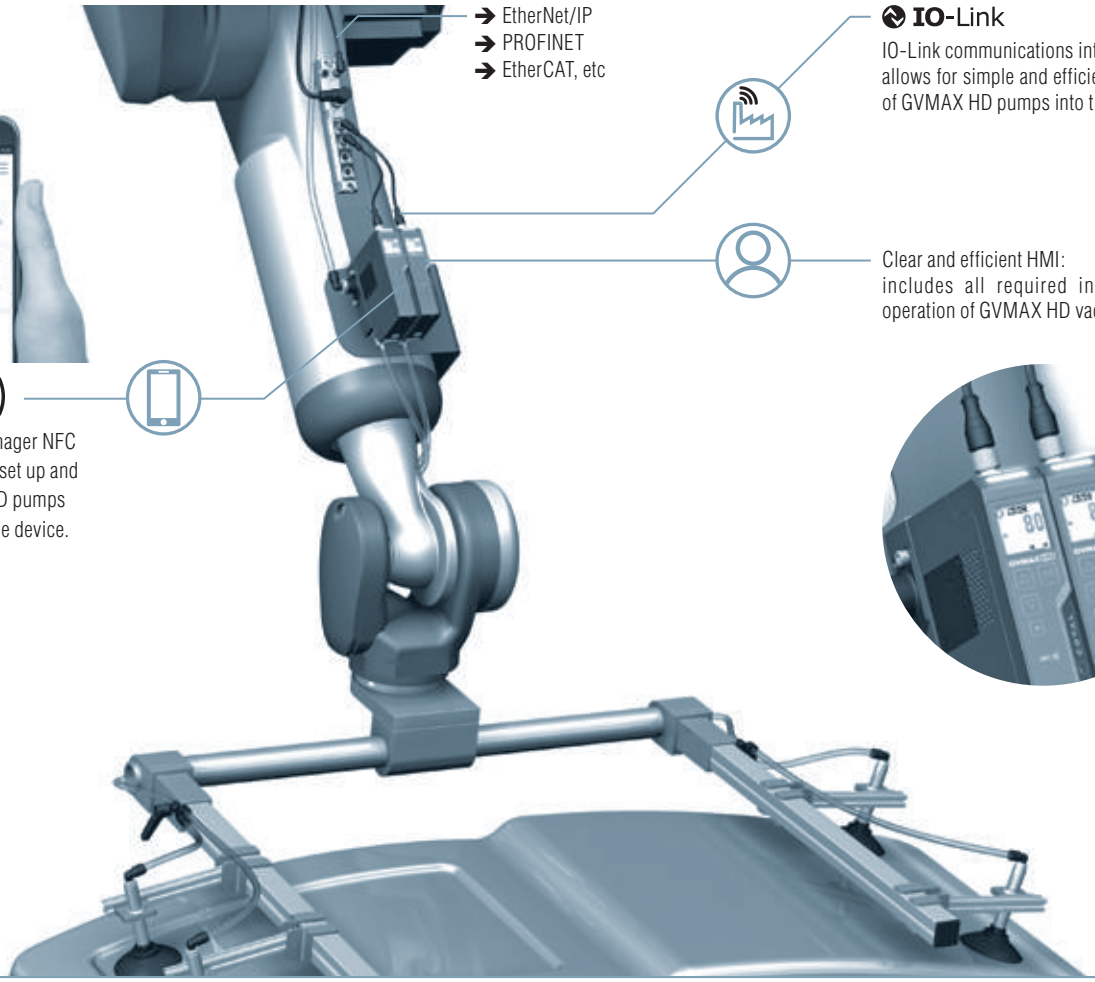
- Vacuum and blow-off control

#### 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

NFC

COVAL Vacuum Manager NFC application: used to set up and diagnose GVMAX HD pumps directly from a mobile device.



→ 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.

# GVMAX HD

## Heavy Duty Communicating Vacuum Pumps

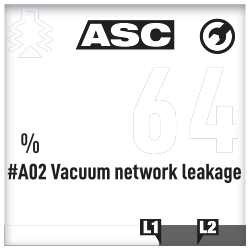
Straightforward Communication

NFC
IO-Link
AIR Saving Control

## HMI

Gripping status indicator light:
- Green: object gripped
- Yellow: ASC disabled due to vacuum leakage (object held in place)
- Red: object lost

1.54" high-visibility color LCD display

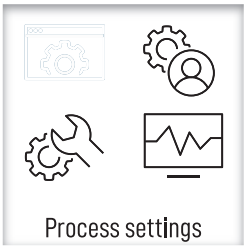


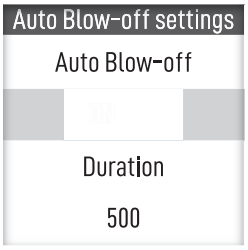

Settings keypad

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**

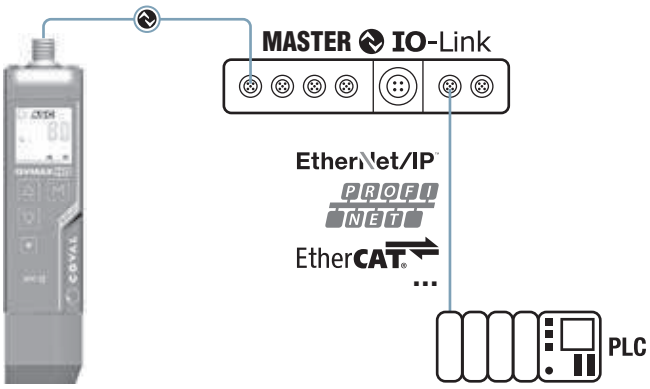
EN FR DE IT ES

## 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 different 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

# GVMAX HD

## Heavy Duty Communicating Vacuum Pumps

Configuration

NFC
IO-Link
AIR Saving Control

### 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

SMART SWAP

**RA** version (standalone)

GVMAX HD standalone module with SMART SWAP system and pneumatic socket

**RB** version (island)

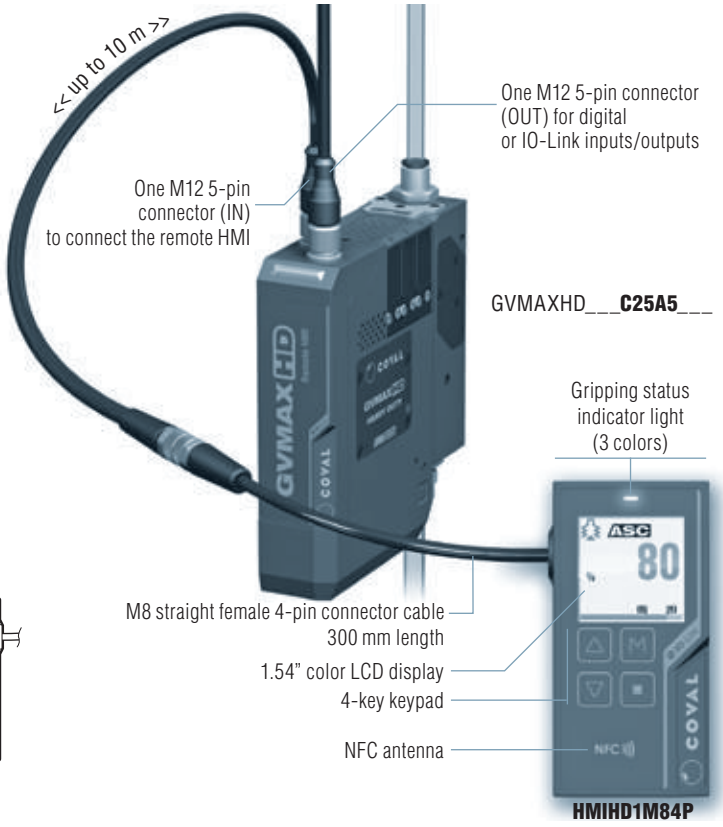
Island of 3 GVMAX HD modules with SMART SWAP system on pneumatic sockets

### 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.

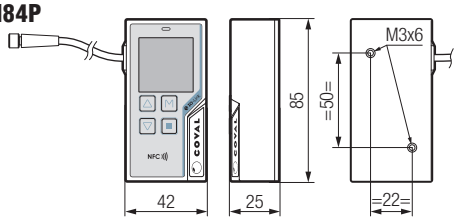
**Advantages:**

- 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



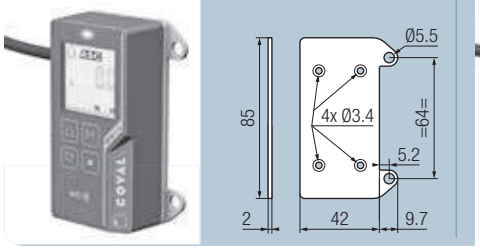

➔ **GVMAX HD vacuum pump without HMI**
Part No.: GVMAXHD___**C25A5**___
- Two M12 5-pin connectors
- M12 blanking plug provided for use without HMI

➔ **Remote HMI**
Part No.: **HMIHD1M84P**

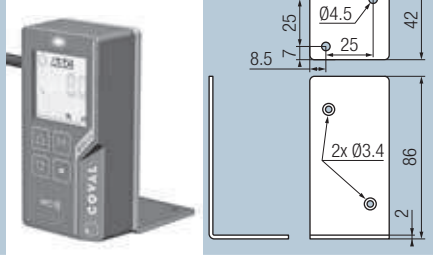



### Accessories for remote HMI

**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.

8

GVMAX HD

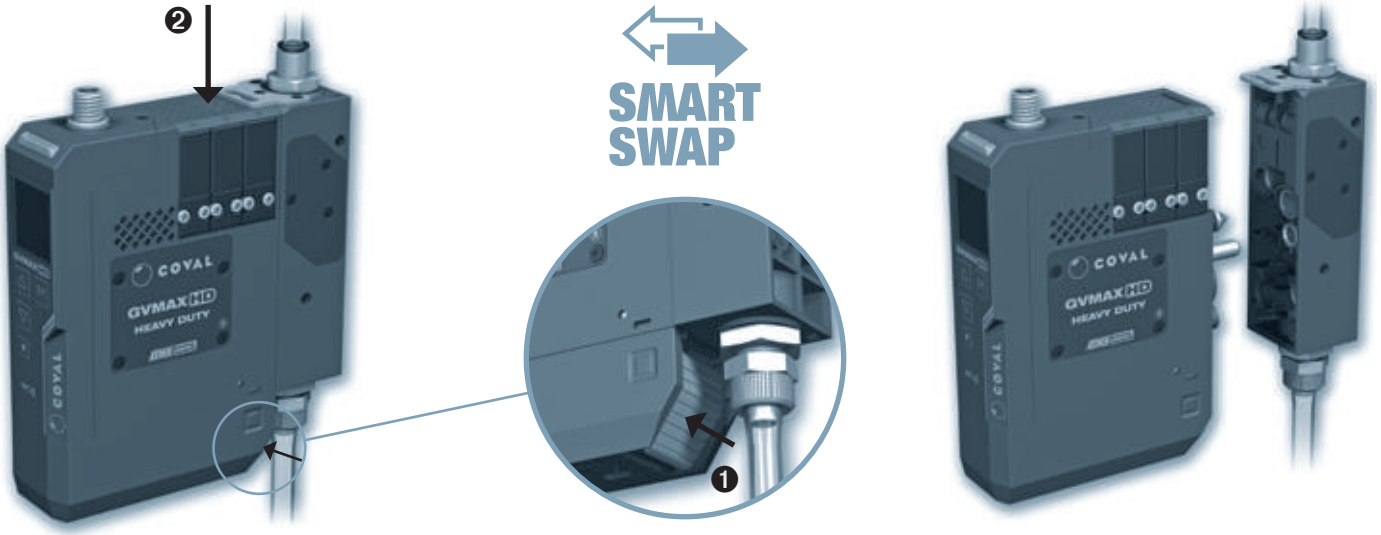
# GVMAX HD

## Heavy Duty Communicating Vacuum Pumps

Modularity and Maintenance

NFC
IO-Link
AIR Saving Control

### SMART SWAP Quick-Mounting System



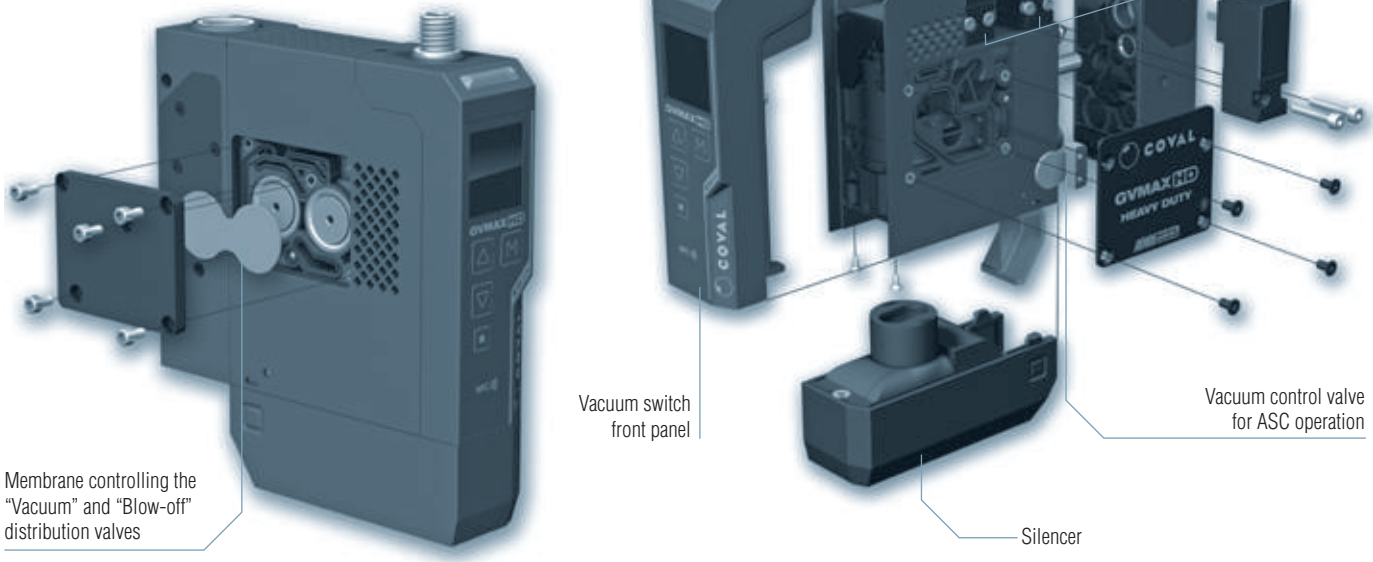

COVAL's patented SMART SWAP quick-mounting system allows you to mount the GVMAX HD module onto its pneumatic socket or remove it in the blink of an eye, without needing to disconnect compressed air and vacuum tubes.

No tools required, just two steps by operator to release: press release tab ❶ at back of silencer and apply pressure to upper housing ❷ 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 va

### 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

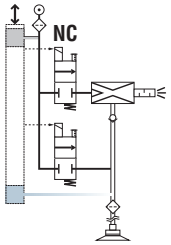
Selection guide

NFC
IO-Link
AIR Saving Control

## Vacuum Control: 3 Solutions

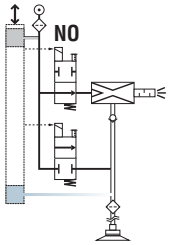
**Model GVMAXHD__S:** vacuum pump with **NC** vacuum control and **NC** blow-off
In the event of power failure, vacuum is no longer generated. In the event of compressed air failure, the vacuum is no longer maintained.

- 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



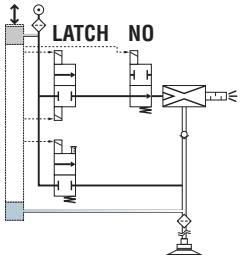

**Model GVMAXHD__L:** vacuum pump with **pulse-triggered bistable** vacuum control and **NC** blow-off (patented system)
In the event of power failure, the vacuum pump maintains its previous state.
More specifically, one of the following two scenarios will take place should the failure occur:

- 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.

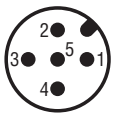
In the event of compressed air failure, the vacuum is no longer maintained.

- 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

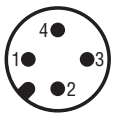



| | | |
|---|---|---|
| ⇄ | 1 | 24 V DC |
| | 2 | 24 V DC suction command (1) |
| ⇄ | 3 | 0 V - GND |
| ⇄ | 4 | 24 V DC object gripped DO1 - C/Q |
| | 5 | 24 V DC blow-off command |

▪ **C18A1**: One M12 8-pin male connector

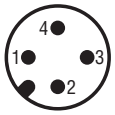
| | | |
|---|---|---|
| | 1 | 24 V DC object gripped DO1 |
| ⇄ | 2 | 24 V DC |
| | 3 | / |
| | 4 | 24 V DC suction command (1) |
| ⇄ | 5 | 24 V DC ASC Status DO2 - C/Q (2) |
| | 6 | 24 V DC blow-off command |
| ⇄ | 7 | 0 V - GND |
| | 8 | / |

▪ **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 (1) |




Front connector: OUT

| | | |
|---|---|---|
| ⇄ | 1 | 24 V DC |
| | 2 | 24 V DC ASC Status DO2 (2) |
| ⇄ | 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 (1) |
| ⇄ | 3 | 0 V - GND |
| ⇄ | 4 | 24 V DC object gripped DO1 - C/Q |
| | 5 | 24 V DC blow-off command |

⇄ : *Connections for* IO-Link

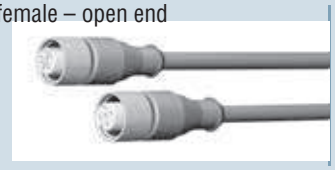
(1) *24 V DC suction command, depending on version:*
- ***S**: 24 V DC vacuum control*
- ***V**: 24 V DC vacuum off command*
- ***L**: 24 V DC vacuum control with min. pulse-triggering of 50 ms*

(2) *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

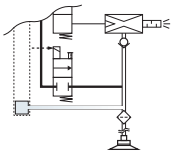
NFC
IO-Link
AIR Saving Control

## 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**)

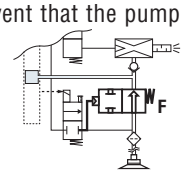
The blow-off flow is directed into the vacuum network and ensures the object is released in most applications.



- 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?

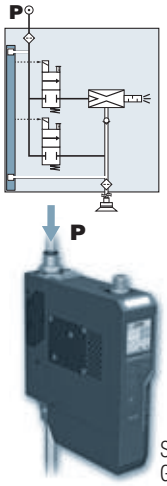
Standalone GVMAX HD vacuum pumps meet the needs of most common applications: a GVMAX HD controls one or several suction cups, which all operate according to the same sequence. Whenever several suction cups operate according to different sequences, several vacuum pumps are required. The choices are as follows:

- Several standalone pumps
- An island assembly including 1 to 4 vacuum pumps and a shared internal pressure supply

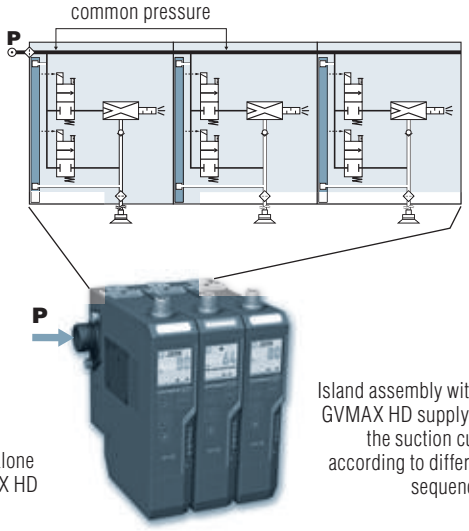
**Standalone vacuum pumps are available in 2 versions:**

- 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

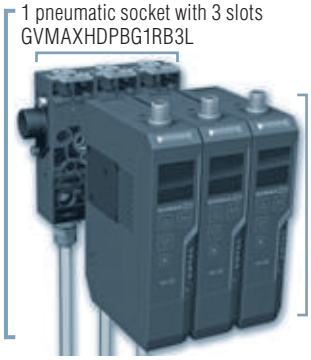



Standalone GVMAX HD




Island assembly with 3 GVMAX HD supplying the suction cups according to different sequences

## Configuration of Island Assemblies




Configuration of an island assembly with 3 identical vacuum pumps GVMAXHD___RB3L

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.

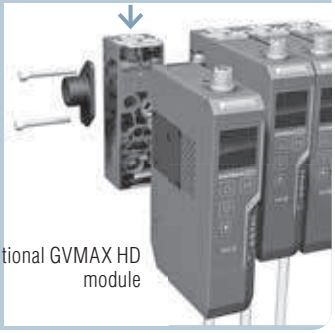
*(*) Assembled pneumatic sockets are supplied as standard with the pressure connection on the left side (version L). On request, an R version with right-hand pressure connection or a T version with top pressure connection is available.*

### 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

Pneumatic socket for island assemblies



Additional GVMAX HD module

# GVMAX HD

## Heavy Duty Communicating Vacuum Pumps

Configuring a Vacuum Pump

NFC
IO-Link
AIR Saving Control

| GVMAXHD90X | 25 | L | C15A1 | X | G1 | | F1 | D | RB3L |
|---|---|---|---|---|---|---|---|---|---|

### NOZZLE DIA.

| | |
|---|---|
| 2.5 mm dia | 25 |
| 3.0 mm dia | 30 |

### GENERATOR CONTROL

| | |
|---|---|
| Vacuum pump with **NC** vacuum control and **NC** blow-off<br>Choice of blow-off settings:<br>▪ Controlled by external signal<br>▪ Automatic timer from 50 to 9999 ms (advantage: saves one controller output) | S |
| Vacuum pump with **NO** vacuum control and **NC** blow-off<br>▪ Blow-off controlled by external signal | V |
| Vacuum pump with **pulse-triggered bistable** vacuum control and **NC** blow-off<br>▪ Blow-off controlled by external signal | L |

### BLOW-OFF

| | |
|---|---|
| Standard blow-off | F1 |
| **Powerful blow-off**<br>*The powerful blow-off option is used when the object needs to be released quickly.* | F2 |

### CONNECTOR(S)

| | |
|---|---|
| C15A1 | 1 x M12 5-pin male |
| C18A1 | 1 x M12 8-pin male |
| C24A2 | 2 x M12 4-pin male |
| C25A5 | 2 x M12 5-pin male<br>**For use with remote HMI** |

### CONFIGURATIONS

**Standalone vacuum pumps**

**VA** — **GVMAXHD90X __XG1_D_VA**
GVMAX HD module screwed onto its pneumatic socket

**RA** — **GVMAXHD90X __XG1_D_RA**
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)**

**RB1L*** — **GVMAXHD90X__XG1_D_RB1L**
1 x GVMAX HD module with SMART SWAP quick-mounting system and pneumatic socket with 1 slot
▪ Left lateral pressure connection

**RB2L*** — **GVMAXHD90X__XG1_D_RB2L**
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

**RB3L*** — **GVMAXHD90X__XG1_D_RB3L**
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

**RB4L*** — **GVMAXHD90X__XG1_D_RB4L**
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

NFC
IO-Link
AIR Saving Control

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

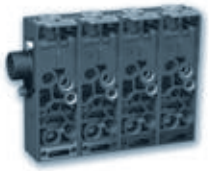
**GVMAXHDPBG1RB_L** sockets come assembled with the corresponding set of end pieces and the pressure connection on the left side.

SMART SWAP

**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.**

| | |
|---|---|
| 2.5 mm dia | 25 |
| 3.0 mm dia | 30 |

**GENERATOR CONTROL**

| | |
|---|---|
| Vacuum pump with **NC** vacuum control and **NC** blow-off<br>Choice of blow-off settings:<br>▪ Controlled by external signal<br>▪ Automatic timed from 50 to 9999 ms (advantage: saves one controller output) | S |
| Vacuum pump with **NO** vacuum control and **NC** blow-off<br>▪ Blow-off controlled by external signal | V |
| Vacuum pump with **pulse-triggered bistable** vacuum control and **NC** blow-off<br>▪ Blow-off controlled by external signal | L |

**CONNECTOR(S)**

| | |
|---|---|
| C15A1 | 1 x M12 5-pin male |
| C18A1 | 1 x M12 8-pin male |
| C24A2 | 2 x M12 4-pin male |
| C25A5 | 2 x M12 5-pin male<br>**For use with remote HMI** |

**BLOW-OFF**

| | |
|---|---|
| F1 | Standard blow-off |
| F2 | **Powerful blow-off**<br>*The powerful blow-off option is used when the object needs to be released quickly.* |

**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

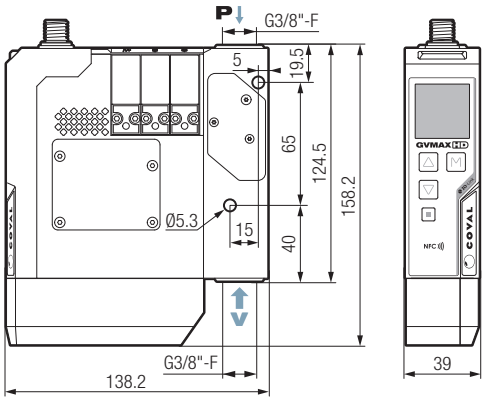
## Heavy Duty Communicating Vacuum Pumps

Dimensions and Installation Options

NFC
IO-Link
AIR Saving Control

### Lateral installation (standalone version)

2 x 5.3 mm dia. (for two Ø 5 mm through screws or bolts with large washers).




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

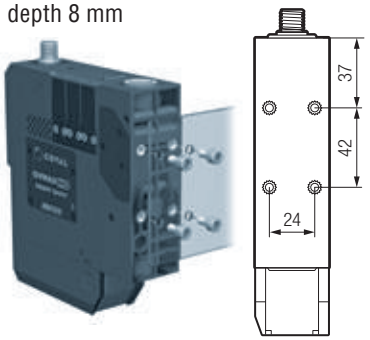
**www.coval.com**

3D COVAL Data

### Front Panel Installation

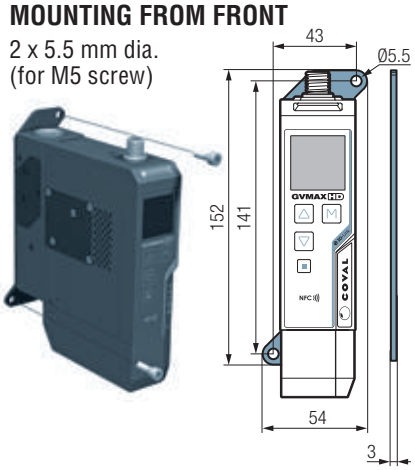
#### MOUNTING FROM REAR

4 x M5 screw threads, depth 8 mm




#### MOUNTING FROM FRONT

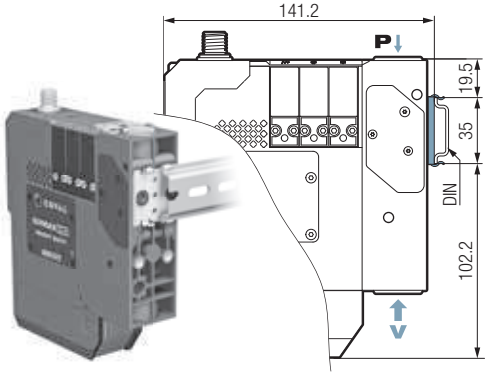
2 x 5.5 mm dia. (for M5 screw)




For front panel installation, order the following installation kit:

Part No.: **GVMAXHDFIXA**
(1 plate + 4 fastening screws)

### Installation on DIN Rail



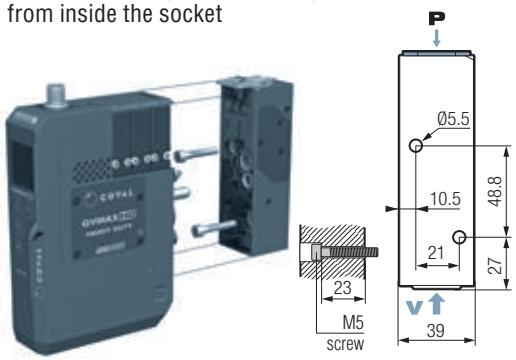

The pump can be mounted on a DIN rail for a static installation (e.g. in a cabinet).
In this case, it must be equipped with an installation clip that is to be ordered separately:

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

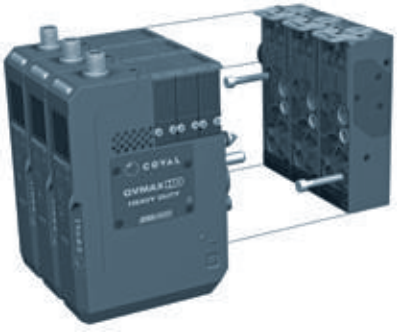
#### STANDALONE VERSION

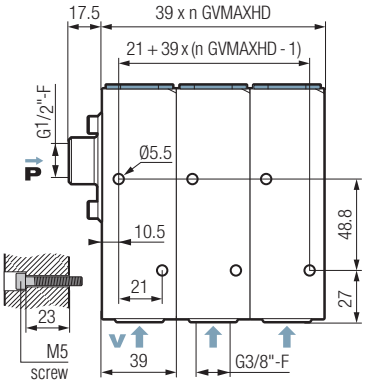
2 x 5.5 mm dia. (for M5 screws) from inside the socket




#### ISLAND VERSION

2 x 5.5 mm dia. (for M5 screws) from inside the socket



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GVMAX HD

# GVMAX HD

## Heavy Duty Communicating Vacuum Pumps

Technical specifications

- 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: 6.48/8.05 SCFM
- Air consumption: 10.29/13.3 SCFM, 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 32 to 122 °F
- 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

NFC

IO-Link

Industry-specific applications

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.

### 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__ → 24.72 SCFM
  - CMSHD90X100__ → 38.85 SCFM
  - CMSHD90X150__ → 56.50 SCFM
- 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

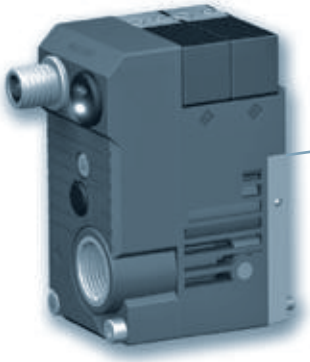
**Different configurations available for the exhaust:**

**CMSHD____K**
Silencer

**CMSHD__NVO_**
Pressure connection end plate

**CMSHD90X50_ / CMSHD90X100_**
Simple body

**CMSHD__SVO / VVO_**
Control valve block for vacuum and blow-off without vacuum switch

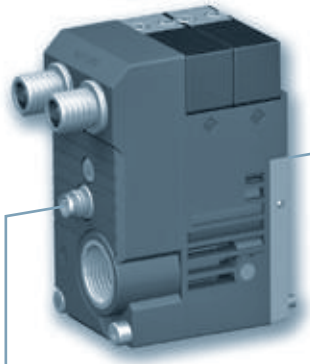


**CMSHD____F**
Diffuser

**CMSHD____E**
Collector exhaust

**CMSHD90X150_**
Double body

*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.*



**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**

# CMS HD

## Heavy Duty Multi-stage Vacuum Pumps

General Information

NFC

IO-Link

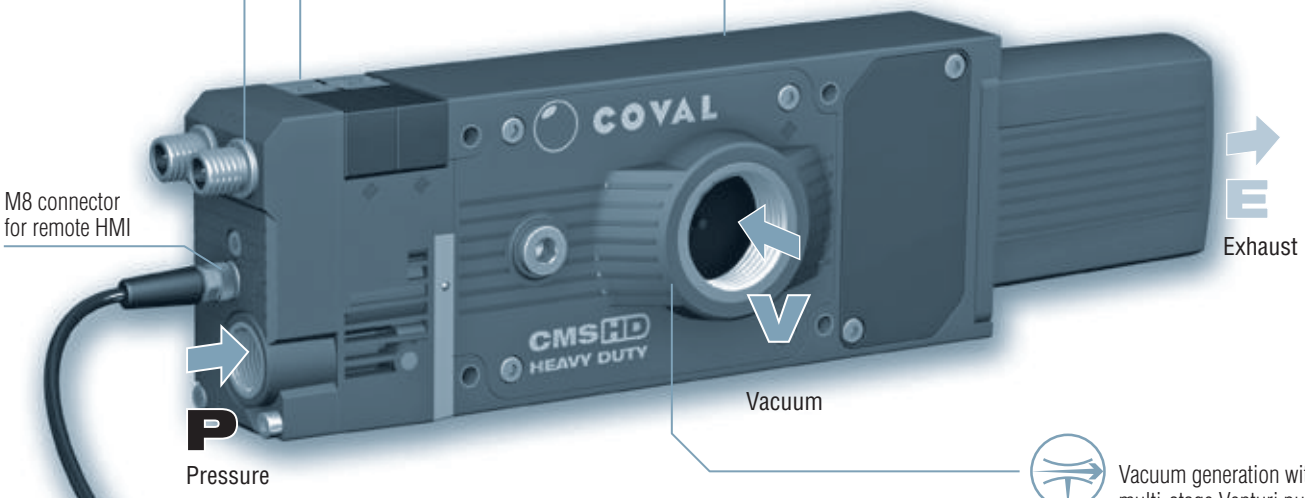
### CMS HD with control and vacuum switch

**Digital inputs/outputs (SIO) / IO-Link**

M12 connectors available in 3 versions:
- one 5 or 8-pin connector
- or two 4-pin connectors

- NC, NO vacuum control
- Blow-off controlled or automatic timed

Onboard installation and diagnostic tools:
- Vacuum network sizing support and clogging detection
- Supply pressure and voltage monitoring




M8 connector for remote HMI

Pressure

Vacuum

Exhaust

Vacuum generation with multi-stage Venturi pump:
- high suction rates
- silent operation

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

Clear and efficient HMI:
includes all required inputs for full operation of CMS HD multi-stage vacuum pumps.

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

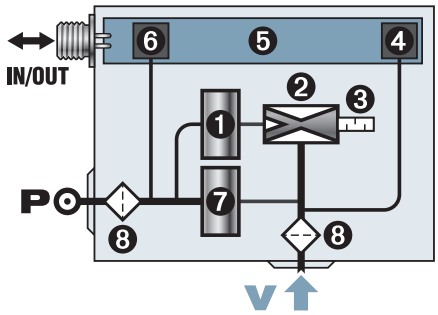
NFC

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

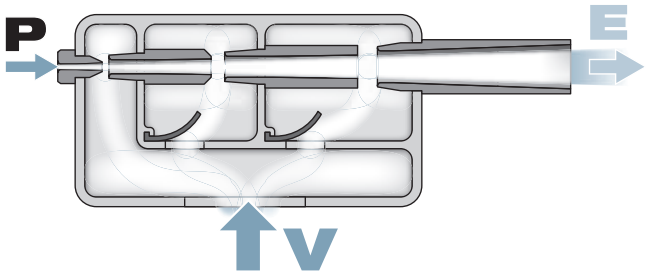



### Primary Functions

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.

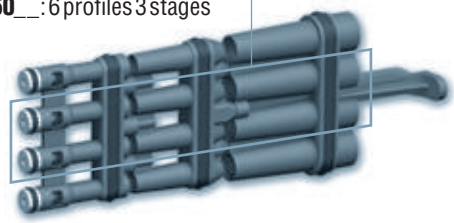



### Performance Determined by CMS HD Model

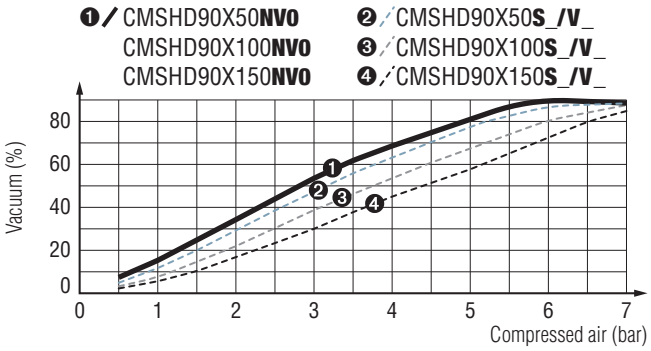
| Model | Max. vacuum (%) | Air drawn in (SCFM) | Air consumed (SCFM) | Air pressure level* (bar) |
|---|---|---|---|---|
| **CMSHD90X50** | **80** | **24.72** | **7.77** | **5.5** |
| **CMSHD90X100** | **80** | **38.85** | **14.83** | **5.5** |
| **CMSHD90X150** | **80** | **56.50** | **21.90** | **5.5** |

** 6 bar for versions with control:*
*CMSHD90X**50S**_ / CMSHD90X**50V**_ / CMSHD90X**100S**_ / CMSHD90X**100V**_*
** 6.5 bar for versions with control:*
*CMSHD90X**150S**_ / CMSHD90X**150V**_*

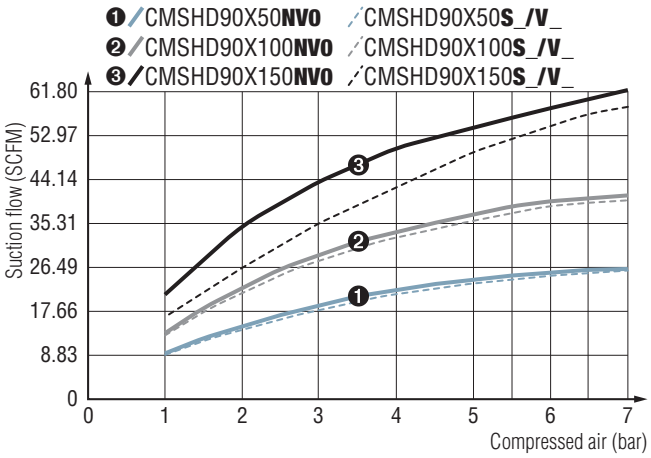
- CMSHD90X**50**__: 2 profiles 3 stages
- CMSHD90X**100**__: 4 profiles 3 stages
- CMSHD90X**150**__: 6 profiles 3 stages



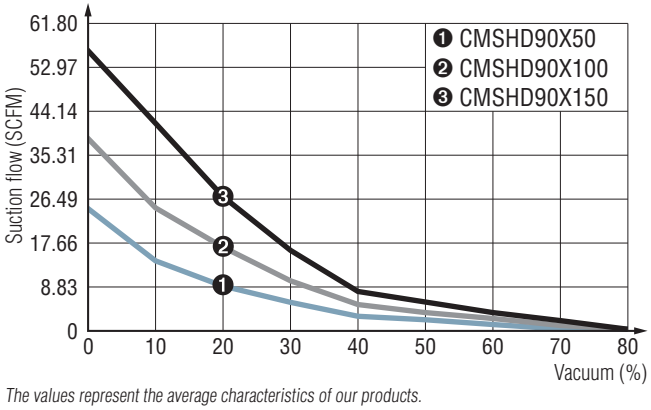
### Vacuum / Compressed air




### Suction flow / Compressed air




### Suction Flow / Vacuum




*The values represent the average characteristics of our products.*

8

CMS HD

# 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

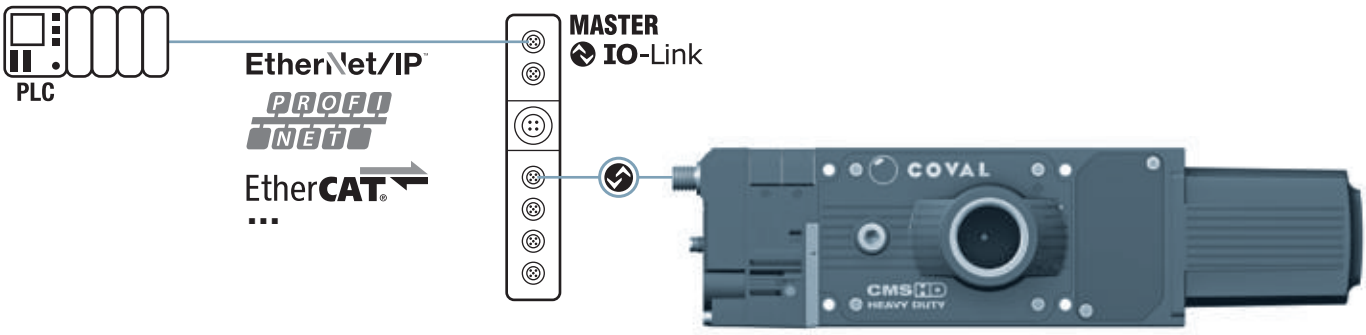


### IO-Link

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



# 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.

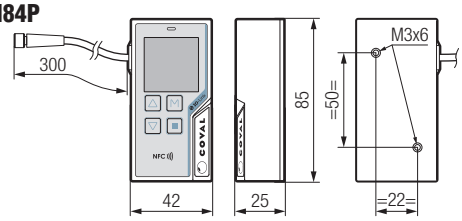
### Advantages:

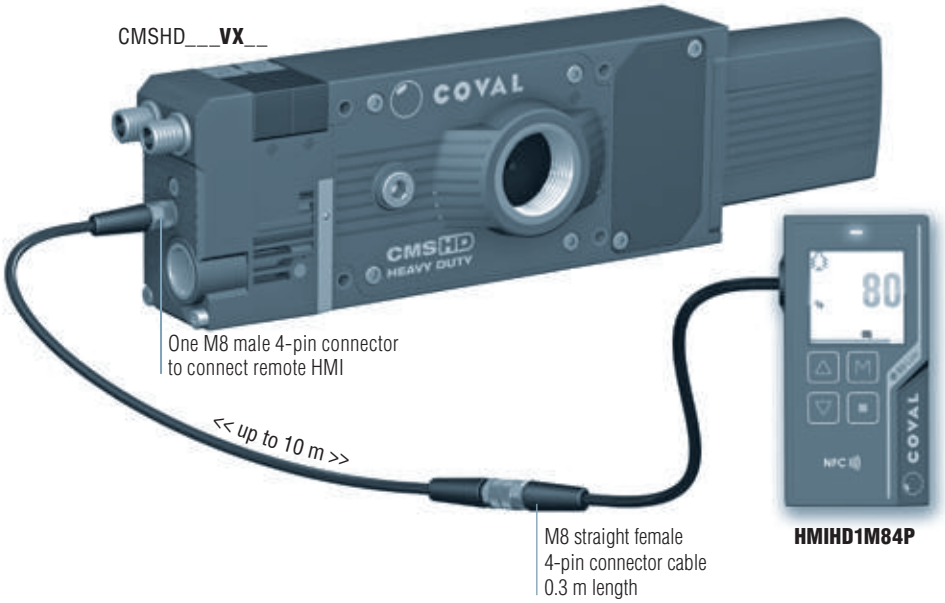
- Place the HMI in an easily accessible and visible area
- Use one HMI for several CMS HD multi-stage vacuum pumps
- Copy settings from one pump to another
- Use the CMS HD multi-stage vacuum pump without any HMI connected

**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**

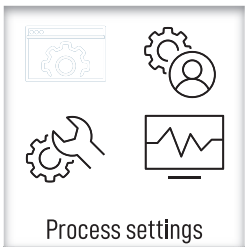


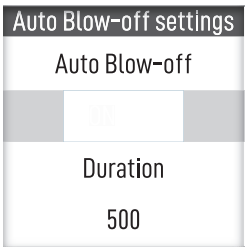




## Remote HMI Dialog Front Panel

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

8

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

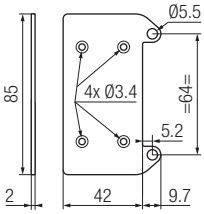
GET IT ON Google Play

Download on the App Store

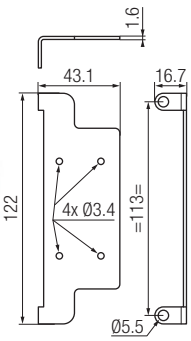
**NFC APP: COVAL Vacuum Manager**
Available for Android and iOS

## Accessories for remote HMI

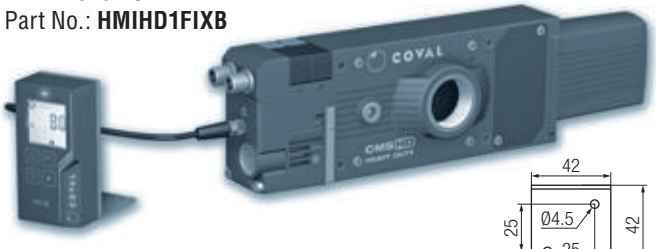
**Front mounting plate**
+ 2 x M3x6 TORX
+ 2 x M5x50 CHC
Part No.: **HMIHD1FIXA**

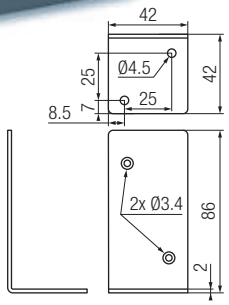


**Side mounting plate**
+ 2 x M3x6 TORX
+ 2 x M5x50 CHC
Part No.: **HMIHD1FIXC**




**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

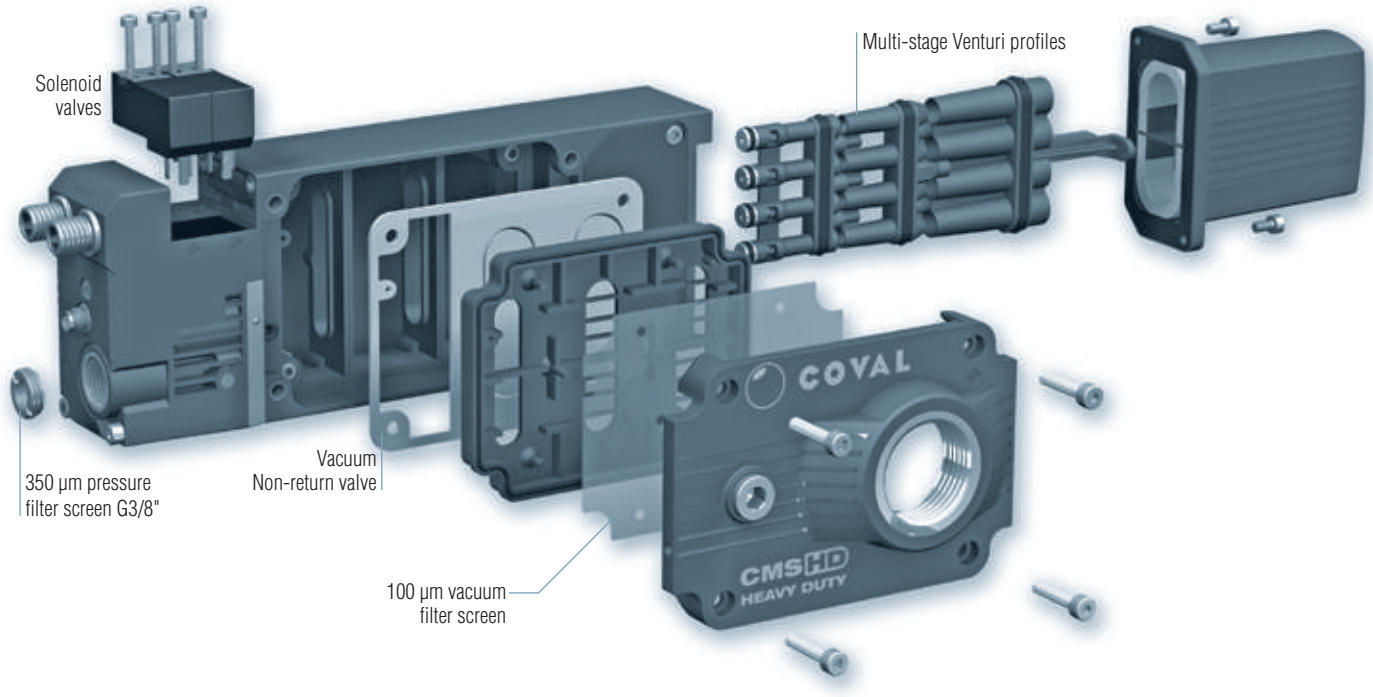
**Exhaust collector**
**CMSHD___E** version
- G1" female connection

*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.



# CMS HD

## Heavy Duty Multi-stage Vacuum Pumps

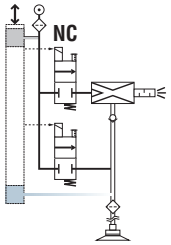
Selection guide

NFC

IO-Link

### Vacuum Control: 2 Solutions

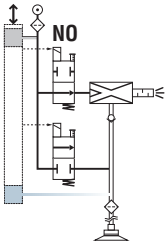
**Model CMSHD__S**: vacuum pump with **NC** vacuum control and **NC** blow-off control. In the event of power failure, vacuum is no longer generated. In the event of compressed air failure, the vacuum is no longer maintained.




- 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.

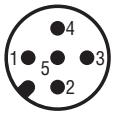



- NO vacuum control solenoid valve
- NC blow-off control solenoid valve
- Blow-off controlled by external signal

### Electrical Connections

**VOC15P**:

- One M12 5-pin male connector




| | |
|---|---|
| 1 | / |
| 2 | 24 V DC suction command (1) |
| 3 | 0 V - GND |
| 4 | 24 V DC blow-off command |
| 5 | / |

**VXC18X**:

- One M12 8-pin male connector

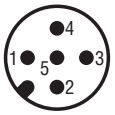
| | |
|---|---|
| 1 | 24 V DC object gripped DO1 |
| 2 | 24 V DC |
| 3 | / |
| 4 | 24 V DC suction command (1) |
| 5 | 24 V DC object lost DO2 - C/Q (2) |
| 6 | 24 V DC blow-off command |
| 7 | 0 V - GND |
| 8 | / |

- One M8 4-pin male connector → remote HMI

| | |
|---|---|
| 1 | 24 V DC |
| 2 | RS485 (DATA+) |
| 3 | 0 V - GND |
| 4 | RS485 (DATA-) |

**VXC15X**:

- One M12 5-pin male connector



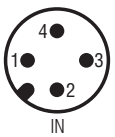

| | |
|---|---|
| 1 | 24 V DC |
| 2 | 24 V DC suction command (1) |
| 3 | 0 V - GND |
| 4 | 24 V DC object gripped DO1 - C/Q |
| 5 | 24 V DC blow-off command |

- One M8 4-pin male connector → remote HMI

| | |
|---|---|
| 1 | 24 V DC |
| 2 | RS485 (DATA+) |
| 3 | 0 V - GND |
| 4 | RS485 (DATA-) |

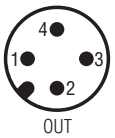
**VXC24X**:

- Two M12 4-pin male connectors




IN

| | |
|---|---|
| 1 | / |
| 2 | 24 V DC blow-off command |
| 3 | 0 V - GND |
| 4 | 24 V DC suction command (1) |




OUT

| | |
|---|---|
| 1 | 24 V DC |
| 2 | 24 V DC object lost DO2 (2) |
| 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

*(1) 24 V DC suction command, depending on version:*
*- **S**: 24 V DC vacuum control*
*- **V**: 24 V DC vacuum off command*

*(2) 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 | |
|---|---|
| 24.72 SCFM | 50 |
| 38.85 SCFM | 100 |
| 56.50 SCFM | 150 |

| EXHAUST | |
|---|---|
| K | Through-type silencer |
| E | Exhaust collector |
| F | 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 38.85 SCFM with Through-type silencer

### CMS HD With Control

**CMSHD90X 100 S VX C15X G4 K D**

| SUCTION FLOW RATE | |
|---|---|
| 24.72 SCFM | 50 |
| 38.85 SCFM | 100 |
| 56.50 SCFM | 150 |

| GENERATOR CONTROL | |
|---|---|
| Vacuum pump with **NC** vacuum control and **NC** blow-off control. Choice of blow-off settings (only on CMSHD__**SVX**_models):<br>▪ Controlled by external signal<br>▪ Automatic timer from 50 to 9999 ms (advantage: saves one controller output). | S |
| Vacuum pump with **NO** vacuum control and **NC** blow-off control.<br>▪ Blow-off controlled by external signal | V |

| VACUUM SWITCH / HMI | | CONNECTORS | |
|---|---|---|---|
| Multi-stage vacuum pump without vacuum switch and HMI | VO | C15P | ▪ One M12 5-pin male PNP |
| ▪ Simplified CMS HD with control, without settings and dialogs<br>▪ Digital inputs/outputs mode (SIO) | | | |
| Multi-stage vacuum pump with integrated vacuum switch and pressure sensor, without HMI | VX | C15X | ▪ One M12 5-pin male configurable as PNP or NPN<br>▪ One M8 4-pin male for remote HMI |
| ▪ Electronic vacuum switch<br>▪ Digital Output DO1 "object gripped" 24 V DC / NO<br>▪ Digital input/outputs mode (SIO) / IO-Link<br>▪ Compatible with remote HMI | | | IO-Link |
| | | C18X | ▪ One M12 8-pin male configurable as PNP or NPN<br>▪ One M8 4-pin male for remote HMI<br>▪ Digital Output DO2 configurable 24 V DC / NO |
| | | | IO-Link |
| | | C24X | ▪ Two M12 4-pin male configurable as PNP or NPN<br>▪ One M8 4-pin male for remote HMI<br>▪ Digital Output DO2 configurable 24 V DC / NO |
| | | | IO-Link |

| 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 38.85 SCFM, NC vacuum and blow-off control, one M12 5-pin connector and one M8 4-pin connector, with diffuser

# 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 24.72 SCFM with exhaust collector.

**CMSHD90X150NVOG4K**

Multi-stage vacuum pump without control, max. vacuum 80%, suction flow rate 56.50 SCFM with through-type silencer.

**CMSHD90X100SVOC15PG4F**

Multi-stage vacuum pump with control, max. vacuum 80%, suction flow rate 38.85 SCFM, 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 38.85 SCFM, 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 56.50 SCFM, NC vacuum and blow-off control, one M12 5-pin connector and one M8 4-pin connector, with through-type silencer.

# CMS HD

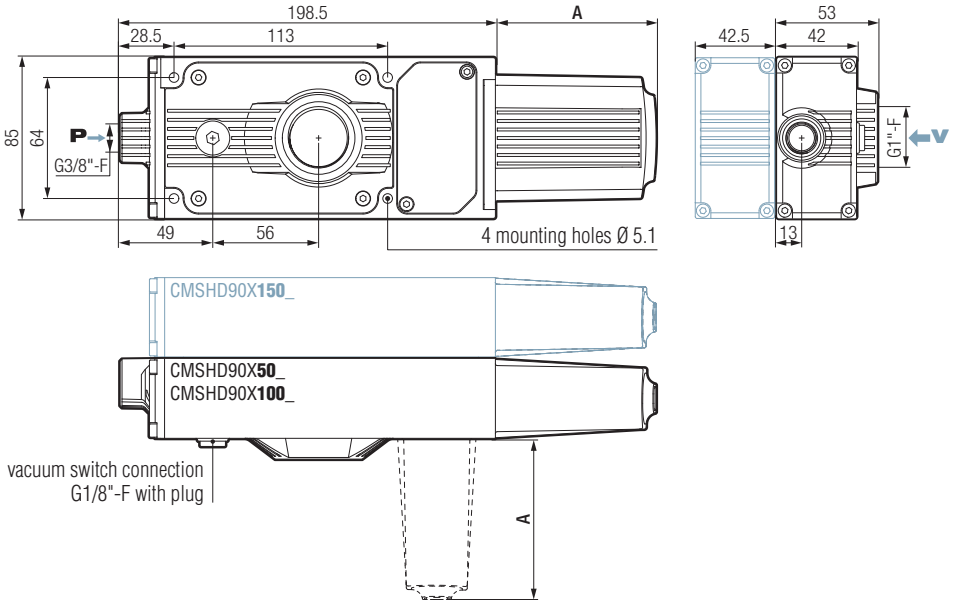
## Heavy Duty Multi-stage Vacuum Pumps

Dimensions

NFC

IO-Link

### CMS HD Without Control

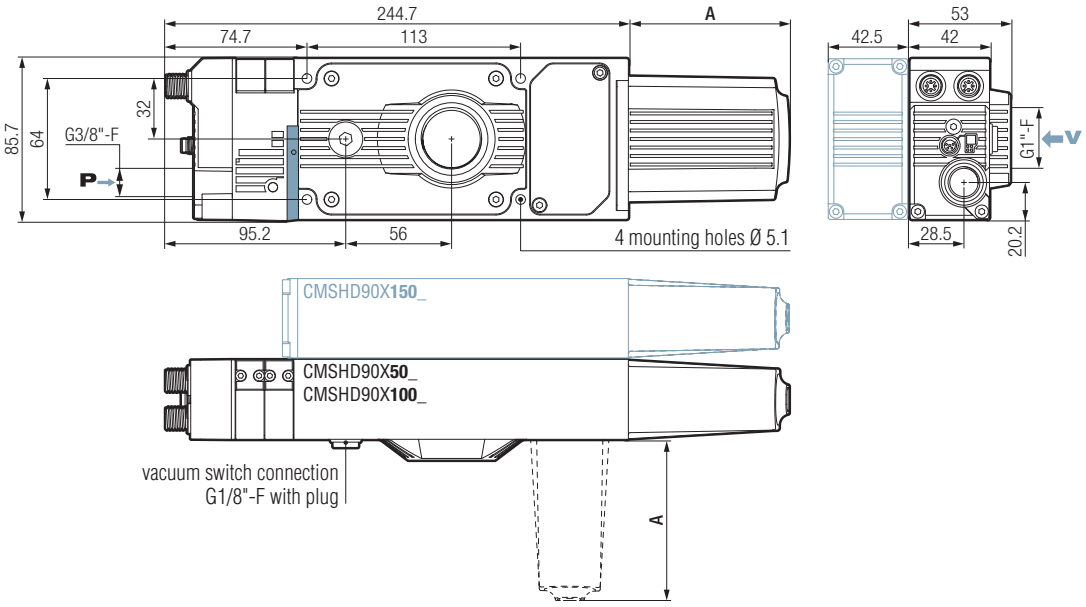



Note: all dimensions are in mm.

3D COVAL Data

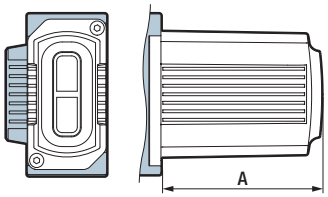
You can access 3D files of all our products in formats compatible with the main CAD software on our website **www.coval.com**

### CMS HD With Control

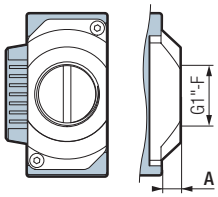



### Exhaust Options

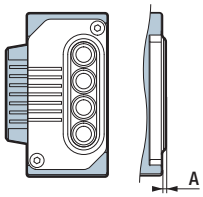
**Through-type silencer**
CMSHD___**K** version




**Exhaust collector**
CMSHD___**E** version




**Diffuser**
CMSHD___**F** version




| *Exhaust Type* | A |
|---|---|
| Silencer | 85 |
| Collector | 10 |
| Diffuser | 2 |

# CMS HD

## Heavy Duty Multi-stage Vacuum Pumps

Technical specifications

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: 24.72 to 56.50 SCFM
- Air consumption: 7.77 to 21.90 SCFM
- 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 32 to 122° F
- 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

# CMS HD

## Heavy Duty Multi-stage Vacuum Pumps

Accessories

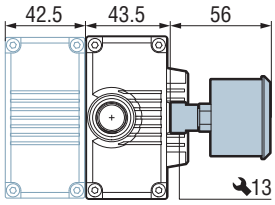
NFC

IO-Link

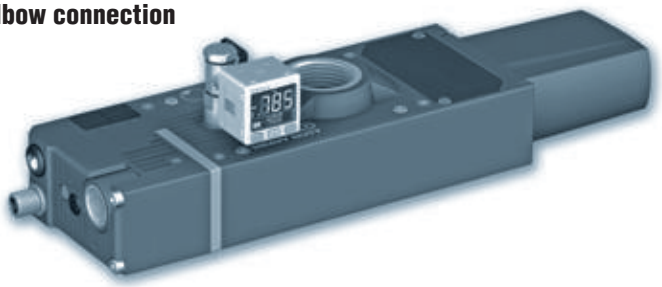
### To visualize the vacuum level

**Vacuum gauge Ø 40 mm**
**Part No. VAF11140RDM18G**

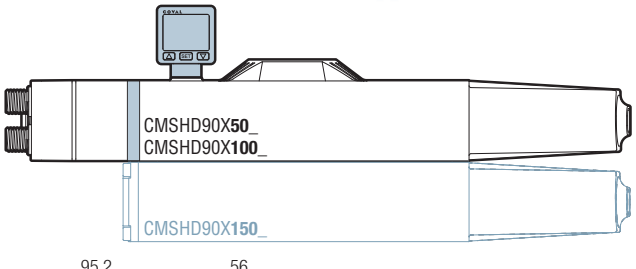
- Damping: by silicone movement (patented).
- Measuring: Bourdon tube in CuSn.
- Precision: cl. 2.5 (+/- 2.5% of max. scale value).
- Frame: black ABS
- Vacuum connection: G1/8"-M

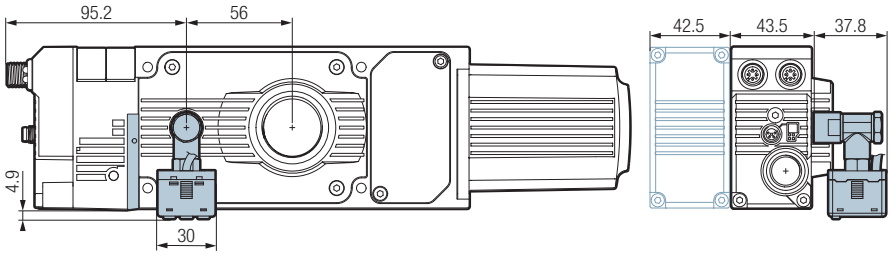



**Electronic vacuum switch with 3-color display with adjustable elbow connection**
**Part No. PSD100CPNPRCOM18G**



- One M8 4-pin connector.
- 1 PNP digital output (NO or NC). Max. load current: 125 mA, Max. supply voltage: 24 VDC, Residual voltage: ≤ 1.5 V.
- 1 analog output (Output voltage: 1 to 5 V ≤ ± 2.5% F.S. (within rated pressure range), linearity: ≤ ± 1% F.S. / Output impedance: approx. 1 kΩ)
- 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/cm², bar, psi, InHg, mmHg.
- Power supply voltage: 12 to 24 V DC ±10%.
- Current consumption: ≤ 40mA (without load).
- Repeatability (switch ouptut): ≤ ±0.2% F.S. ±1 digit.
- Protection: IP40.
- Ambient temperature range: 32 to 122°F (operation).
- Adjustable elbow connection 360°: G1/8"-M

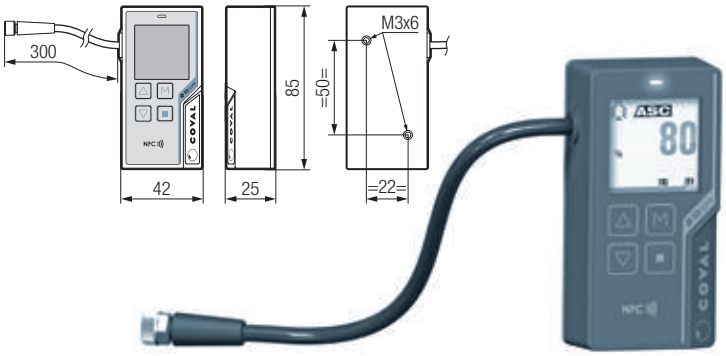



### Remote HMI

(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.

8

# Air Amplifiers

Chapter 9

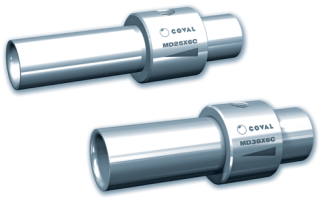
## M--C

### Air Amplifiers

- Operating principle based on the COANDA effect
- Bore diameter (Ø): 6, 10, 20, 30, 40 mm
- Flow rate: between 7.06 and 177 SCFM 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 9/2

## MD



### Air Amplifiers

- Operating principle based on the COANDA effect
- Bore diameter (Ø): 26.6 and 38.1 mm
- Flow rate: between 71.1 and 154.2 SCFM 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 9/5

## 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

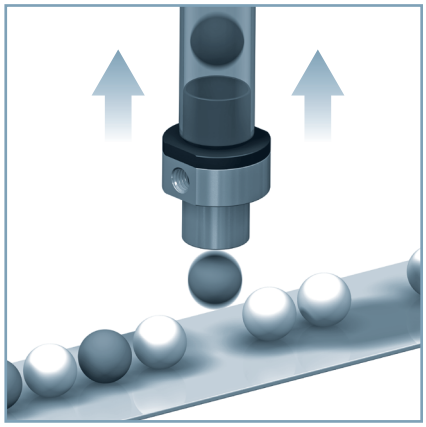
P 9/6

# Air Amplifiers

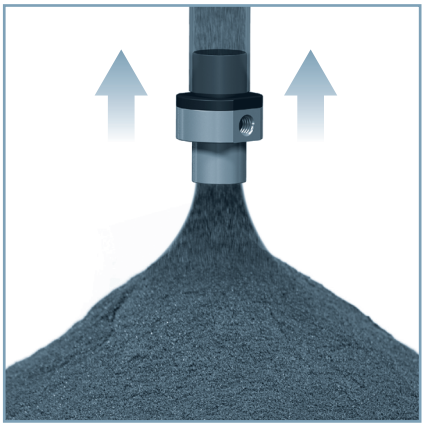
## Applications

### BLOW-OFF, CLEANING, WASTE SUCTION

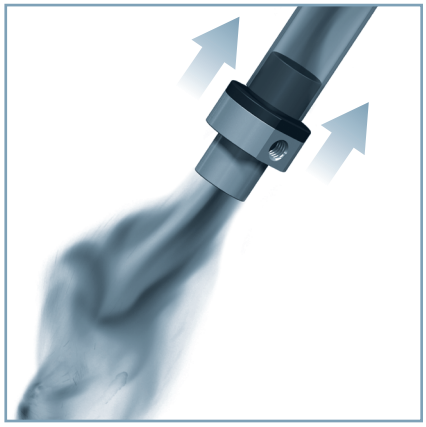
### SORTING BY WEIGHT



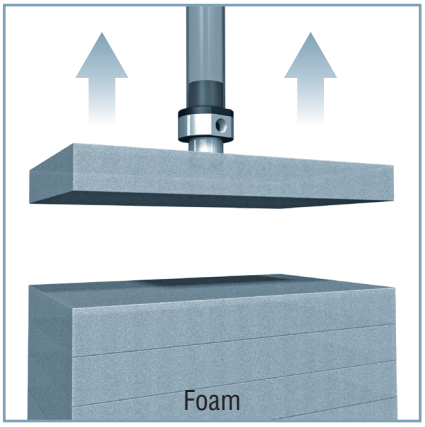
### TRANSPORT OF GRANULES (rice, grains of wheat or coffee, etc.)



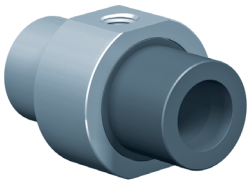
### DEGASSING, SMOKE EVACUATION



### 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.

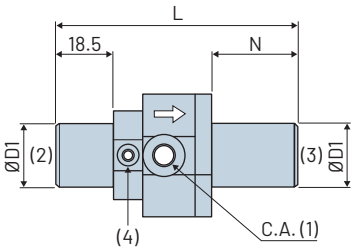
**Operation requirement**
Compressed air filtration at 5 microns for the M6C model and 20 microns for the other models.

## Characteristics

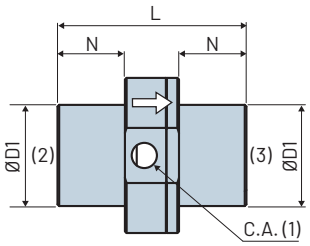
| | L | N | M | C.A. | ØD | ØD1 | ØD2 | (g) |
|---|---|---|---|---|---|---|---|---|
| **M 6 C** | 77 | 27.5 | 37 | G1/8"-F | 39 | 20 | 6 | 100 |
| **M 10 C** | 60 | 20 | 36 | G1/8"-F | 40 | 25 | 10 | 100 |
| **M 20 C** | 90 | 30 | 55 | G1/4"-F | 60 | 40 | 20 | 295 |
| **M 30 CV** | 105 | 35 | 72 | G1/4"-F | 77 | 50 | 30 | 495 |
| **M 40 CV** | 112 | 40 | 86 | G3/8"-F | 92 | 60 | 40 | 600 |

Note: all dimensions are shown in (mm).

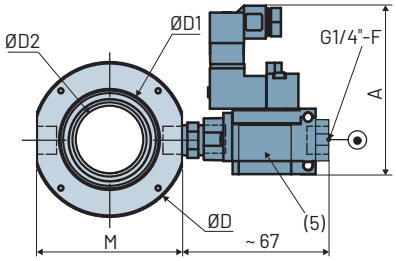
**M6C**




**M10C - M20C - M30CV - M40CV**




**M___AP214E1**




## Specifications

| | |
|---|---|
| **Compressed air** | Dry non-lubricated 1.5 to 5 bar |
| **Maximum pressure drop** | see table page 9/4 |
| **Materials** | Aluminum body |
| **Temperature** | 32 to 176°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 | |
|---|---|---|---|---|---|---|
| **M** | **6 C** | 6 mm | **-** | Without control valve | **E1** | 24 V DC DIN |
| | **10 C** | 10 mm | **AP214** | C.A. control valve | | |
| | **20 C** | 20 mm | | | | |
| | **30 CV** | 30 mm | | | | |
| | **40 CV** | 40 mm | | | | |

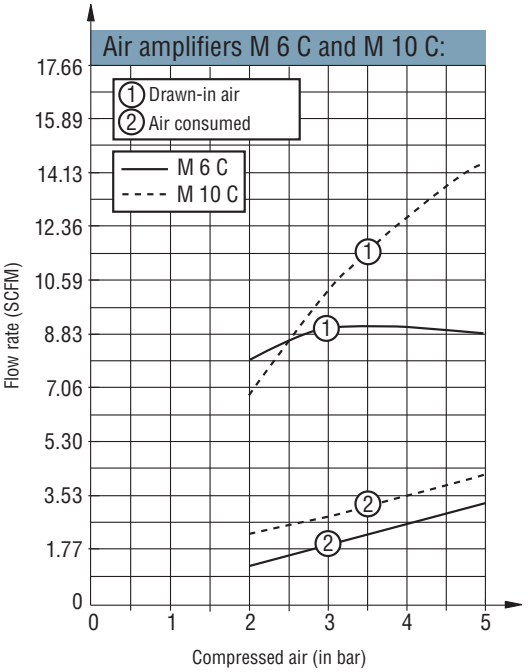
# M-C
## Air Amplifiers
Performance Curves

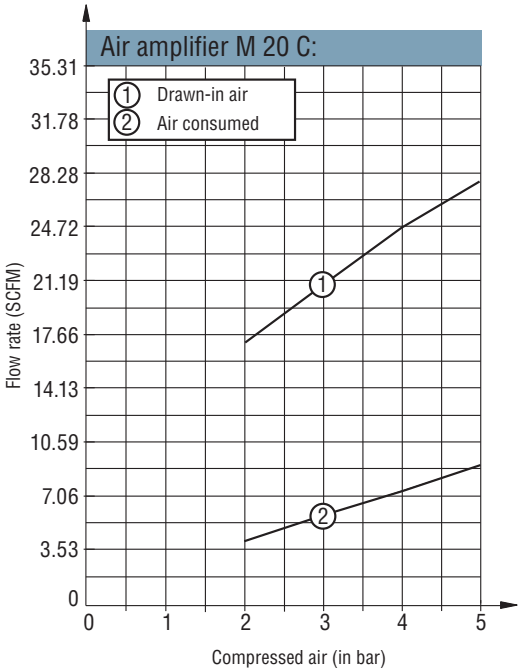
### Maximum Vacuum / Supply Pressure

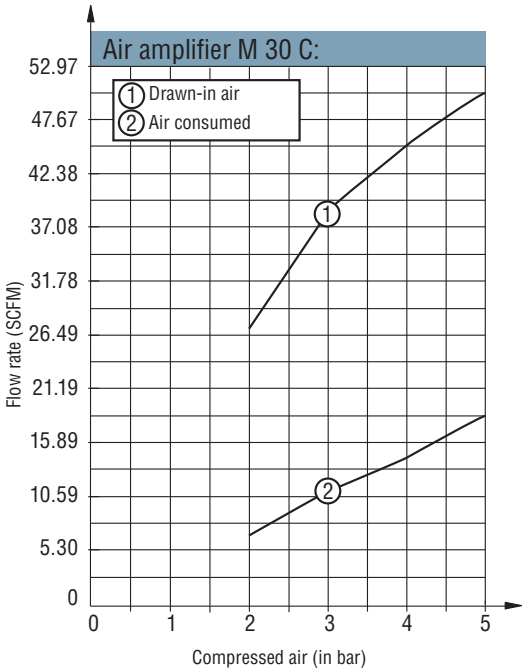
| | Supply pressure / Maximum vacuum (in Bar) (in mm CE) | | | |
|---|---|---|---|---|
| | **2** | **3** | **4** | **5** |
| **M 6 C** | 900 | 1500 | 2000 | 2600 |
| **M 10 C** | 200 | 500 | 700 | 1000 |
| **M 20 C** | 207 | 310 | 400 | 510 |
| **M 30 CV** | 90 | 130 | 220 | 280 |
| **M 40 CV** | 140 | 200 | 284 | 360 |

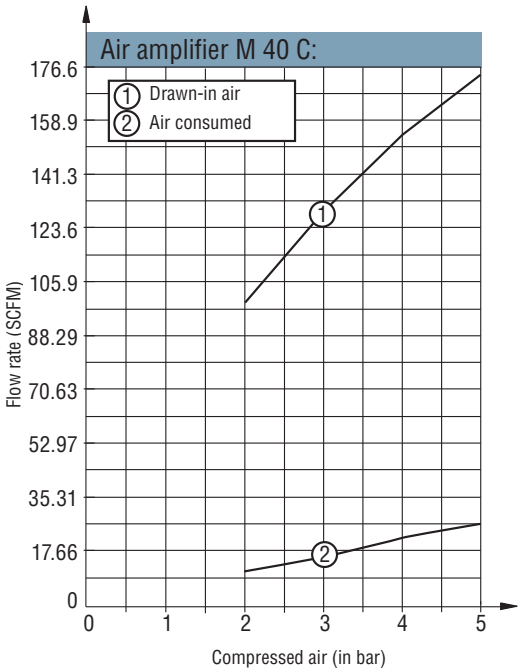
### Maximum Overpressure / Supply Pressure

| | Supply pressure / Maximum Overpressure (in Bar) (in mm CE) | | | |
|---|---|---|---|---|
| | **2** | **3** | **4** | **5** |
| **M 6 C** | 100 | 550 | 1300 | 2000 |
| **M 10 C** | 400 | 700 | 1500 | 2000 |
| **M 20 C** | 220 | 340 | 500 | 600 |
| **M 30 CV** | 45 | 70 | 100 | 160 |
| **M 40 CV** | 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

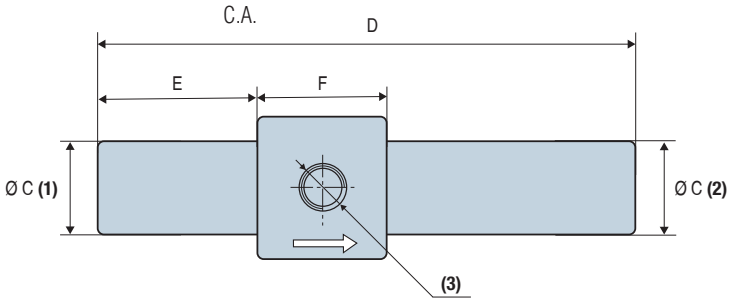
| Pressure (bar) | Level of vacuum (%) | Suction rate: (SCFM) | Consumption (SCFM) |
|---|---|---|---|
| 3 | 6.1 | 71.16 | 16.88 |
| 4 | 8.7 | 77.69 | 21.68 |
| 5 | 10.9 | 83.69 | 25.92 |

### Characteristics MD38X6C

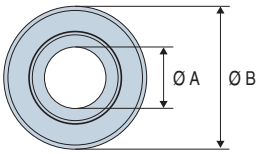
| Pressure (bar) | Level of vacuum (%) | Suction rate: (SCFM) | Consumption (SCFM) |
|---|---|---|---|
| 3 | 2.7 | 123.60 | 16.88 |
| 4 | 4 | 140.38 | 21.68 |
| 5 | 5 | 154.33 | 25.92 |

### 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 |



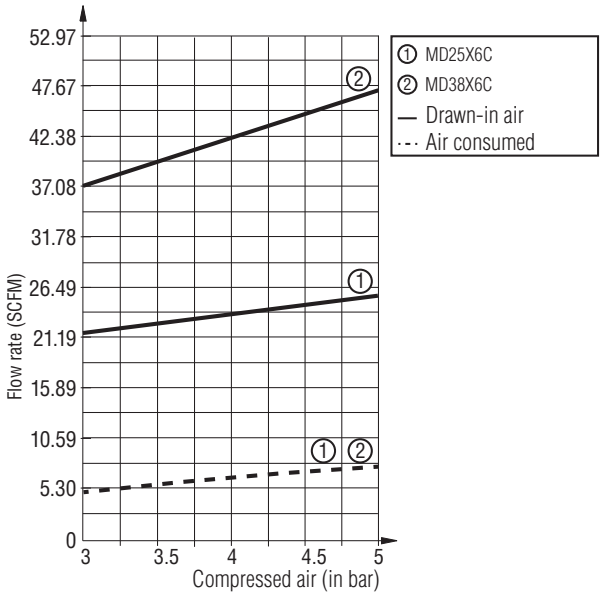

(**1**) Suction
(**2**) Discharge
(**3**) Pressure connection G3/8"-F




### 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** | 32 to 212°F |

### Performance Curves




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 | |

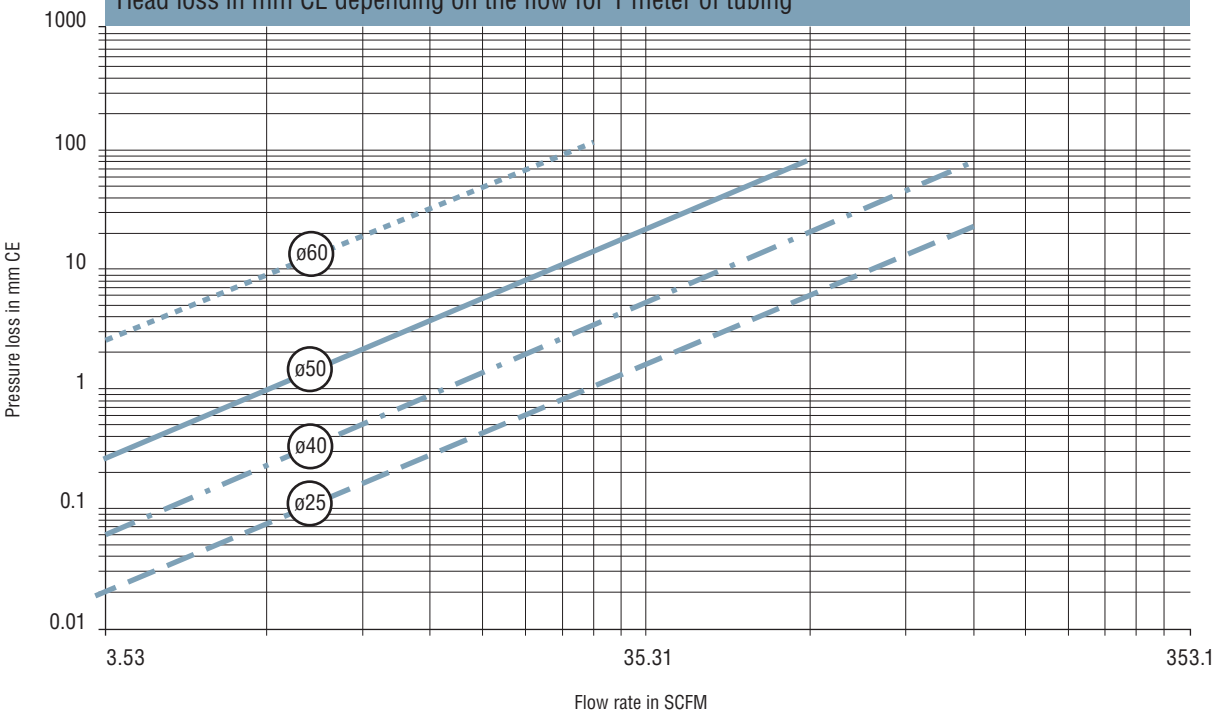
# TVM
## Pipes for Air Amplifiers

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 to 212°F |
| **Anti-static** | R < 108 Ohm |

Head loss in mm CE depending on the flow for 1 meter of tubing




**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 65.9 ft³/min
- 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 10/2

## TCL

### Side-channel Blowers, single-stage and two-stage

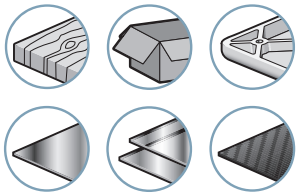
- Flow rate up to 735.7 ft³/min
- Maximum vacuum: -410 mbar absolute
- Available:
  - 50 and 60 Hz
  - Single-stage and two-stage
- Wide range of vacuum to meet specific applications
- Vibration-free
- Maintenance-free: self-lubricated bearings, contactless impeller

P 10/6

# PVS
## Dry vane vacuum pumps

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.

Industry-specific 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

### Characteristics

| Model | Hz | ft³/min | Vacuum (%) | kW | Rotation speed (min-1) | Voltage(V) | Amper (A) | Vacuum connection | dB(A) | (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| **PVS4T3** | 50<br>60 | 2.4<br>2.8 | 85 | 0.18<br>0.216 | 2800<br>3360 | 175-260/300-450<br>202-300/350-520 | 1.08/0.62<br>1.08/0.62 | G1/4"-F | 59<br>61 | 7 |
| **PVS8M1** | 50<br>60 | 4.7<br>5.3 | 85 | 0.35<br>0.42 | 2700<br>3200 | 230 +/-10% | 3.9<br>3.4 | G3/8"-F | 58<br>61 | 9.5 |
| **PVS8T3** | 50<br>60 | 4.7<br>5.3 | 85 | 0.37<br>0.44 | 2800<br>3150 | 175-260/300-450<br>202-300/350-520 | 2.35/1.35<br>2.4/1.4 | G3/8"-F | 58<br>61 | 9.5 |
| **PVS10M1** | 50<br>60 | 5.9<br>7 | 85 | 0.37<br>0.44 | 1380<br>1630 | 230 +/-10% | 3.0<br>3.4 | G1/2"-F | 60<br>62 | 16 |
| **PVS10T3** | 50<br>60 | 5.9<br>7 | 85 | 0.37<br>0.45 | 1420<br>1700 | 175-260/300-450<br>202-300/350-520 | 2.3/1.33<br>2.35/1.36 | G1/2"-F | 60<br>62 | 16 |
| **PVS16M1** | 50<br>60 | 9.4<br>11.2 | 85 | 0.55<br>0.66 | 1360<br>1600 | 230 +/-10% | 4.6<br>5.2 | G1/2"-F | 61<br>64 | 22.5 |
| **PVS16T3** | 50<br>60 | 9.4<br>11.2 | 85 | 0.55<br>0.70 | 1420<br>1700 | 175-260/300-450<br>202-300/350-520 | 3.8/2.2<br>3.9/2.25 | G1/2"-F | 61<br>64 | 22.5 |
| **PVS25M1** | 50<br>60 | 14.7<br>17.6 | 85 | 0.80<br>1.00 | 1350<br>1600 | 230 +/-10% | 6.4<br>7.2 | G3/4"-F | 62<br>67 | 29 |
| **PVS25T3** | 50<br>60 | 14.7<br>17.6 | 85 | 0.75<br>0.90 | 1430<br>1690 | 190-255/330-440<br>190-290/330-500 | 3.9-4.85/2.25-2.8<br>4.65-4.25/2.7-2.45 | G3/4"-F | 62<br>67 | 29 |
| **PVS40M1** | 50<br>60 | 23.5<br>28.2 | 85 | 1.10 | 1350<br>1620 | 230 +/-10% | 7.6<br>7.3 | G3/4"-F | 67<br>72 | 41 |
| **PVS40T3** | 50<br>60 | 23.5<br>28.2 | 85 | 1.25<br>1.50 | 1430<br>1680 | 190-255/330-440<br>190-290/330-500 | 5.2-6.2/3.0-3.6<br>6.9-5.7/4.0-3.3 | G3/4"-F | 67<br>72 | 41 |
| **PVS55T3** | 50<br>60 | 32.4<br>38.8 | 90 | 2.2<br>2.6 | 1440<br>1705 | Δ230/Y400 | 8.2/4.8<br>9.0/5.2 | G1"-F | 71<br>73 | 76 |
| **PVS100T3** | 50<br>60 | 57.7<br>65.9 | 90 | 3.0<br>3.6 | 1445<br>1705 | Δ230/Y400 | 12.1/7.0<br>12.7/7.4 | G1" 1/2-F | 75<br>77 | 100 |

**Version M1:** Single phase (1~)
**Version T3:** Three-phase (3~)

### Specifications

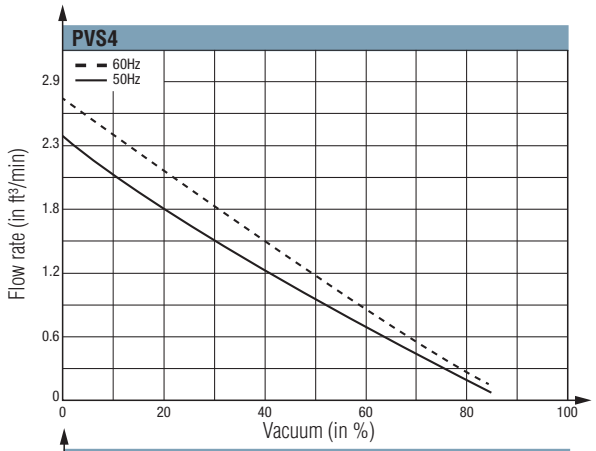
| | |
|---|---|
| **Electrical protection level** | PVS4 to 40 : IP54<br>PVS55 and 100 : IP55 |
| **Protection class** | ISO F |
| **Materials** | Steel, aluminium, polyethylene, carbone |
| **Ambient temperature:** | From 41°F to 113°F |

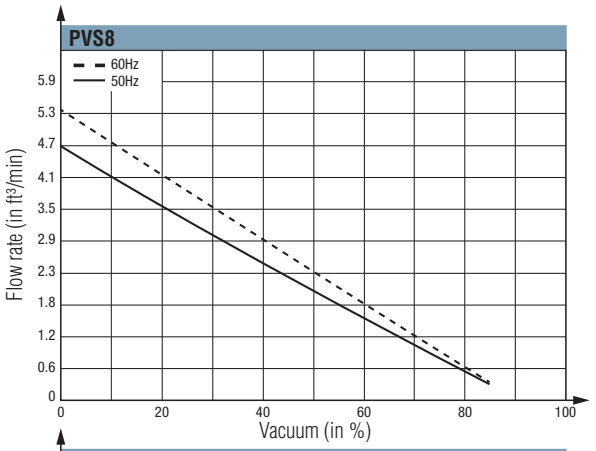
# PVS

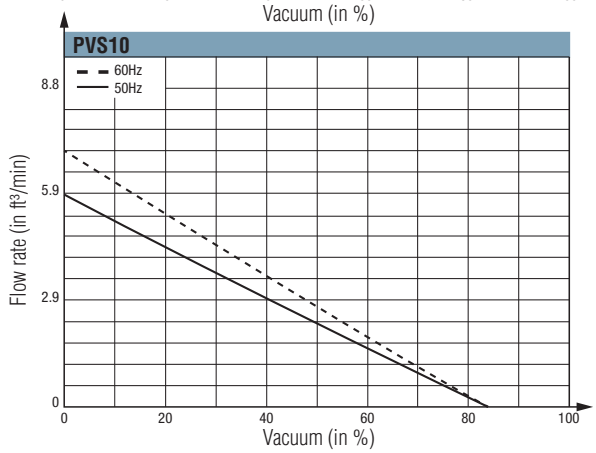
## Dry vane vacuum pumps

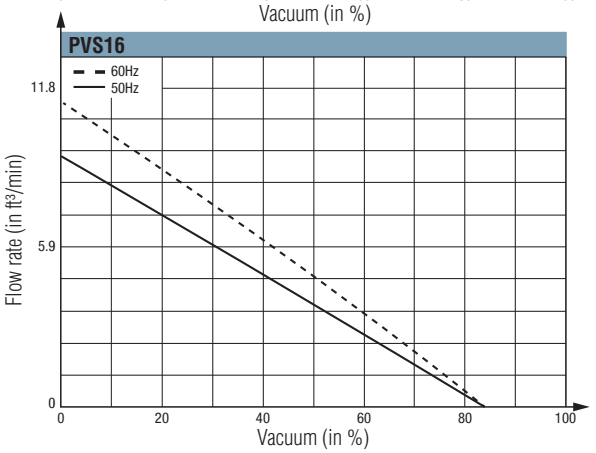
Curves

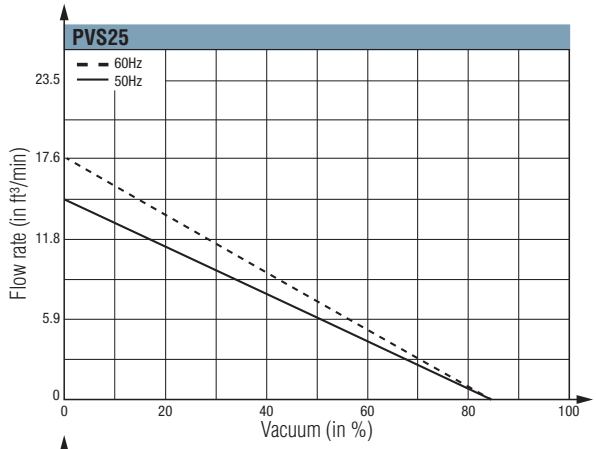
### Flow rate (ft³/min) / Vacuum (%)

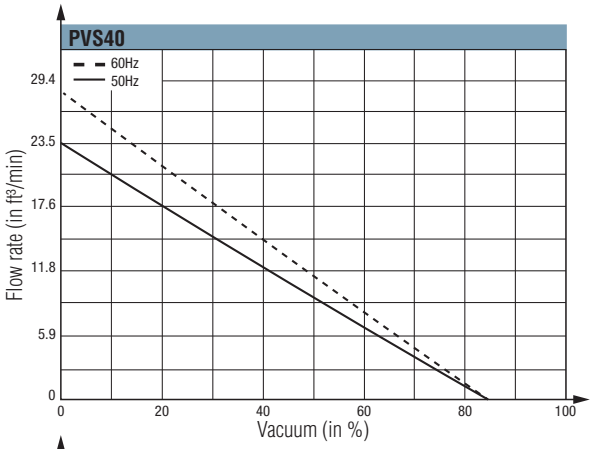


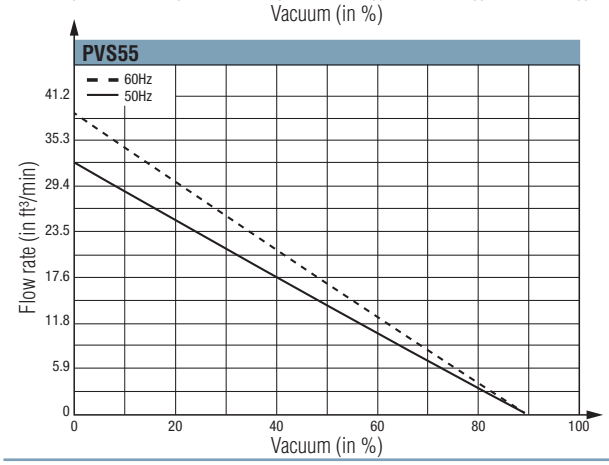



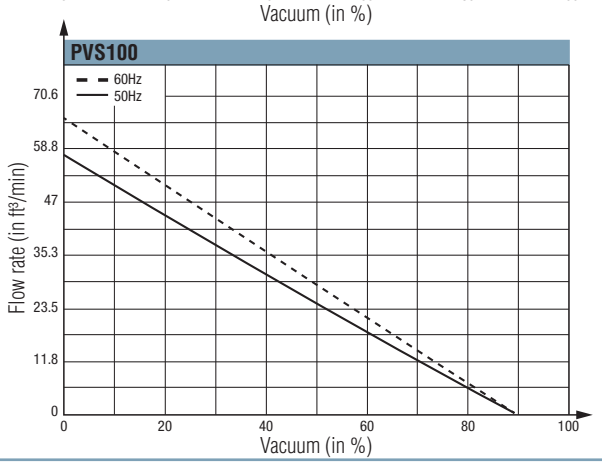



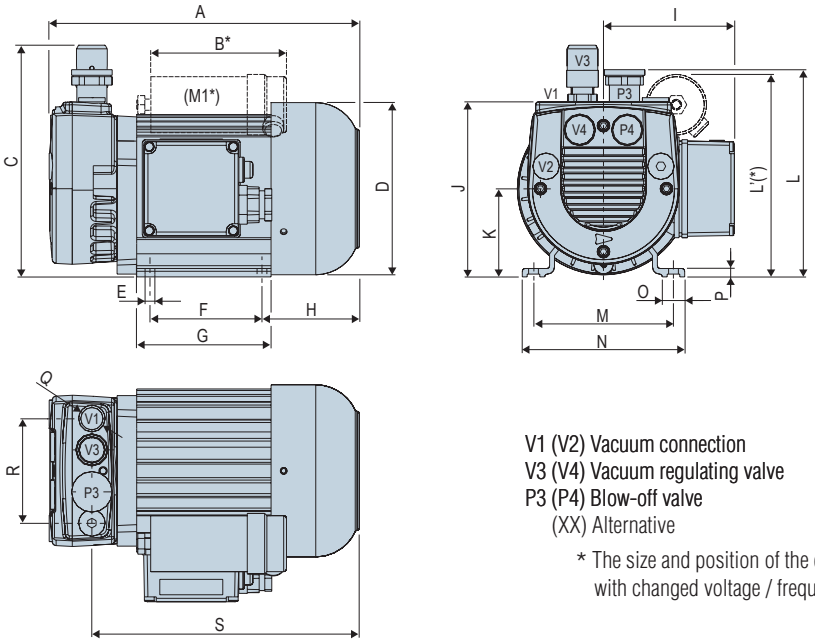



# PVS

## Dry vane vacuum pumps

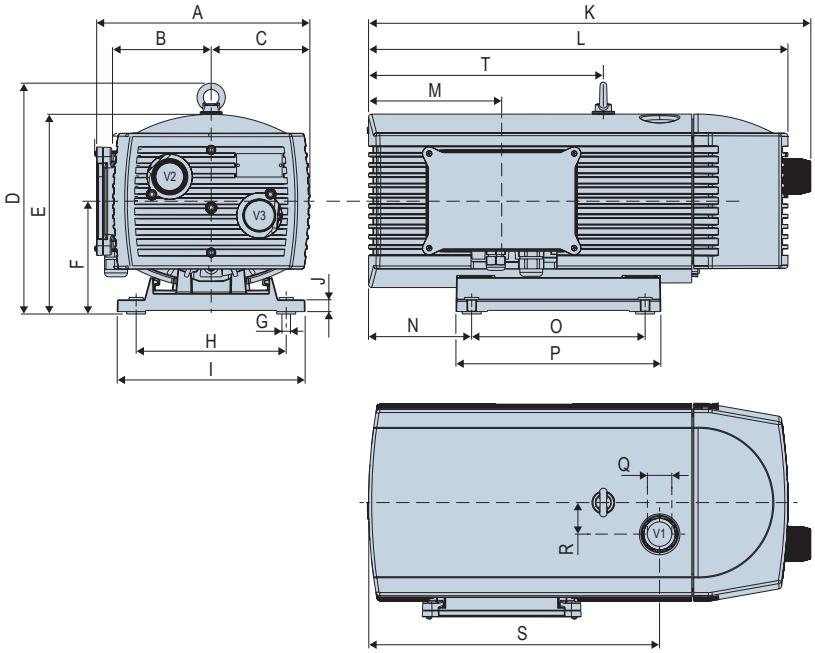
Dimensions




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

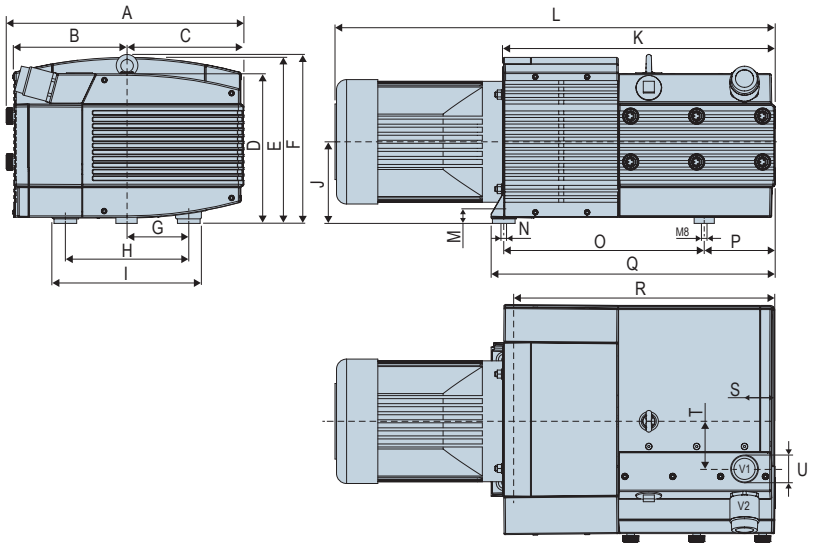
| Model | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PVS10** | 206 | 90 | 90 | - | 189 | 107 | 7 | 112 | 142 | 15 | 429 | 387 | 123 | 106 | 160 | 200 | G1/2"-F | 35 | 257 | - |
| **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.

# PVS

## Dry vane vacuum pumps

Dimensions



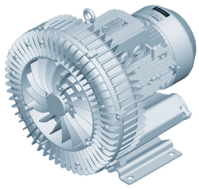

V1 Vacuum connection
V2 Vacuum regulating valve

| 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"1/2-F |

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

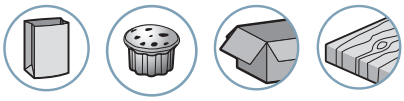
# TCL

## Side-channel Blowers, single-stage and two-stage



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 | ft³/min | Vacuum (%)[1] | kW | Number of stages | Voltage (V)[2] | Intensity (A) | dB (A)[3] | (kg) |
|---|---|---|---|---|---|---|---|---|---|
| TCL210T40A2S | 50 | 123.6 | 39 | 4.0 | 2 | 345-415 Δ / 600-720 Y | 10 Δ / 5.8 Y | 72 | 44 |
| | 60 | 147.1 | 41 | 4.6 | | 380-480 Δ / 660-720 Y | 9.9 Δ / 5.71 Y | 74 | 44 |
| TCL315T43A2S | 50 | 185.4 | 36 | 4.3 | 2 | 345-415 Δ / 600-720 Y | 10 Δ / 5.2 Y | 73 | 54 |
| | 60 | 220.7 | 32 | 4.8 | | 380-480 Δ / 660-720 Y | 10.4 Δ / 6 Y | 76 | 54 |
| TCL530T75A2S | 50 | 311.9 | 40 | 7.5 | 2 | 345-415 Δ / 600-720 Y | 16.7 Δ / 9.6 Y | 74 | 86 |
| | 60 | 364.9 | 36 | 8.6 | | 380-480 Δ / 660-720 Y | 17.3 Δ / 10 Y | 78 | 86 |
| TCL1050T125B1S | 50 | 618 | 29 | 12.5 | 1 | 345-415 Δ / 600-720 Y | 28 Δ / 16.2 Y | 74 | 116 |
| | 60 | 735.7 | 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** | -77°F to +104°F |



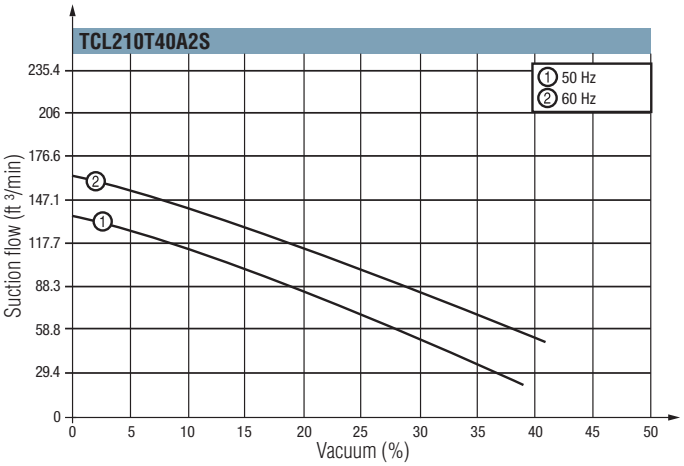
**Specify the part number: TCL210T40A2S**
**Please refer to the characteristics table above**

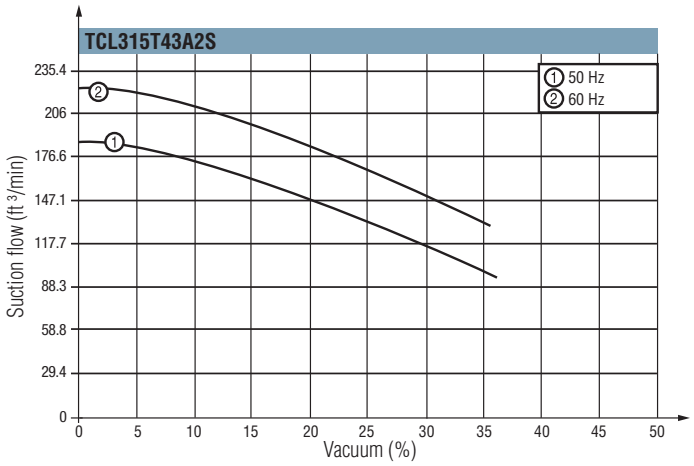
**Accessories on demand:**
- Safety valve
- Reversing valve
- Sound proofingbox

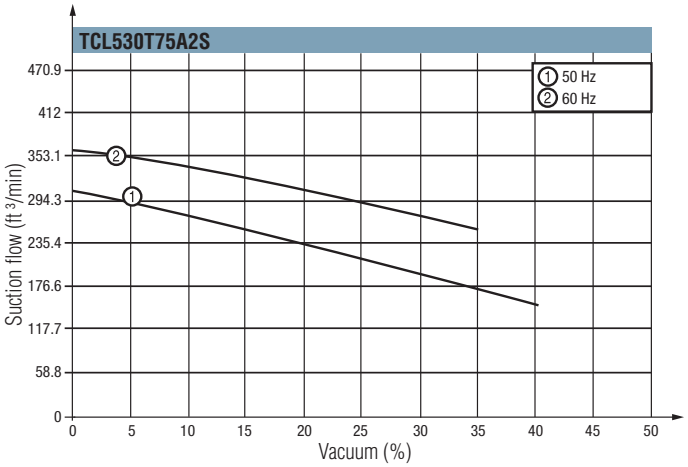
# Side-channel Blowers, single-stage and two-stage

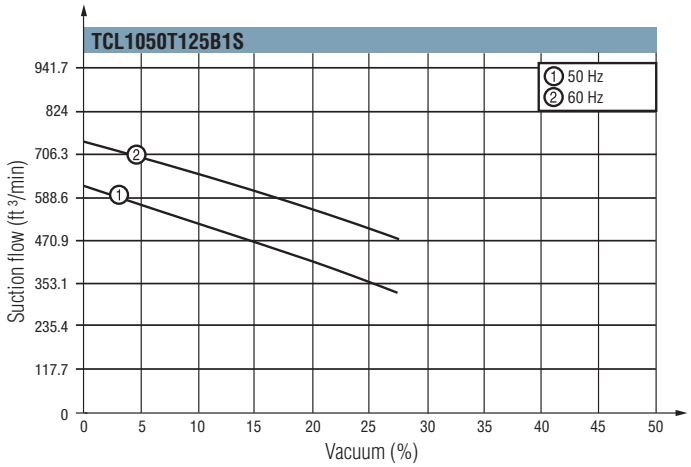
## Curves

### Suction flow (m³/h) / Vacuum (%)



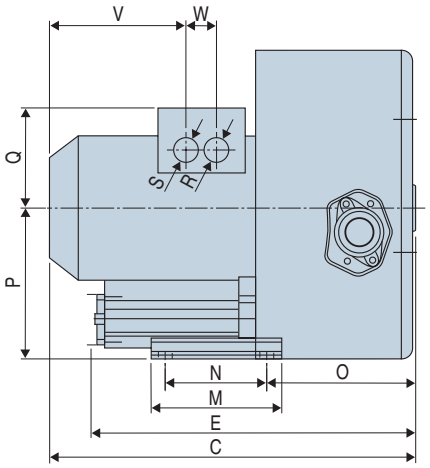



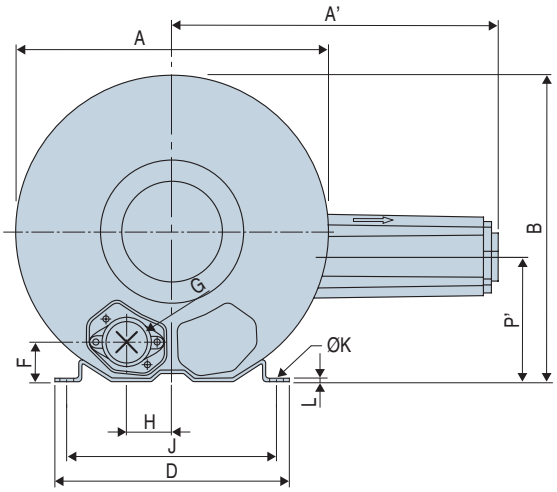




Curves are valid for continuous operation; medium: air at 59°F, measured at inlet port and atmospheric back pressure of 1013 hPa (mbar abs.), Tolerance: ± 10%; ambient temperature : -77°F to +104°F

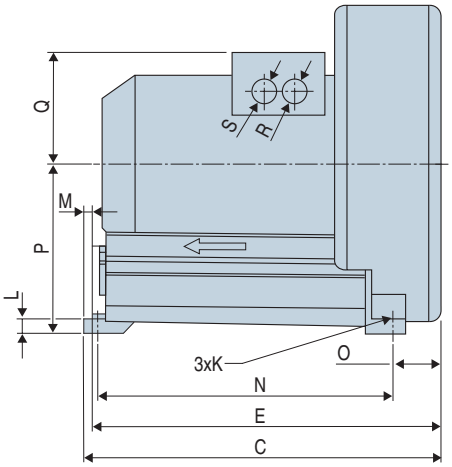
# Side-channel Blowers, single-stage and two-stage

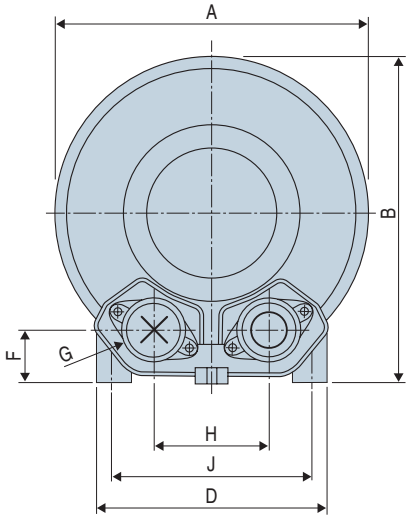
## Dimensions




| 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 5.30 SCFM
- 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
- 3.53 SCFM 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

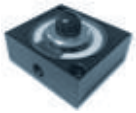
## FVUM FVUG

### 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 sound-proof 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

# QR
## Quick Release Device
Quick Release

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.

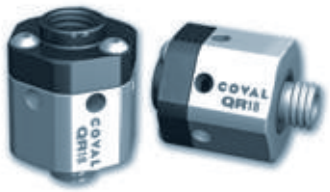
### Advantages

- 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

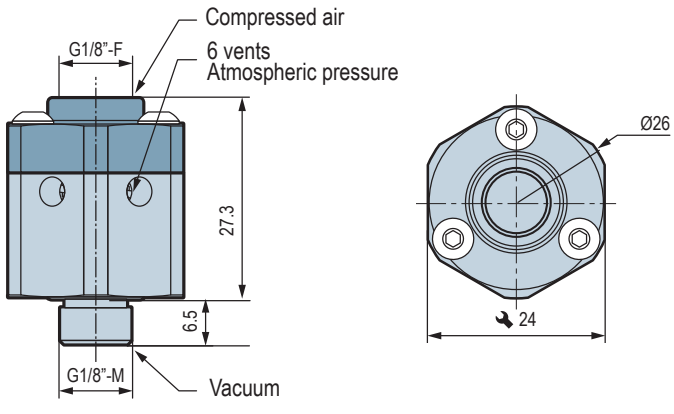
### Specifications

| Model | Fitting | (g) |
|---|---|---|
| QR18 | G1/8" | 35 |

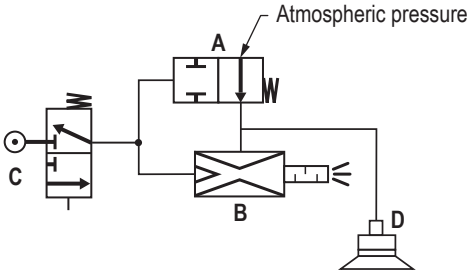
- Pressure connection by G1/8" female fitting
- Connection to vacuum network by G1/8" male thread
- Operating pressure: 2 to 7 bar
- Release rate to atmosphere: about 5.30 SCFM
- Nominal diameter : 4mm
- Materials : aluminium, nitrile (NBR), brass, steel
- Operating temperature : 32 to122°F



### 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

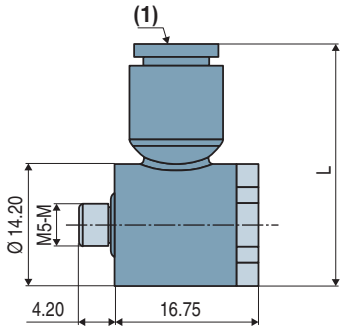
- Allows blow-off on VR or any other M5 fitting
- Reduces cycle times
- Avoids using a vacuum-proof distributor.

### Technical Characteristics

| Model | Push fitting | L |
|---|---|---|
| **MS2M5** | Ø 2.7x4 | 25.8 |
| **MS4M5** | Ø 4x6 | 28.10 |

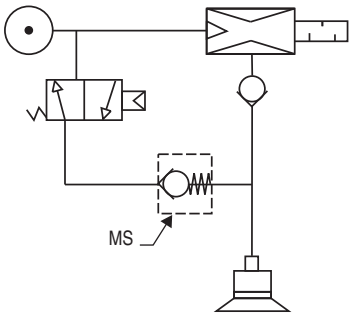
- Pressure connection by push fitting for Ø 4x6 or 2.7x4 tube
- Connection to the vacuum network by M5 male threaded fitting
- Blow-off flow rate at 5 bar: 3.53 SCFM
- Materials: polyamide PA 6.6 + brass (CuZn) + nitrile (NBR)

### Dimensions




(**1**) Push fitting

### Pneumatic Diagram




**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.

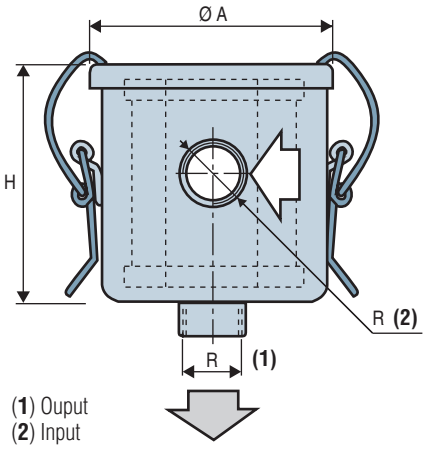
Important: These filters are designed for vacuum. They cannot withstand pressure greater than atmospheric pressure.

Filter cartridge available in 3 versions: paper, polyester and stainless steel.

### Characteristics

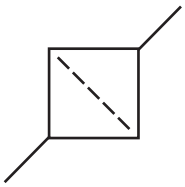
| Models | A | H | R | Flow rate (SCFM) | Weight (g) |
|---|---|---|---|---|---|
| **FVI 38** | 79 | 76 | G3/8"-F | 14.13 | 270 |
| **FVI 12** | 101 | 86 | G1/2"-F | 21.19 | 600 |
| **FVI 34** | 101 | 86 | G3/4"-F | 21.19 | 600 |
| **FVI 114** | 135 | 96 | G1"1/4-F | 49.44 | 1050 |
| **FVI 114 G** | 173 | 156 | G1"1/4-F | 84,75 | 1850 |
| **FVI 2** | 201 | 258 | G2"-F | 176.6 | 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" | **C** | Paper |
| | **12** | G1/2" | **P** | Polyester |
| | **34** | G3/4" | **I** | Stainless steel |
| | **114** | G1"1/4 | | |
| | **114G** | G1"1/4 | | |
| | **2** | G2" | | |

# FVI
## Filters and Filtration
Accessories

### Filter

| Models | Use |
|---|---|
| **FVI 38** | GVP 20 |
| **FVI 12** | GVP 25 - 30 - PVR 6 (211.88 Cf) |
| **FVI 34** | Vacuum pumps: 353/565 Cf |
| **FVI 114** | Vacuum pumps: 706/882 Cf |
| **FVI 2** | 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)

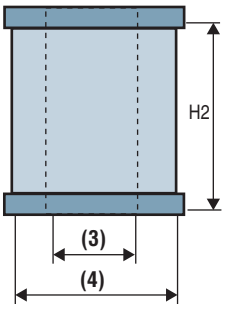
### Accessories

| Models | Replacement cartridge (*) | External Ø | Internal Ø | H2 |
|---|---|---|---|---|
| **FVI 38** | FVI 38*E | 51 | 23 | 57 |
| **FVI 12** | FVI 12*E | 64 | 38 | 68 |
| **FVI 34** | FVI 12*E | 64 | 38 | 68 |
| **FVI 114** | FVI 114*E | 98 | 60 | 71 |
| **FVI 114 G** | FVI 114G*E | 125 | 64 | 125 |
| **FVI 2** | 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**




(**3**) inside Ø
(**4**) outside Ø

### 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 (SCFM) |
|---|---|---|---|---|---|---|
| **FVUM 14** | 75 | 60 | 49.5 | 49.5 | G1/4"-F | 5.30 |
| **FVUM 38** | 75 | 64 | 49.5 | 51.5 | G3/8"-F | 12.36 |
| **FVUG 38** | 90.5 | 126.5 | 75 | 112.5 | G3/8"-F | 12.36 |
| **FVUG 12** | 90.5 | 130 | 75 | 114.5 | G1/2"-F | 17.66 |

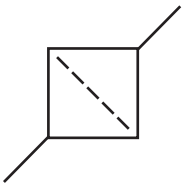
Note: all dimensions are shown in (mm)

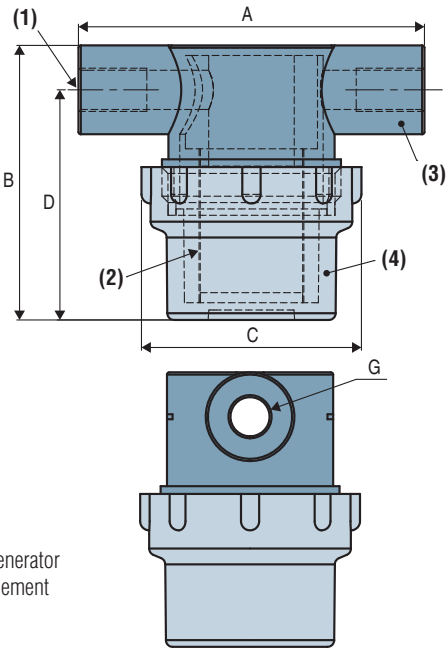
### Operating range

■ - 1 to 10 bar

### Specifications

| | |
|---|---|
| **Body material** | High: nylon 6.6<br>Tank: transparent polyamide |
| **Filtration** | Two options available:<br>50 micron stainless steel grill<br>or Polyethylene 80 micron |
| **Temperature** | 32 to 122°F |






(**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** | Mini | **14** | G1/4" for M series | **-** | Stainless steel |
| | **G** | Large | **38** | G3/8" for M and G series | **P** | Polyethylene |
| | | | **12** | G1/2" for G series | | |

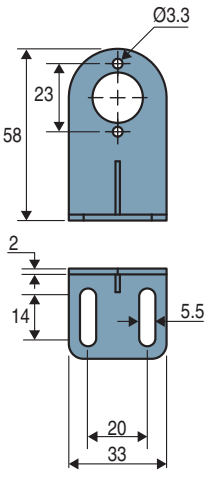
**To order a replacement filtering element, please specify:**
**e.g. : FVUM12E**

| 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) |

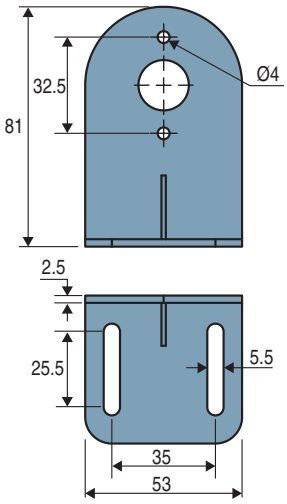
### Mounting bracket for vacuum filter

| Model | Designation | Material |
|---|---|---|
| **FVUFIXM** | Mounting bracket for filter FVUM | Stainless steel |
| **FVUFIXG** | Mounting bracket for filter FVUG | Stainless steel |

**FVUFIXM**

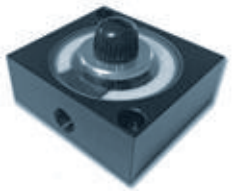



**FVUFIXG**




**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

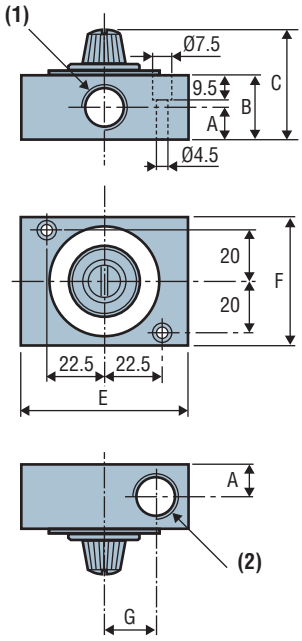
| Models | Vacuum pumps |
|---|---|
| FVG 3 | GVP 10 - VR 07 - VR 09 |
| FVG 5 | GVP 12 and 14 |
| FVG 6 | GVP 20 |

### Characteristics

| Models | A | B | C | E | F | G | D1 | D2 |
|---|---|---|---|---|---|---|---|---|
| FVG 3 | 8 | 20.5 | 33.8 | 55 | 50 | 18 | G1/8"-F | G1/8"-F |
| FVG 5 | 12.5 | 25 | 42 | 65 | 50 | 23 | G1/4"-F | G1/4"-F |
| FVG 6 | 15 | 30 | 47 | 70 | 60 | 23 | G3/8"-F | G3/8"-F |

Note: all dimensions are shown in (mm)

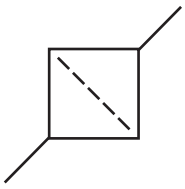
FVG 3/5/6




(**1**) D1 (input)
(**2**) DE (Output)

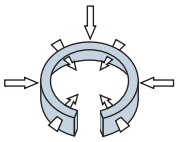
### Specifications

| | |
|---|---|
| **Operating pressure** | -1 to 5 bar |
| **Temperature** | 32 to 140 °F |
| **Filtration (µ)** | FVG 3-5-6 : 40 |
| **Weight (g)** | FVG 3/5/6: 70/138.5/220 |
| **Material** | Body : POM<br>Hood : Polycarbonate<br>Seal : Nitrile (NBR)<br>Screws / large washers : Polyethylene and plated steel<br>Filter : Porex |



### Accessories

Replacement cartridges: interchangeable filtration element.
Add E to the filter model reference to order the replacement cartridge.



Filtration angle 300°

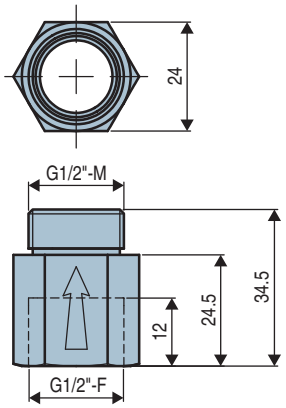
**For all orders, please specify:**
**Model + Type + Filter or Cartridge**
**e.g.: FVG5**

| 1: Model | 2: Type | | 3: Filter or Cartridge | |
|---|---|---|---|---|
| FVG | 3 | FVG 3 | - | Filter |
| | 5 | FVG 5 | E | Cartridge |
| | 6 | FVG 6 | | |

# FVL 12
## In-line Filter

The FVL12 in-line filter allows quick integration for vacuum pumps GVP and GEMP.

| Specifications | |
|---|---|
| **Material** | Body: Nickel-plated brass<br>Grille: 400 micron stainless steel |
| **Weight** | 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)

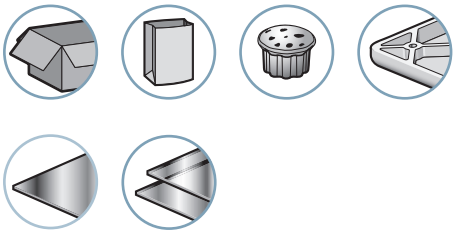
**For all orders, please specify: FVL12**

# 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.

Industry-specific applications

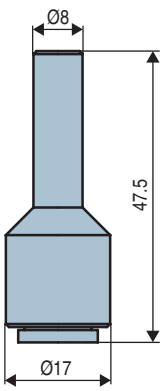


### Applications

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.

| Specifications | |
|---|---|
| **Material** | Body: POM<br>Grille: 400 micron stainless steel<br>Push fitting Brass – Steel and polymer |
| **Weight** | 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 filters 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.

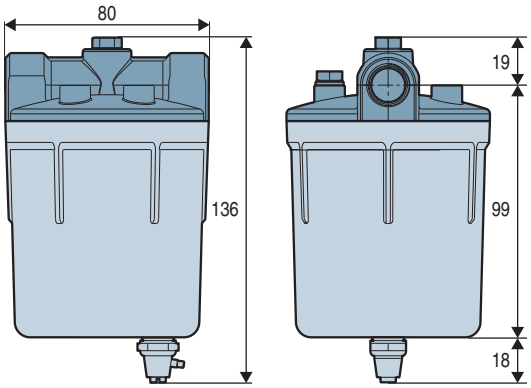
### Advantages

- 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 (1) (SCFM) |
|---|---|---|---|
| **FSLI38X50** | G3/8"-F | 50 µ | 12.25 |

(1) The flow rate may vary according to the viscosity of the liquid drawn in.




### Specifications

| | |
|---|---|
| **Material** | Lid: molded aluminium<br>Tank:transparent polycarbonate<br>Filter cartridge: stainless steel<br>Accessories: stainless steel, brass and nickel-plated brass<br>Seal: nitrile |
| **Filtering** | Two options available: 50 microns |
| **Operating range** | -1 to 2 bar |
| **Pressure max.** | 2 bar |
| **Temperature** | 32 to 122°F |

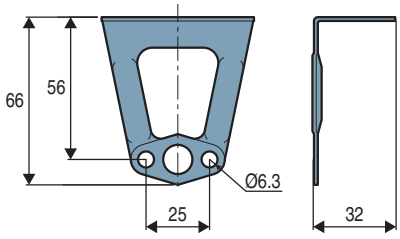
**For all orders, please specify:**
- **For complete filter: FSLI38X50**
- **For a replacement filtering element: FVUM12E**

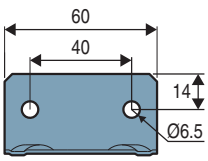
### Mounting bracket for FSLI series liquid separator filter

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**

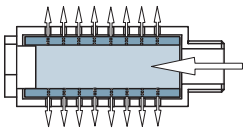
Note: all dimensions are shown in (mm)

# SIL GV. SIL K -- C

## Diffuser Type Silencers, Through-type Silencers

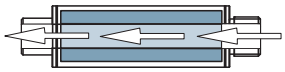
From when it was founded, COVAL has always given particular attention to reducing the noise of vacuum pumps and improving their performance.

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.

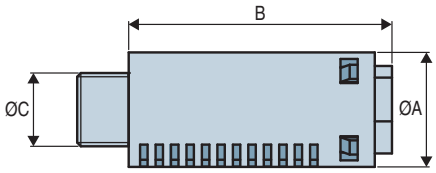
### SIL GV series diffuser-type silencers

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** | 14 to 122 °F |

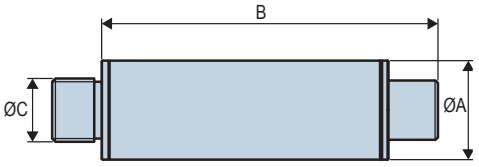
### SIL K -- C series through-type silencers

- 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)<br>interior: Textile soundproof material |
| **Temperature** | 14 to 122 °F |

**Special:**

**COVAL** develops tailor-made through-type silencers according to specifications, male of 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 characteritics 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 12/3

## PSA 100 C

### Electronic Vacuum Switch with Display

- 2 configu able digital outputs
- NO or NC ouputs
- Adjustable hysteresis
- IP 65
- The PSA100 C electronic vacuum switch is the most efficient acuum measuring component in the COVAL range.
- It can be easily installed on all machines and robots, etc. thanks to its compact lightweight design.

P 12/4

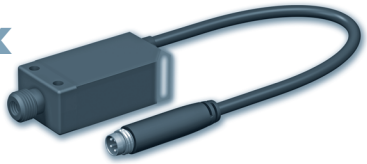
## PSD 100

### Vacuum Switch with 3-colour Display

- 1 to 5 VDC analog output
- Response time: < 5ms
- 2 vacuum fittings vailable
- M8 connection
- The compact PSD100 electronic vacuum switch is used to check the exact level of vacuum in the system.
- Analog output

P 12/5

## PSP 100 CX

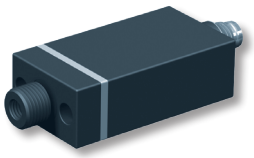


### Electronic Vacuum Switch

- 1 configu able digital output
- Response time: < 5ms
- 2 vacuum fittings vailable
- M8 connections
- The PSP100 electronic switch reduces size while accurately monitoring the vacuum level
- Adjustable digital output and hysteresis.

P 12/7

## 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 12/8

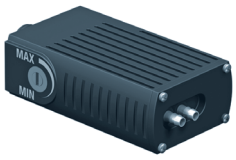
## PSE 100 E

### 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 12/9

## 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 12/10

# 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

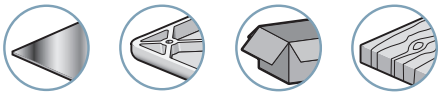
# PSK
## Mini Vacuum Switch

The PSK series adjustable vacuum switches, due to a compact and ultra-light design, enable installation close to the suction cups for reduced reponse 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

| Model | PSK 100 |
|---|---|
| Setting pressure range | 0 to 100% vacuum (0~-101.3 kPa) |
| Withstand pressure | 0.6 MPa |
| Fluid | Air, Non-corrosive/Non-flammable gas |
| Power supply voltage | 10.8 to 30 VCC |
| Load current | 80mA max. |
| Internal voltage drop | ≤ 0.8 V |
| Current consumption | 10 mA max. |
| Sensor type | PNP |
| Output short circuit protection | Yes |
| Setting method | Adjusting by VR |
| Response time | Approx.1ms |
| Repeatability | ≤+/-1% F/S/ |
| Hysteresis | 3% F.S. max. |
| Indicator | Red LED turns ON |
| Enclosure | IP 40 |
| Temperature characteristic | ≤ +/-3% F/S/ of detected pressure (77°F) at temp. Range of 32~122°F |
| Ambient temp. range | Operation: 32 ~ 140°F (0 ~ 60°C)<br>Storage: -4 ~ 158°F (-20 ~ 70°C)<br>(No condensation or freezing) |
| Ambient humidity range | Operation/Storage: 35 85% RH<br>(No condensation) |
| Vibration | Total amplitude 1.5 mm, 10Hz-55Hz-10Hz scan for 1 minute, two hours each direction of X, Y and Z |
| Shock | 980m/s² (100G), 3 times each in direction of X, Y and Z |
| vacuum connection | Push-in tube or thread-in |
| Electrical connection | M8 connection 3-pin (Cable L:150 mm) |
| Weight | Approx. 8.3 g (with M8, 3-pin male connector) |

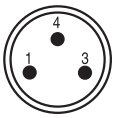
### Advantages

- 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

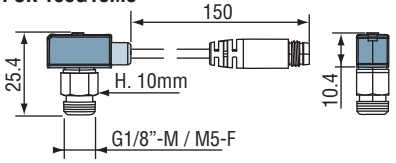



**1** = + (Brown)
**3** = - (Blue)
**4** = out (Black)

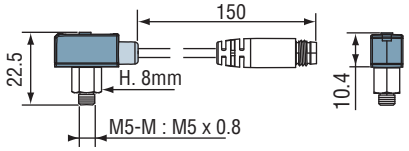
- Ø6mm stem for one-touch push fitting, Male M5 or G1/8"-M.

### Dimensions

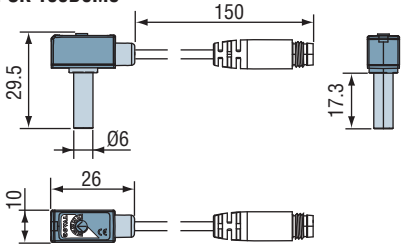
**PSK 100G18M8**




**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 | M8 | M8, 3-pin male connector |
| | | | G18 | G 1/8"-M, M5-F | | |
| | | | M5 | M5 male | | |

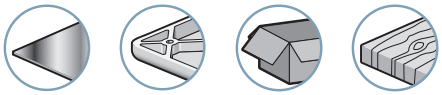
# PSA 100 C
## Electronic Vacuum Switch with Display

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

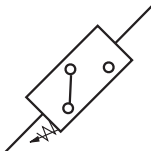


### Specifications

| | |
|---|---|
| **Compatible fluids** | All non-corrosive, filtered, non-lubricated gases |
| **Supply** | 12 to 24 V CC ± 10% |
| **Current consumed** | ≤ 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



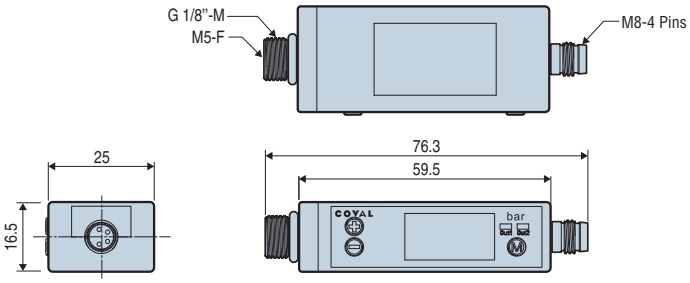
### Additional Information

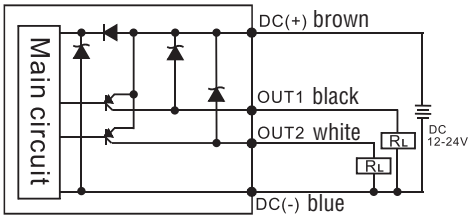
**Electrical connections**

- 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)

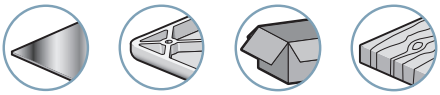
**For all orders, please specify: PSA 100 C**

# 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



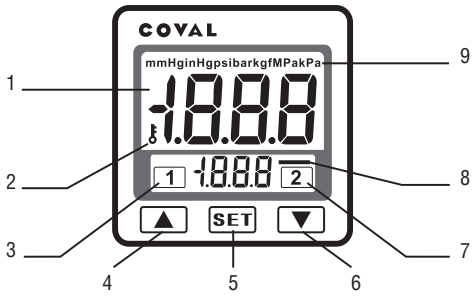
### Specifications

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Pressure rating range** | | 0.0 ~ -101.3 kPa | | | | | | |
| **Pressure setting range** | | 10.0 ~ -101.3 kPa | | | | | | |
| **Max. pressure** | | 300 kPa | | | | | | |
| **Fluid** | | Air, non-corrosive/non-flammable gas | | | | | | |
| **Pressure setting resolution** | kPa<br>0.1 | MPa<br>/ | kgf/cm²<br>0.001 | bar<br>0.001 | psi<br>0.01 | inHg<br>0.1 | mmHg<br>1 | |
| **Power supply voltage** | | 12 to 24 V DC ±10%, ripple (P-P) 10% or less | | | | | | |
| **Current consumption** | | ≤ 40 mA (without load) | | | | | | |
| **Switch output** | | 1 PNP digital output (2x on PNP2 version)<br>Max. load current: 125 mA<br>Max. supply voltage: 24 VDC<br>Residual voltage: ≤ 1.5 V | | | | | | |
| **Repeatability (Switch output)** | | ≤ ± 0.2% F.S. ±1 digit | | | | | | |
| **Hysteresis** | **Threshold mode** | Adjustable (1 to 8 digits) | | | | | | |
| | **Hysteresis mode** | Adjustable | | | | | | |
| | **Window comparator mode** | Adjustable (1 to 8 digits) | | | | | | |
| **Response time** | | ≤ 2.5ms (anti-vibration function: 25 ms,100 ms, 250 ms, 500 ms, 1000 ms and 1500 ms selection) | | | | | | |
| **Output short circuit protection** | | Yes | | | | | | |
| **7 segment LCD display** | | Two colour (red / green) main display, orange sub-display (refresh rate: 5 times / 1sec.) | | | | | | |
| **Indicator accuracy** | | ≤ ± 2% F.S. ± 1 digit<br>(ambient temperature: 77 ± 37.4°F) | | | | | | |
| **Switch ON indicator** | | Orange OUT 1 / OUT 2 (PNP2 only) | | | | | | |
| **Analog output (voltage power) (PNP version only)** | | Output voltage: 1 to 5 V ≤ ± 2.5% F.S. (within rated pressure range), linearity: ≤ ± 1% F.S. / Output impedance: approx. 1 kΩ | | | | | | |
| **Environnement** | Enclosure | IP40 | | | | | | |
| | Ambient temp. range | operation: 32 – 122° F / storage: 14 – 140° F<br>(no condensation or freezing) | | | | | | |
| | Ambient humidity | Operation / Storage: 35-85% RH<br>(no condensation) | | | | | | |
| | Permissible voltage | 1000 V AC in 1-min (between case and lead wire) | | | | | | |
| | Insulation resistance | 50 M Ohm min.<br>(at 500 V DC, between case and lead wire) | | | | | | |
| | Vibrations | 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 | | | | | | |
| | Shocks | 100 m/s² (10 G), 3 times each in direction of X, Y and Z | | | | | | |
| **Temperature characteristic** | | ≤ ± 2% FS. of detected pressure (77°F) at temp. range of 32~122°F | | | | | | |
| **Port size** | | G1/8", M5-F | | | | | | |
| **Lead wire** | | Oil-resistance cable (0.15 mm²) | | | | | | |
| **Weight** | | 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/cm²).
- 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 + Electrical connection + Outputs.**
**Example: PSD100CPNP**

| 1: Model | 2: Electrical connection | 3: Outputs |
|---|---|---|
| **PSD100CPNP** | M8 connector | 1 digital output PNP<br>1 analog output |
| **PSD100LPNP2** | 2 m cable | 2 digital outputs PNP |

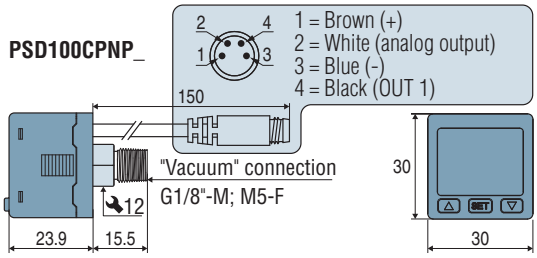
### Accessories

- 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.

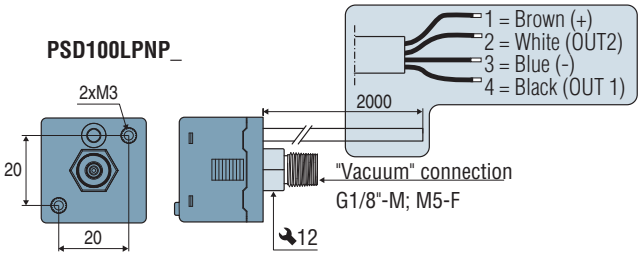
# PSD 100
## Vacuum Switch with 3-color Display

## Electrical connections - Dimensions

■ M8 Connector-4 poles

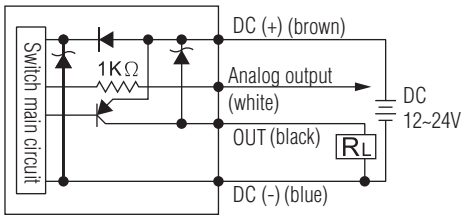



■ 2 m. cable

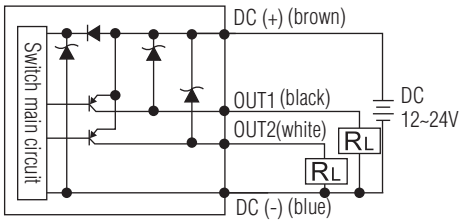



## Electrical Diagrams

**PSD100_PNP**



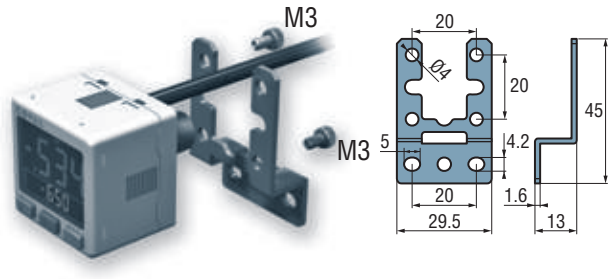

**PSD100_PNP2**



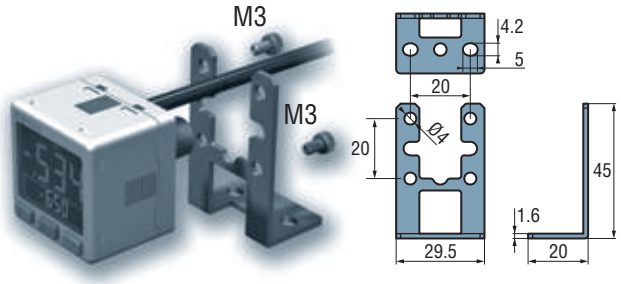

## Mounting Solutions

### Mounting brackets

■ **PSDFIXA**, vertical attachment.



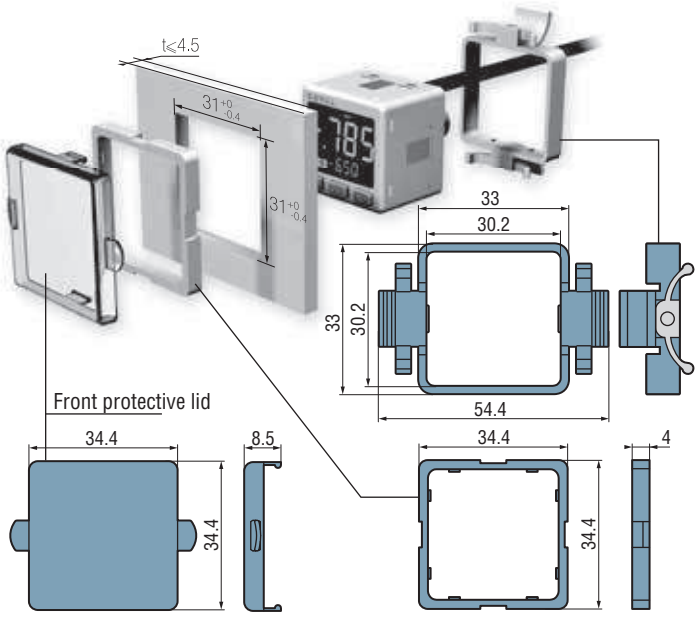

■ **PSDFIXB**, horizontal attachment.




### Panel mounting kits

■ **PSDFIXC**: front attachment kit.

■ **PSDFIXD**: front attachment kit + front protective lid

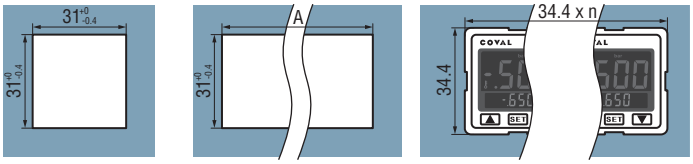



Panel opening (max. thickness: 4.5 mm)

For 1 vacuum switch

For multiple vacuum switches:
A = (34.4 x n) -3.4
n = number of switches

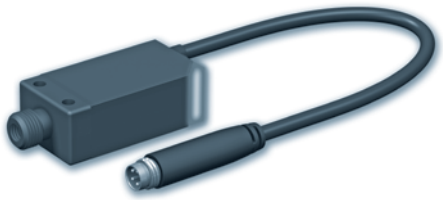
Dimensions after installation
n = number of switches




Note: all dimensions shown in (mm)

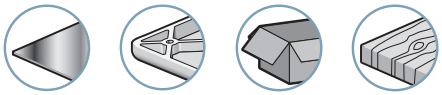
# PSP 100 CX

## Electronic Vacuum Switch



The electronic vacuum switch PSP100CX integrates standard threshold and hysteresis adjustment. It is equipped with wo vacuum connections (G1/8"-Male, M5-Female) and an M8 connector 4-pin for electrical connection.

Industry-specific application

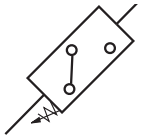


## Specification

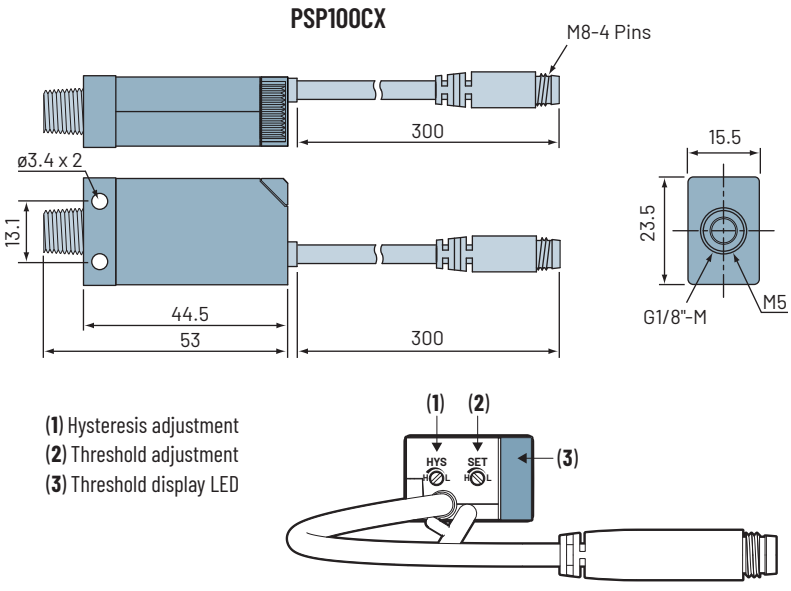
| Models | PSP100CX |
|---|---|
| Compatible fluid | All non-corrosive, filte ed, non-lubricated gases |
| Supply | Regulated 12-24 V DC, polarity inversion protection |
| Current consumed | < 21 mA |
| Transistor output | NO 80 mA with 24 VDC |
| Thermal drift | ± 3% of the measuring scale between 32 and 122°F |
| Output viewing | LED |
| Response time | < 5 ms |
| Threshold adjustment | By 3/4 turn potentiometer |
| Hysteresis adjustment | 0 to 10% adjustment by 3/4 turn potentiometer |
| EMC | Industrial standard class B |
| Materials | PA 66 and brass |
| Temperature | Operation: 32 to 122 °F<br>Storage: -4 to 140 °F |
| Protection | IP 40 |
| Electrical connection | M8 connector 4-pin (cable length: 0.3 m) |
| Pneumatic connection | G1/8"-M or M5-F |
| Weight | 22 g |
| Adjustment range | 0 to -1 bar |

## Additional Information

- 1 adjustable digital output
- Adjustable hysteresis
- Measuring range: 0 / -1 bar
- Overpressure: +3 bar
- PNP



## Dimensions




## Additional Information

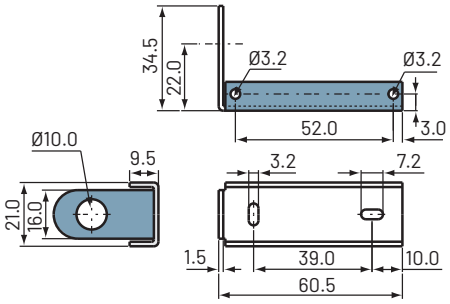
**Electrical connections**

- 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)

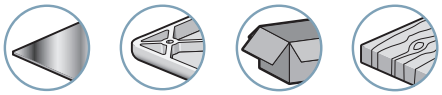
**For all orders, please specify: PSP100CX**

# 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

| | |
|---|---|
| **Compatible fluids** | All filtered, non-corrosive, non-lubricated gases |
| **Supply** | 24 V DC (18 V DC min / 30 V DC max) |
| **Current draw** | < 20 mA |
| **Analog output** | 1 to 5 VDC from 0 to –1 bar |
| **Thermal drift** | ± 3% of the measuring scale between 32 and 122°F |
| **Response time** | < 5 ms |
| **EMC** | Industrial standard Class B |
| **Materials** | PA 66 and brass |
| **Temperature** | Operation: 32 to 122 °F<br>Storage: 14 to 140 °F |
| **Protection** | IP 50 |
| **Electrical connection** | M8 connector (4 pins) |
| **Pneumatic connection** | G1/8" Male and M5 Female |
| **Weight** | 22 g |

### Advantages

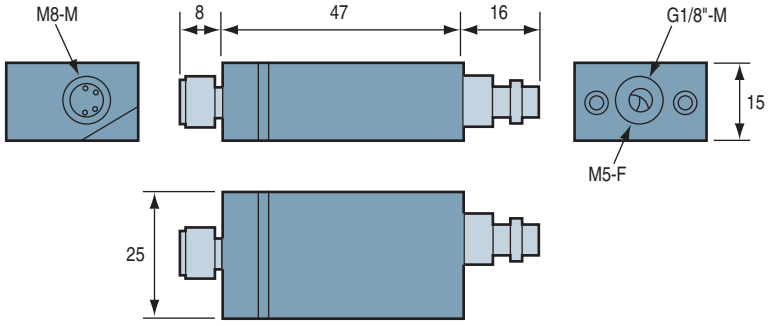
- 1 analog output from 1 to 5 VDC
- Measuring range: 0 / -1 bar
- Overpressure: +3 bar max.
- PNP

### 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

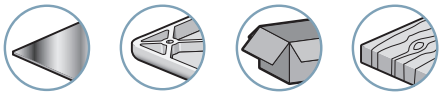
- Straight or elbow connector, see page 11/12.

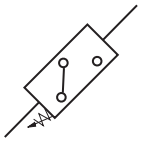
**For all orders, please specify: PSP 100 ANA**

# PSE 100 E
## Electric Vacuum Switch

The PSE 100 E series vacuum switch with electric output allows the vacuum level in the system to be checked by means of a patented system.
- It is adapted to all electrical automated systems.
- The choice between the NO or NC function is made during wiring.

Industry-specific applications



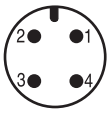


### Specifications

| | |
|---|---|
| **Models** | **Two versions: PSE 100 E and PSE 100 EC** |
| **Compatible fluids** | All non-corrosive gases |
| **Switching power** | 250 V - 5 A with cable<br>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 $10^6$ 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** | 14 °F to 176 °F |

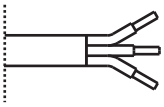
### Electrical connections

**M12 connector**




**1** : Common
**2** : NO Contact
**3** : -
**4** : NC Contact

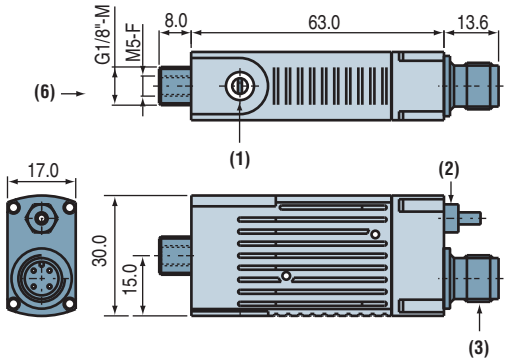
**PVC cable (length 2m)**

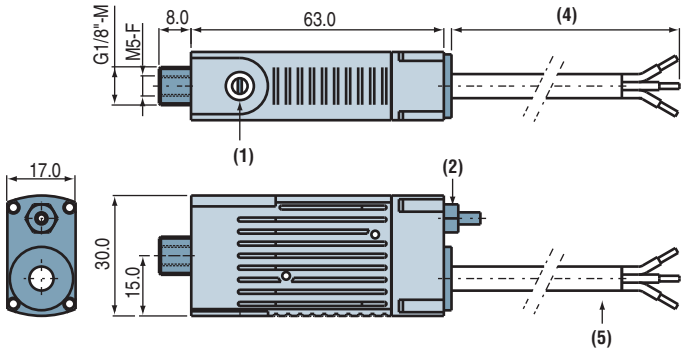


Brown: Common
White: NO Contact
Black: NC Contact

**Connection for EC version (M12)**
Straight PVC cable, 2 meters: Part No CD M12.
Elbow PVC cable, 2 meters: Part No CC M12.
See page 11/12.

### Dimensions

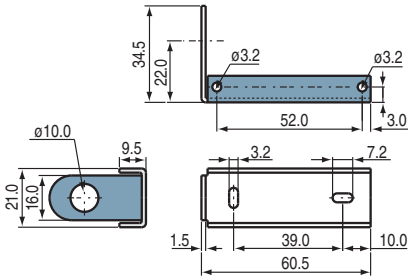



(**1**) Adjustment screw
(**2**) Atmospheric pressure hollow shaft fitting for tube, inside Ø 2.7mm
(**3**) M12 male connector
(**4**) Approx. 2 meters
(**5**) Cable, 3 conductors
(**6**) Vacuum

### Additional Information

**Vacuum switch attachment - Clip Part No: PSE.F**

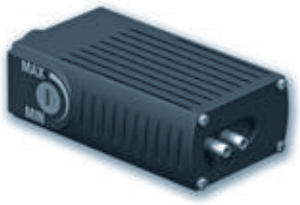



**For all orders, please specify: Model + Version.**
**Example: PSE100EC**

| 1: Model | 2: Version | |
|---|---|---|
| PSE 100 E | - | PVC cable, length 2m |
| | C | M12 connector |

Note: all dimensions shown in (mm)

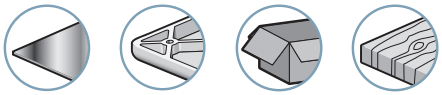
# PSE 100 P
## Pneumatic Vacuum Switch

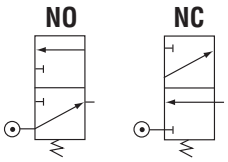


The PSE 100 P series vacuum switch with pneumatic output allows the vacuum level in the system to be checked by means of a patented system

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

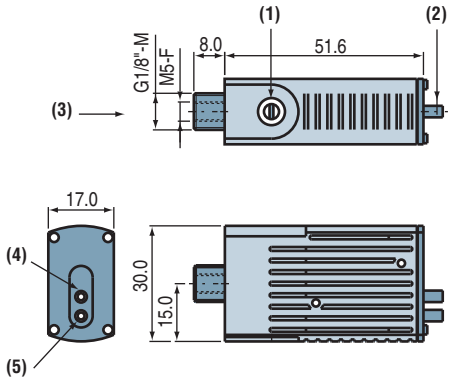





### Specifications

| Models | Two versions: NO and NC |
|---|---|
| Compatible fluids | All non-corrosive gases |
| Operating pressure | 2 to 6 bar |
| Adjustment range | -400 mb to -800 mb |
| Precision | 3% |
| Hysteresis | 80 to 100 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 $10^6$ operations |
| Materials | Body: Polyacetal - Vacuum sensor: nitrile membrane |
| Weight | 32 g |
| Temperature | 14 °F to 176 °F |
| Flow rate at 6 bar | 2.47 SCFM |

### Dimensions

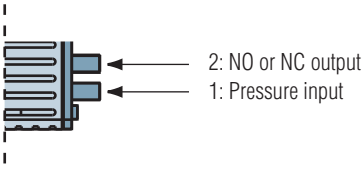



(**1**) Vacuum threshold - Adjustment screw
(**2**) Hollow shaft for tube, inside Ø 2.7 mm
(**3**) Vacuum
(**4**) NO or NC output
(**5**) Pressure input

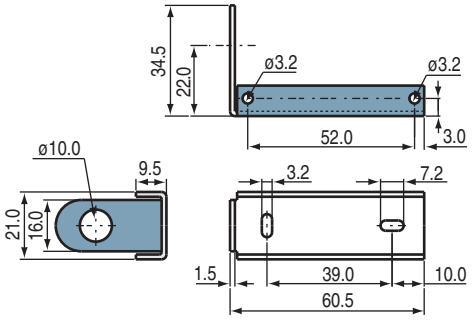
### Additional Information

■ 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)

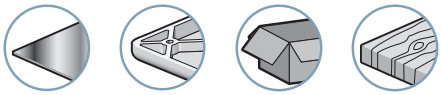
# PSE 100 PK
## Pneumatic Vacuum Switch

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.

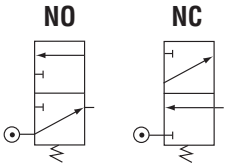
This vacuum switch exists in two versions: NO version recommended for the "air saving" function on a venturi and NC version for the "safety" function (object detected, etc.) and "SFC signal".

Industry-specific applications

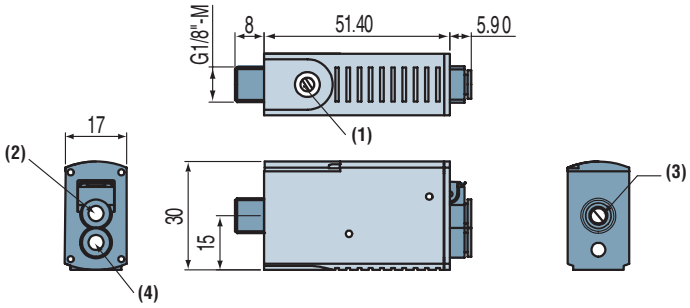


### Specifications

| | |
|---|---|
| **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 $10^6$ operations |
| **Materials** | Body: Polyacetal - Vacuum sensor: nitrile membrane |
| **Weight** | 32 g |
| **Temperature** | 14 °F to 176 °F |
| **Flow rate at 6 bar** | 2.33 SCFM |




### Dimensions

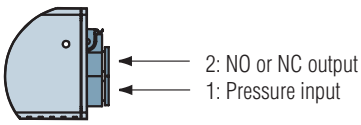



(**1**) Vacuum threshold adjustment
(**2**) Signal output, NC or NO tube
(**3**) M5 Vacuum input
(**4**) Pressure input Ø4 tube

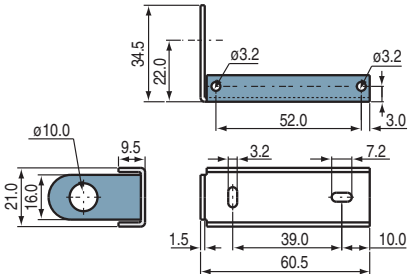
### Additional Information

■ Mounting in GVO option in the GVP / GEMP vacuum pump range.

**Pneumatic connection**




**Vacuum switch attachment - Clip Part No: PSE.F**




**For all orders, please specify:**
**Model + Version.**
**Example: PSE100PKNO**

| 1: Model | 2: Version | |
|---|---|---|
| PSE 100 PK | NO | Normally Open (NO) |
| | NF | Normally Closed (NC) |

Note: all dimensions shown in (mm)

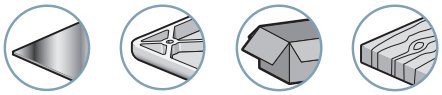
# VAF 111
## Vacuum Gauge

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

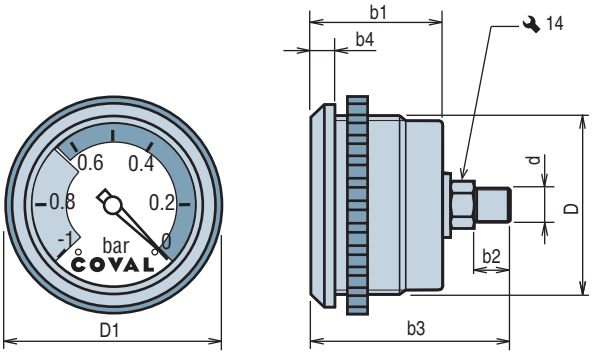
| Models | D (1) | D1 | b1 | b2 | b3 | b4 | d |
|---|---|---|---|---|---|---|---|
| **VAF 111 40** | 40 | 43 | 32.5 | 12 | 52 | 4 | G1/8"-M |
| **VAF 111 50** | 50 | 54 | 32.5 | 12 | 52 | 4 | G1/4"-M |
| **VAF 111 63** | 63 | 68 | 32.5 | 12 | 52 | 4 | G1/4"-M |

(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** | 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 |

12

# Gripping Solutions

Chapter 13

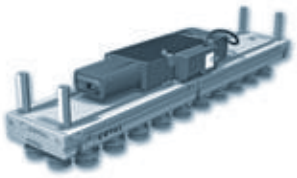
## CVGC

### Carbon Vacuum Grippers for Collaborative Robots

- 3 standard formats (150x150, 240x120, 320x160 mm)
- Ultra-light and compact, due to their carbon design
- Interface de préhension en mousse
- 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



NFC IO-Link

### Compact and Light Vacuum Grippers

- 3 standard lenghts (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

NFC IO-Link

### 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

# CVGC

## Carbon Vacuum Grippers

## General Information

With their innovative design, Coval's **CVGC** carbon vacuum grippers correspond perfectly to the weight constraints, flexibility and safety of collaborative robot applications.

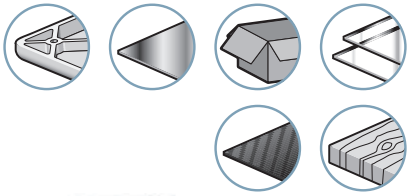
The **CVGC** series is composed of:

- 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.

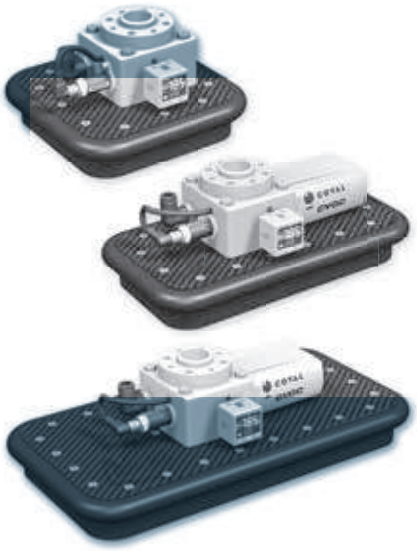
The three standard formats allow you to choose your **CVGC** and ensure the handling of your loads: corrugate, plastics, metal/glass plates, etc.

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 (SCFM) | Air consumed (SCFM) | Capacity (1) (kg) | (2) (kg) |
|---|---|---|---|---|---|
| **CVGC 150X150** | 150 x 150 x 90 | 3.18 | 4.77 | 30 | 0.8 |
| **CVGC 240X120** | 240 x 120 x 90 | 6.36 | 9.53 | 38 | 1.0 |
| **CVGC 320X160** | 320 x 160 x 90 | 7.42 | 12.2 | 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

UNIVERSAL ROBOTS+
Certified

### Applications

The **CVGC** vacuum gripper provide a unique solution for the handling of products in various industrial sectors:

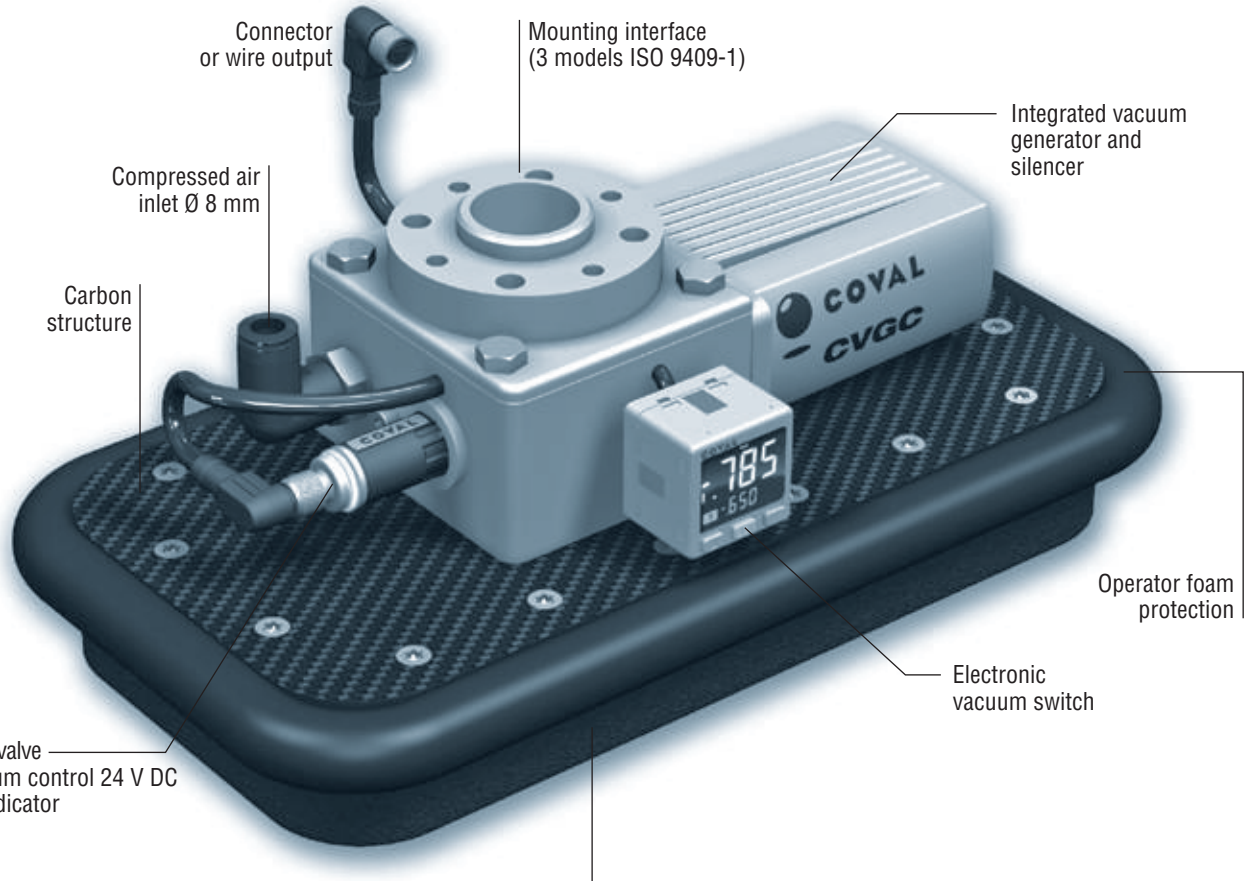
- Packaging
- Plastics
- Metal
- Glass
- Composite
- Wood

# CVGC
## Carbon Vacuum Grippers
General Information

**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



**Foam gripping interface**

**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.

# CVGC
## Carbon Vacuum Grippers
Selection and Configuration

## To Order

| | CVGC | 240X120 | | A50 | | C1 |
|---|---|---|---|---|---|---|

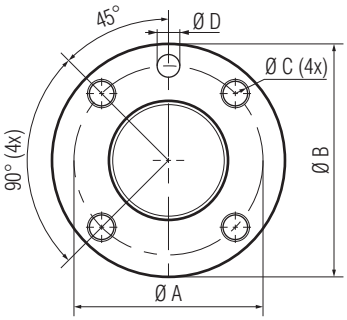
| DIMENSIONS | |
|---|---|
| 150 x 150 mm | 150X150 |
| 240 x 120 mm | 240X120 |
| 320 x 160 mm | 320X160 |

| ISO 9409-1 ROBOT MOUNTING INTERFACE | |
|---|---|
| A31 | ISO 9409-1-31.5-4-M5 |
| A50 | ISO 9409-1-50-4-M6 |
| A63 | ISO 9409-1-63-4-M6 |

| ELECTRICAL CONNECTIONS | |
|---|---|
| C1 | M8 - Female 8-pins |
| C2 | M8 - Male 5-pins |
| C3 | M8 - Male 8-pins |
| C4 | Wire outlet 2 m. |
| C5 | Wire outlet 5 m. |
| C6 | Molex connector 8-pins |

## ISO 9409-1 Robot Mounting Interface

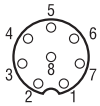
| Version | Standard | Ø A (mm) | Ø B (mm) | Ø C (mm) | Ø D (mm) | |
|---|---|---|---|---|---|---|
| A31 | ISO 9409-1-31.5-4-M5 | 31.5 | 40 | M5 (4 screws) | 5 | Fanuc CR-4, CR-7, CR-7 A/L, CR-14 A/L |
| A50 | ISO 9409-1-50-4-M6 | 50 | 63 | M6 (4 screws) | 6 | Universal Robots UR3, UR5, UR10, UR16 + e-Series<br>Omron/Techman TM5, TM12, TM14<br>Doosan Robotics A0509, A0509S, A0912, A0912S, M0609, M0617, M1013, M1509, H2017, H2515<br>Fanuc CRX10-iA |
| A63 | 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

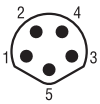


| | |
|---|---|
| 1 | "Vacuum level" signal analogic 1 to 5 V DC |
| 2 | –* |
| 3 | –* |
| 4 | "Gripped product" switching output 24 V DC PNP/NPN NO or NC |
| 5 | +24V DC permanent |
| 6 | –* |
| 7 | Vacuum Control 24 V DC PNP/NPN |
| 8 | 0 V - GND |

** not used in this configuration*

■ **C2**: M8 connector - male 5-pins elbow, cable length 150 mm

Omron/Techman TM5, TM12, TM14

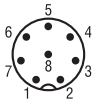


| | |
|---|---|
| 1 | +24V DC permanent |
| 2 | "Gripped product" switching output 24 V DC PNP/NPN NO or NC |
| 3 | Vacuum Control 24 V DC PNP/NPN |
| 4 | "Vacuum level" signal analogic 1 to 5 V DC |
| 5 | 0 V - GND |

■ **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*

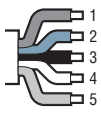


| | |
|---|---|
| 1 | "Gripped product" switching output 24 V DC PNP/NPN NO or NC |
| 2 | Vacuum Control 24 V DC PNP/NPN |
| 3 | –* |
| 4 | –* |
| 5 | +24V DC permanent |
| 6 | –* |
| 7 | –* |
| 8 | 0 V - GND |

** not used in this configuration*

■ **C4 / C5**: 5-wire output, cable length 2 m (C4) or 5 m (C5)

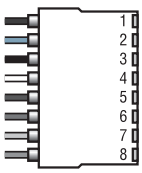
Fanuc CR-4, CR-7, CR-7, CR-7 A/L, CR-14 A/L + any application requiring cables to be routed outside the robot arm + any robot whose housing connection does not match C1/C2/C3/C6.



| | |
|---|---|
| 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*

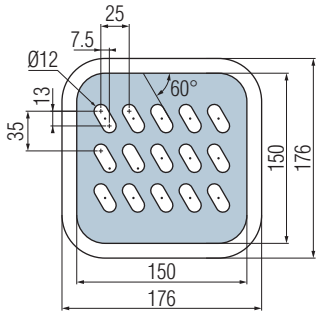
# CVGC

## Carbon Vacuum Grippers

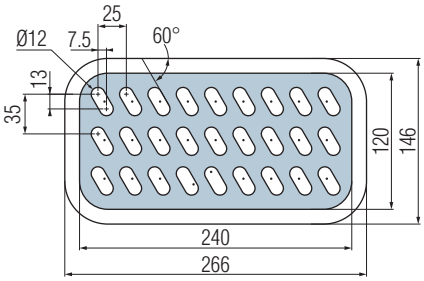
Dimensions and Characteristics

## Dimensions

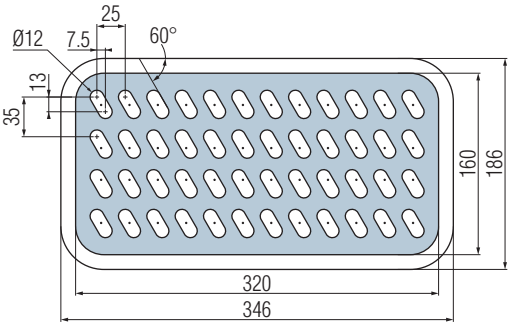
### CVGC150X150A____



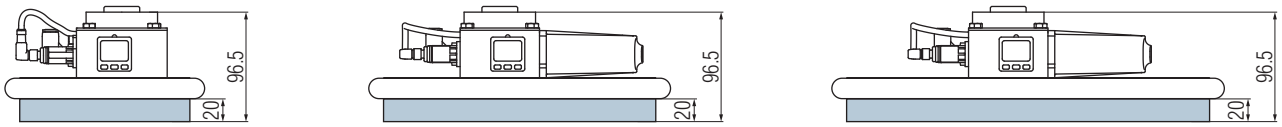

### CVGC240X120A____



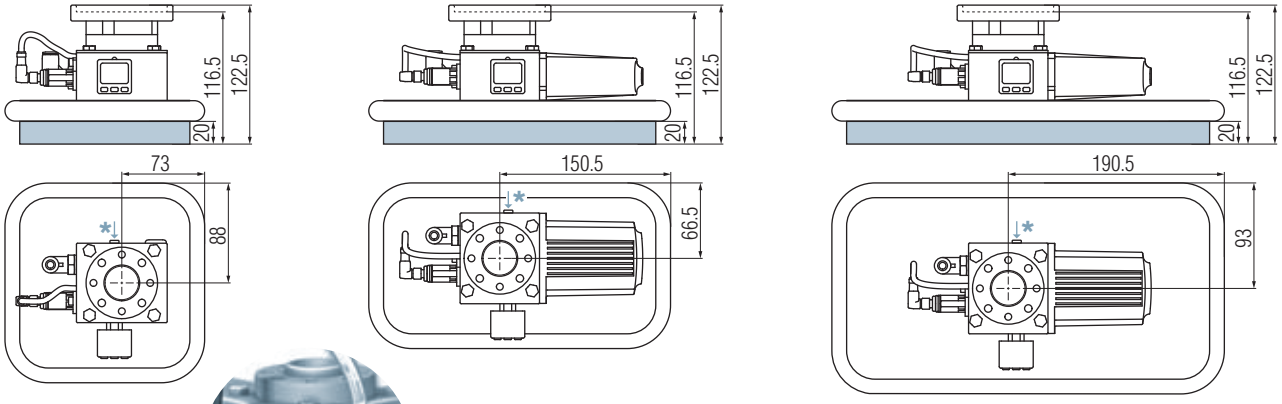

### CVGC320X160A____



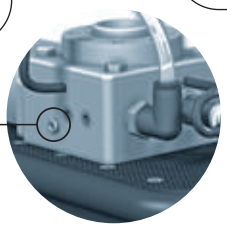

### Mounting interfaces A31 or A50




### Mounting interface A63

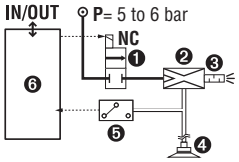



* M5 connection for external blow-off (M5 connector)



*Note: All dimensions are in mm.*

## General Characteristics




❶ "Vacuum" solenoid valve
❷ Venturi
❸ Through-type silencer
❹ Foam gripping interface
❺ Electronic vacuum switch
❻ Input / Output board

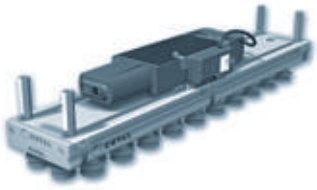
- Supply: non-lubricated air, 5 microns filtered, according to ISO 8573-1:2010 [4:5:4].
- Operating pressure: from 5 to 6 bar
- Optimal pressure:
  - CVGC 150x150 : 5.5 bar
  - CVGC 240x120 : 6 bar
  - CVGC 320x160 : 6.4 bar
- Maximum vacuum: 85%.
- Vacuum command light: orange LED
- Electric protection 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 32 to 122° F
- 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.*

# CVGL

## Compact and Light Vacuum Grippers

General Information

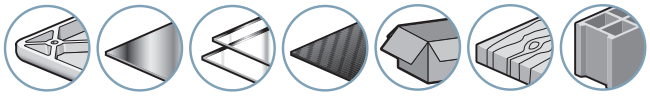


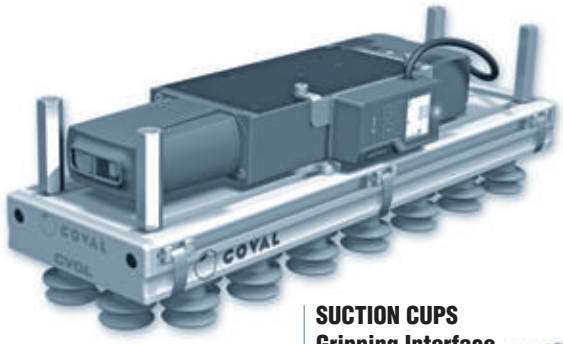
With the CVGL series, COVAL introduces a universal solution to the vacuum gripper that is flexible, simple, and economical.

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

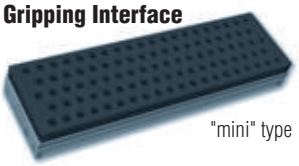
**2** control versions (vacuum and blow-off)

**2** solutions for vacuum display

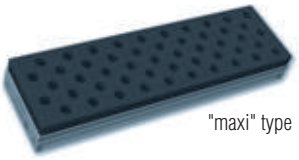
**+ The Vacuum Manager experience of COVAL**

**= YOUR CVGL SOLUTION**

**FOAM**
**Gripping Interface**

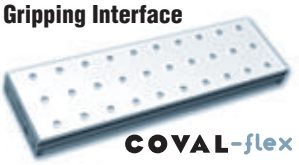


"mini" type

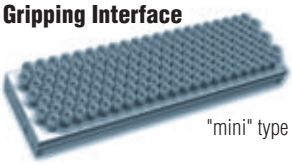


"maxi" type

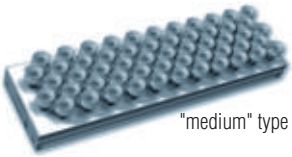
**"COVAL-flex"**
**Gripping Interface**



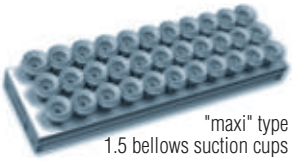

**SUCTION CUPS**
**Gripping Interface**



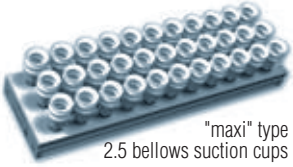
"mini" type



"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:

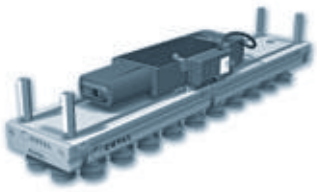
- Packaging
- Plastics
- Metal
- Glass
- Concrete/stone
- Composites
- Wood

The adaptability and the flexibility of COVAL CVGL Series vacuum grippers responds to numerous robotic applications.

# CVGL

## Compact and Light Vacuum Grippers

General Information



### Modular Grippers

**Ultra-light**
Reduced payload weight

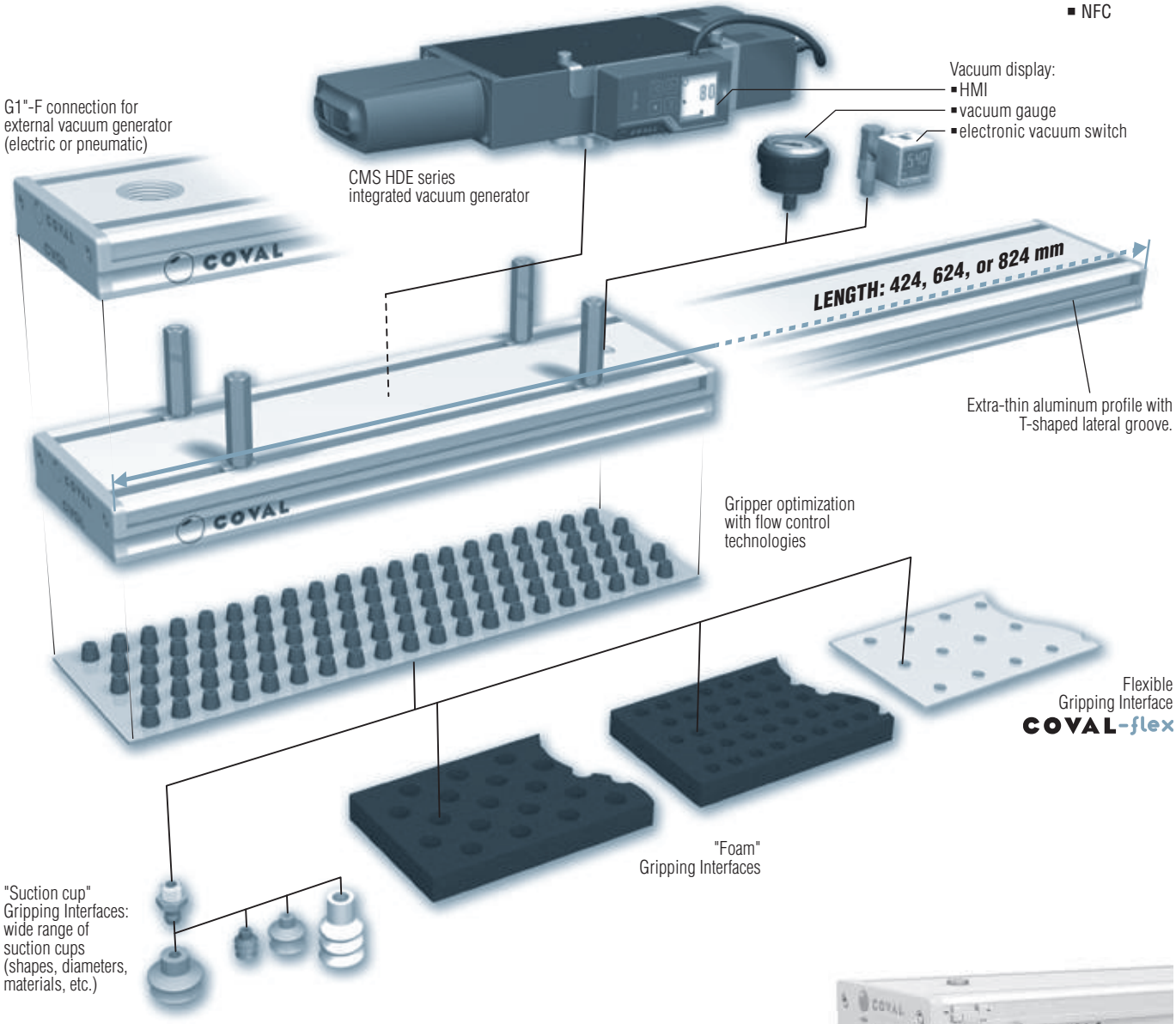
**External or integrated vacuum generation**

**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




**Gripper interface quick change system, ref: CVGL ____C__**

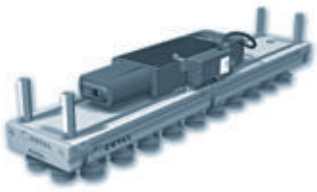
To simplify maintenance and increase the flexibility of the CVGL series vacuum grippers, COVAL has developed an ultra-compact and easy-to-use solution for replacing the gripper interface. Very straight-forward, the spring-loaded clips allow you to replace a worn or damaged gripper interface in a matter 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.

# CVGL

## Compact and Light Vacuum Grippers

General Information

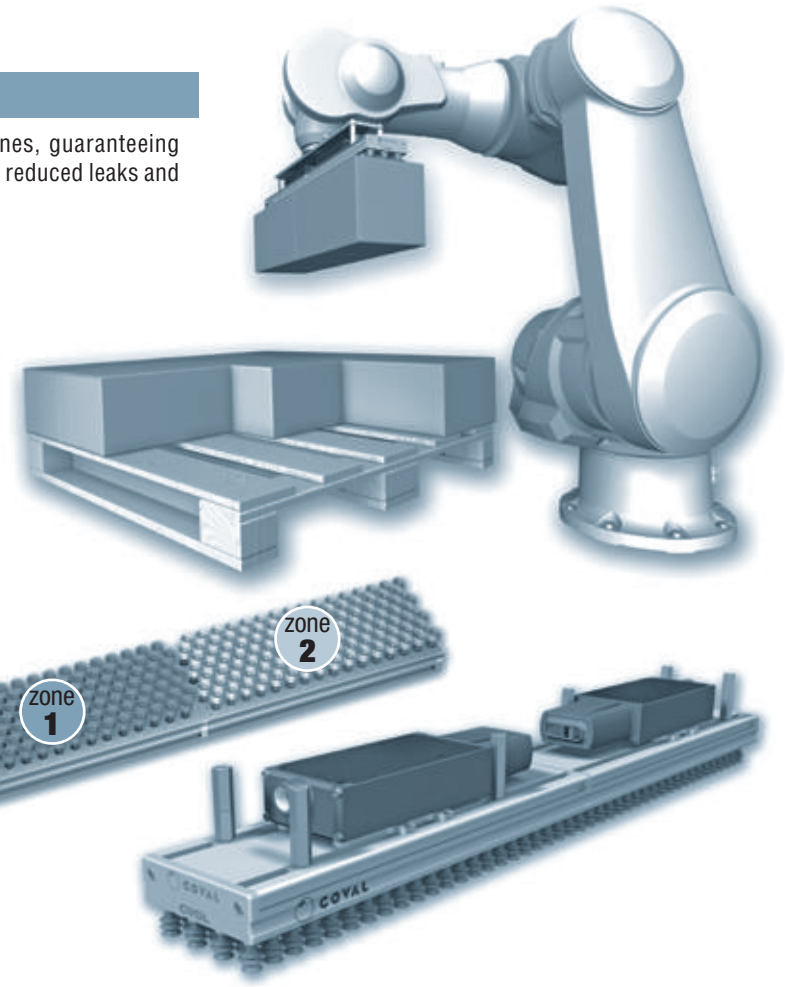


### Multi-zone

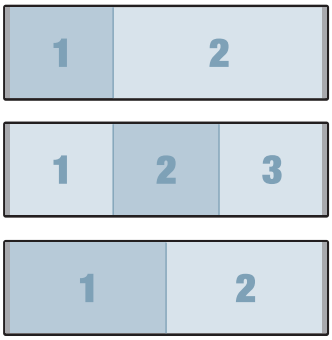
CVGL vacuum grippers can create independent gripping zones, guaranteeing optimization of vacuum management (increased vacuum level, reduced leaks and energy consumption).

- ➔ 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

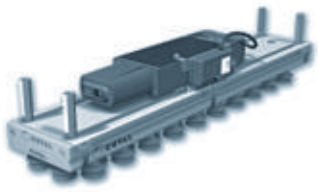
| GRIPPING INTERFACE | Length (mm) | Vacuum gripper without vacuum generator (G0) | Vacuum gripper with 1 CMSHDE__50_ vacuum generator (D1) | | Vacuum gripper with 1 CMSHDE__100_ vacuum generator (D2) | | Vacuum gripper with 2 CMSHDE__100_ vacuum generators (D3) |
|---|---|---|---|---|---|---|---|
| | | | without control | with control | without control | with control | without control |
| **Foam Interface Mini F2S / Maxi F2B type** 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 |
| **Foam Interface Mini F2S / Maxi F2B type** 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 |
| **Suction cup Interface Mini, Medium, or Maxi type** 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*

# CVGL

## Compact and Light Vacuum Grippers

Integrated Technologies



## 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.

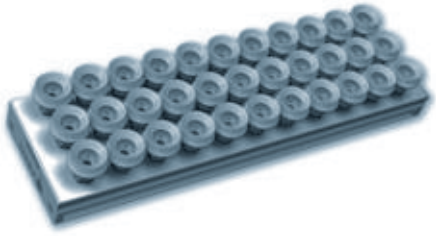
### "SUCTION CUP" Interface

- 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

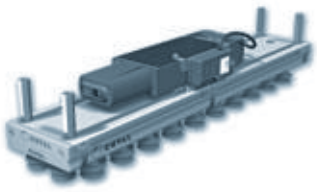
| Part number | Total length of the vacuum gripper (mm) | Force at 80% vacuum (lbf)* | Force at 45% vacuum (lbf)* |
|---|---|---|---|
| **CVGL 424_ _ _ _** | 424 | 232.6 | 134.9 |
| **CVGL 624_ _ _ _** | 624 | 348.4 | 202.3 |
| **CVGL 824_ _ _ _** | 824 | 465.3 | 269.8 |

** Indicative force for a vacuum gripper 100% covered by the load, without safety factor, on a rigid and airtight surface.*

# CVGL

## Compact and Light Vacuum Grippers

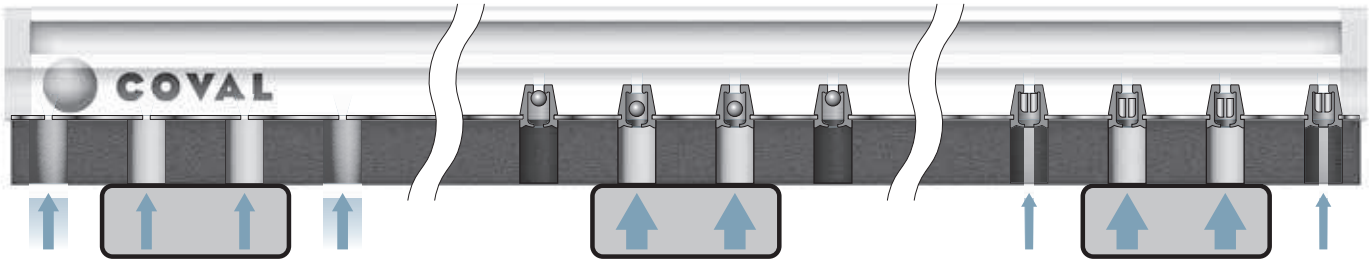
Integrated Technologies



## 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.

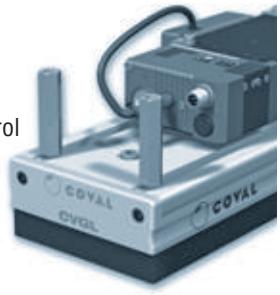
## Vacuum Generation

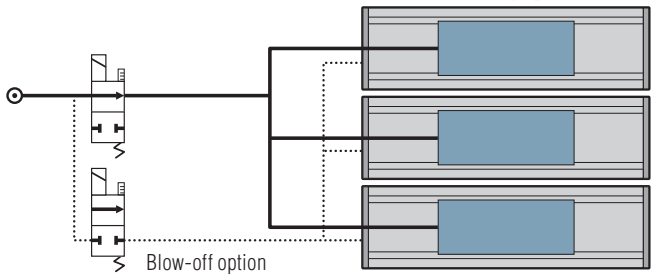
### Integrated vacuum generator, CMS HDE Series

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.



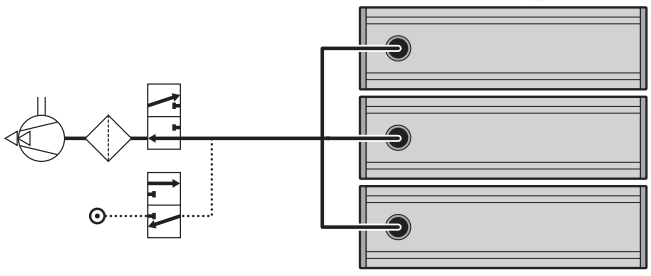



### External vacuum generator

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 (SCFM) | Flow rate (SCFM) | Max. vacuum (%) | Sound level (dBA) |
|---|---|---|---|---|---|
| CVGL_____D1 | CMSHDE__50 | 7.77 | 24.72 | 80 | 59 |
| CVGL_____D2 | CMSHDE__100 | 14.83 | 38.85 | 80 | 62 |
| CVGL_____D3 | 2xCMSHDE__100 | 29.66 | 77.69 | 80 | 65 |

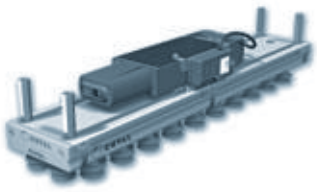
### Generator configurations by vacuum gripper length

| Vacuum generator | CVGL 424 _ | CVGL 624 _ | CVGL 824 _ |
|---|---|---|---|
| G0 | ■ | ■ | ■ |
| CMSHDE__50 (D1 Version) | ■ | – | – |
| CMSHDE__100 (D2 Version) | ■ | ■ | ■ |
| 2xCMSHDE__100 (D3 Version) | – | – | ■ |

# CVGL

## Compact and Light Vacuum Grippers

Integrated Multi-stage Vacuum Pumps

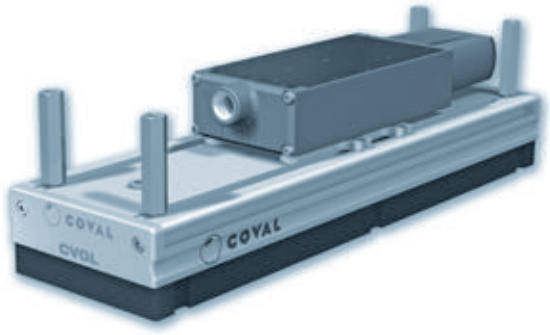


The CVGL vacuum grippers have a wide range of configurations with the CMS HDE Series multi-stage vacuum pumps, allowing for a specialized solution for each application.

### CVGL__D_NOK

CMSHDE_**NVO**G4K multi-stage vacuum pump

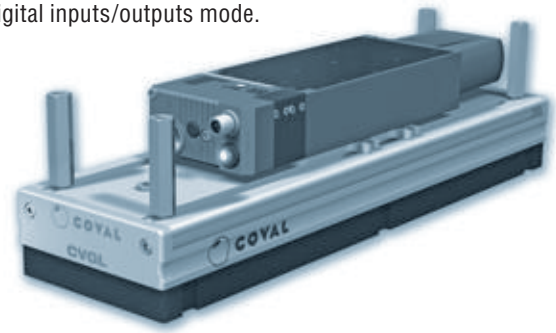
- Without control.



### CVGL__D_S1 / V1K

CMSHDE__**VOC15P**G4K 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__**VXC15P**G4KD 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.

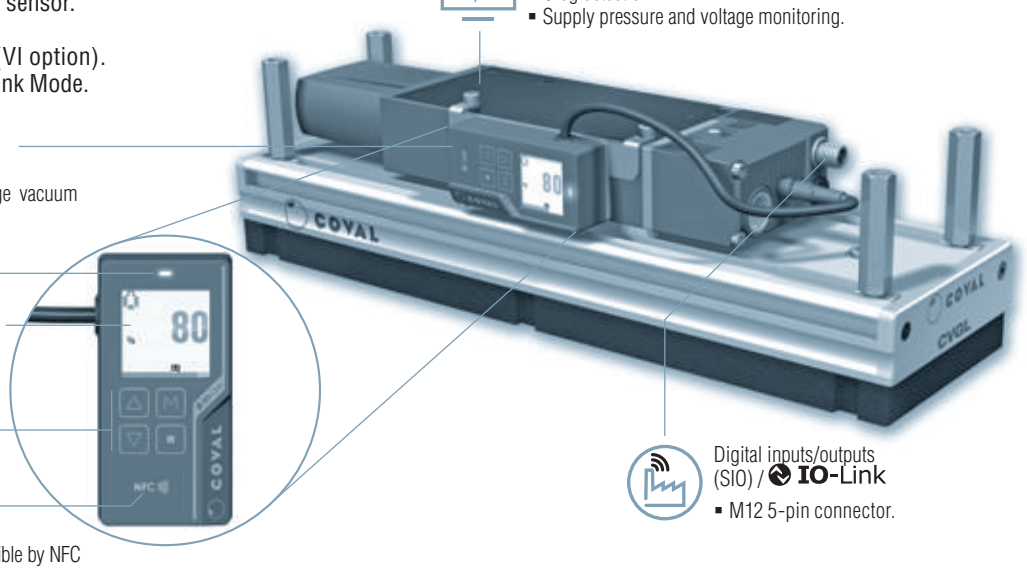
Onboard installation and diagnostic tools:
- Clog detection.
- Supply pressure and voltage monitoring.

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.



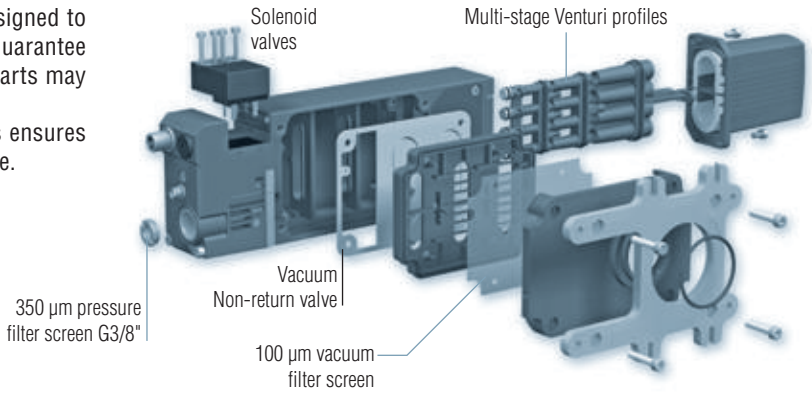

NFC

Straightforward setup and diagnostics made possible by NFC technology and COVAL Vacuum Manager mobile application.

Digital inputs/outputs (SIO) / IO-Link
- M12 5-pin connector.

## Modularity/Maintenance

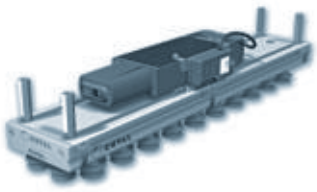
The CMS HDE multi-stage vacuum pumps have been designed to withstand the demands from all your applications and to guarantee a high level of performance. However, handling certain parts may require replacement or cleaning.
The modular design of the CMS HDE multi-stage pumps ensures easy maintenance as the functions are all easily accessible.



# CVGL

## Compact and Light Vacuum Grippers

Straightforward Communication



### 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

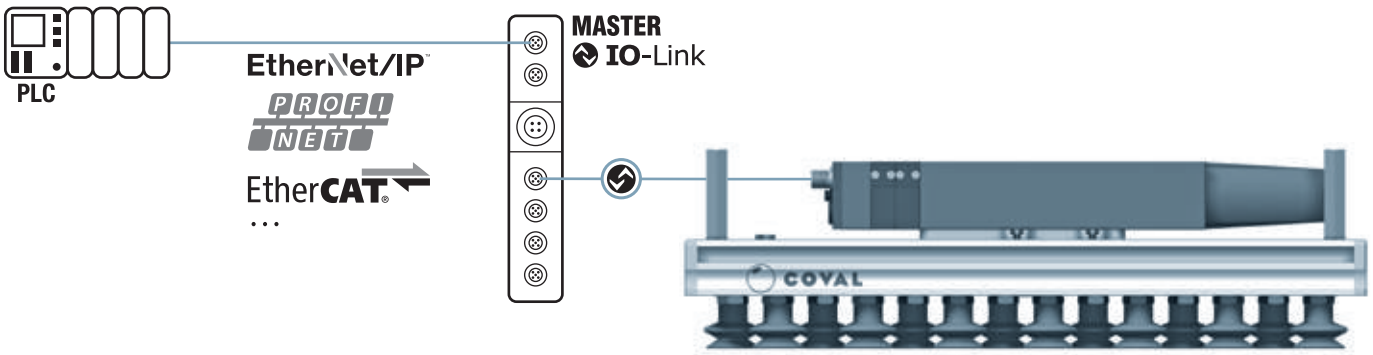
- Instantaneous vacuum level.
- Object gripped and object lost information.
- Alarms (high/low pressure, high/low voltage).
- Instantaneous pressure.

### IO-Link

The IO-Link system provides efficient real-time communication between **CMSHDE_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:**

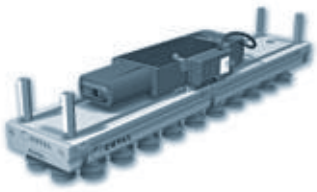
- Straightforward wiring, installation, and setup
- Availability of diagnostic status data
- Simpler preventive maintenance and vacuum pump replacement without manual setup, and more
- Onboard installation and diagnostic tools



# CVGL

## Compact and Light Vacuum Grippers

Straightforward Communication



## Mounted or Remote HMI

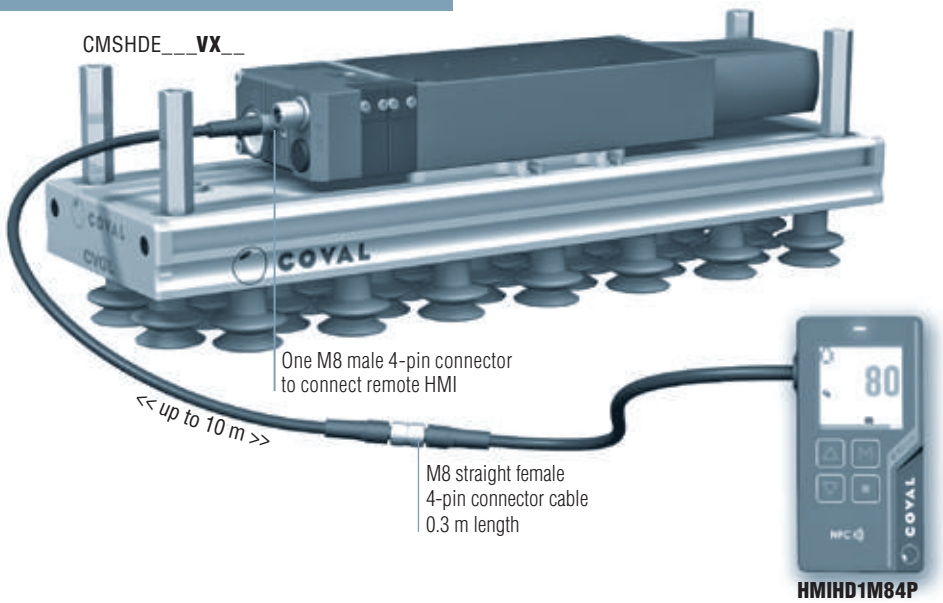
To facilitate the use and configuration of the vacuum generator, the CVGL range has an HMI that can be mounted on the generator or used remotely.

### 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.

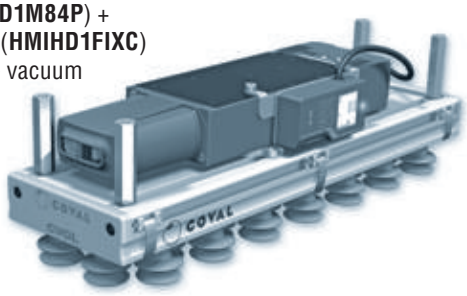
**CVGL vacuum generators compatible with HMI:**

➔ CVGL__**S2** / **V2**___ versions with M8 connector.



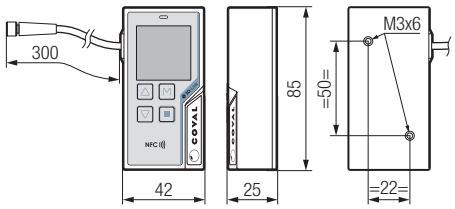

CVGL____**VI** version:

- HMI (ref: **HMIHD1M84P**) + mounting plate (**HMIHD1FIXC**) mounted on the vacuum generator.



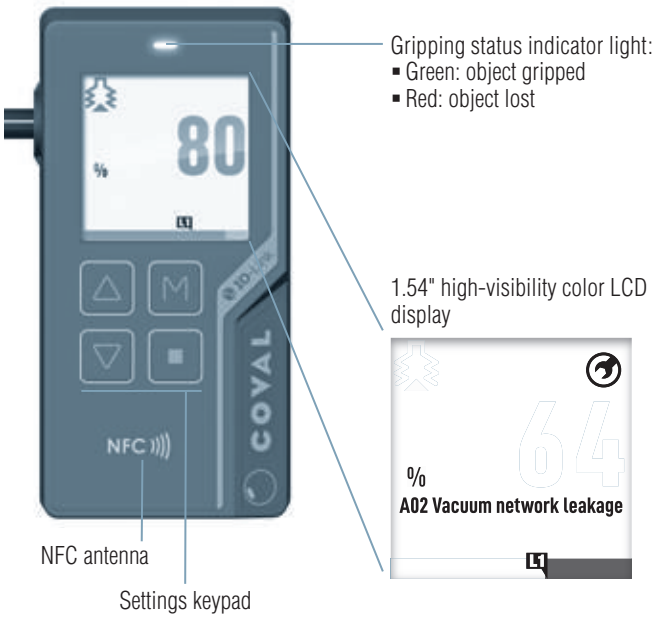
- Accessory: Remote HMI
- Ref: **HMIHD1M84P**

(see accessories for HMI page 13/14).



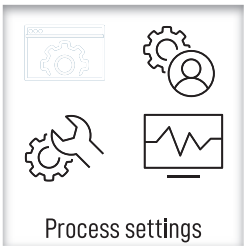

Note: all dimensions are in mm.

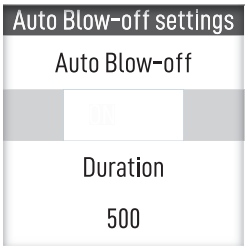
## Remote HMI Dialog Front Panel




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



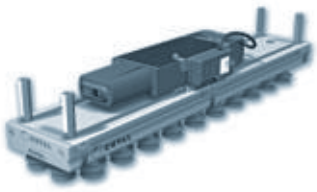




**Multilingual** EN FR DE IT ES

# CVGL

## 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.

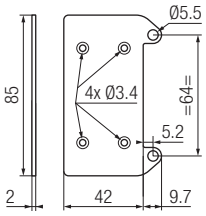
GET IT ON Google Play

Download on the App Store

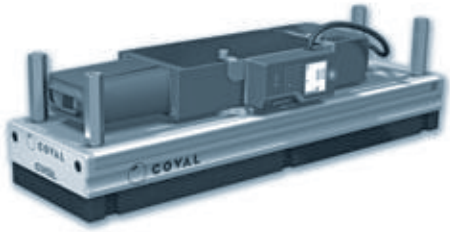
**NFC APP: COVAL Vacuum Manager**
Available for Android and iOS

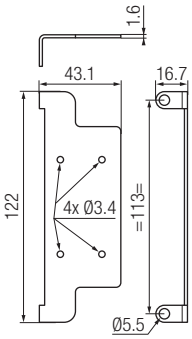
## Accessories for HMI

**Front mounting plate**
+ 2 x M3x6 TORX
+ 2 x M5x50 CHC
Part No.: **HMIHD1FIXA**

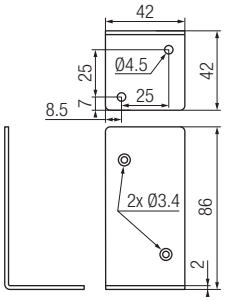



**Side mounting plate**
+ 2 x M3x6 TORX
+ 2 x M5x50 CHC
Part No.: **HMIHD1FIXC**






**90° angled mounting plate**
+ 2 x M3x6 TORX
Part No.: **HMIHD1FIXB**



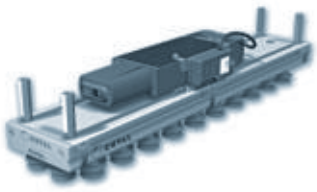

**Connecting cable**
M8 4-pin, female / M8 4-pin, male, compatible with cable chain
- 2 m length: Part No. **CDM8MF4PL2**
- 5 m length: Part No. **CDM8MF4PL5**
- Other lengths available upon request.

Note: all dimensions are in mm.

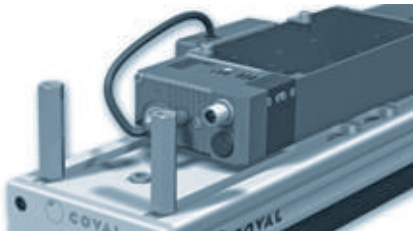
# CVGL

## Compact and Light Vacuum Grippers

Selection guide



### Multi-stage Vacuum Control

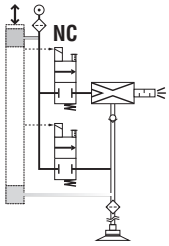


When necessary, the CVGL series vacuum grippers with integrated vacuum generator (versions D1 and D2) can be equipped with a vacuum and/or blow-off control valve to optimize product release. This also enables cleaning of the vacuum network, flow control nozzles, check valves, or airtight valves.
A vacuum 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.

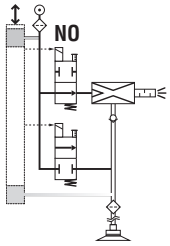
- NC blow-off and vacuum control: solenoid valves
- Choice of blow-off settings (only on CVGL__**S2**_ models):
  - controlled by external signal
  - automatic timer from 50 to 9999 ms (advantage: saves one controller output)




**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.

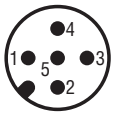
- NO vacuum control solenoid valve
- NC blow-off control solenoid valve
- Blow-off controlled by external signal




### Electrical Connections

**CVGL _ S1 / V1**:

- One M12 5-pin male connector



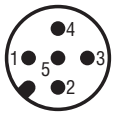

| | |
|---|---|
| 1 | / |
| 2 | 24 V DC suction command (1) |
| 3 | 0 V - GND |
| 4 | 24 V DC blow-off command |
| 5 | / |

: connections for IO-Link

(1) *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 (1) |
| 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 DC |
| 2 | RS485 (DATA+) |
| 3 | 0 V - GND |
| 4 | RS485 (DATA-) |

### Vacuum Level Display

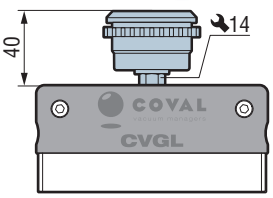
When required, CVGL series grippers can incorporate a vacuum level display with an electronic vacuum switch or vacuum gauge:

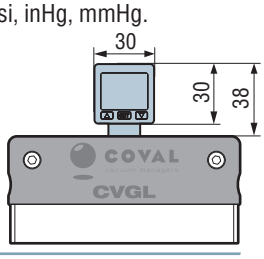
■ **Option VA - electronic vacuum switch with 3-color display** (PSD100CPNP):
CVGL _ _ _ _ _ X _ _ **VA**

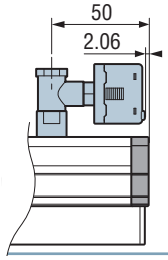
- Pressure rating range: 0 ~ -101.3 kPa.
- Pressure setting range: 10 ~ -101.3 kPa.
- Max. pressure: 300 kPa.
- Fluid: Air, non-corrosive/non-flammable gas.
- Hysteresis: adjustable.
- Response time: ≤ 2.5ms, with anti-vibration function.
- 7 segment LCD display: 2 color (red/green) main display, orange sub-display (refresh rate: 5 times/1sec.)
- Choice of pressure unit display: kPa, MPa, kgf/cm², bar, psi, inHg, mmHg.
- Power supply voltage: 12 to 24 V DC ±10%.
- Current consumption: ≤ 40 mA (without load).
- Repeatability (switch ouptut): ≤ ±0.2% F.S. ±1 digit.
- Electrical connection: M8 (4-pin).
- Protection: IP40.
- Ambient temperature range: 32 – 122 °F (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



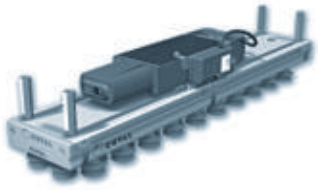




Note: all dimensions are in mm.

# CVGL

## Compact and Light Vacuum Grippers

Configuring a CVGL Vacuum Gripper



| CVGL | 424 | D | | VSA33JK | X | | H | X | |
|---|---|---|---|---|---|---|---|---|---|

| OVERALL LENGTH | |
|---|---|
| 424 mm | 424 |
| 624 mm | 624 |
| 824 mm | 824 |

| HOLE/CUP PATTERN LAYOUT | |
|---|---|
| Staggered | Q |
| Straight* | D |

** Only available for "maxi" type gripping interface with minimum suction cup Ø 26mm.*

| ASSEMBLY TYPE | |
|---|---|
| X | Screw mounting |
| C | Quick-mounting spring clips |

| 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 |
| | | | | V | Check valves |

**COVAL-flex GRIPPING INTERFACES**

"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.

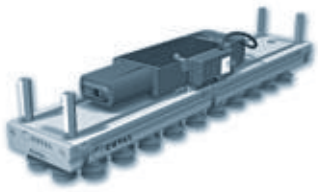
### SPECIAL VERSIONS

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.

# CVGL

## Compact and Light Vacuum Grippers

Configuring a CVGL Vacuum Gripper



| D1 | S | | 1 | | K | | VA |
|---|---|---|---|---|---|---|---|

### VERSION WITHOUT VACUUM GENERATOR

| | |
|---|---|
| Without vacuum generator | **G0** |

### GENERATOR CONTROL

| | |
|---|---|
| **N** | Without |

### GENERATOR CONFIGURATION

| | |
|---|---|
| **0** | Without |

### EXHAUST

| | |
|---|---|
| **X** | Without |

### VERSIONS WITH VACUUM GENERATOR*

| | |
|---|---|
| 1 x **CMSHDE_50** multi-stage vacuum pump Flow rate: 24.72 SCFM | **D1** |
| 1 x **CMSHDE_100** multi-stage vacuum pump Flow rate: 38.85 SCFM | **D2** |
| 2 x **CMSHDE_100** multi-stage vacuum pump Flow rate: 77.69 SCFM | **D3** |

** See p.13/10 table of possible configurations*

### GENERATOR CONTROL

| | |
|---|---|
| **N** | Without |
| **S*** | **CMSHDE__S_**<br>Vacuum pump with **NC** vacuum control and **NC** blow-off control.<br>Choice of blow-off settings (only on CVGL__**S2**_models):<br>▪ Controlled by external signal<br>▪ Automatic timer from 50 to 9999 ms (advantage: saves one controller output). |
| **V*** | **CMSHDE__V_**<br>Vacuum pump with **NO** vacuum control and **NC** blow-off control.<br>▪ Blow-off controlled by external signal |

** Only for D1 and D2.*

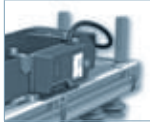
### GENERATOR CONFIGURATION

| | |
|---|---|
| **0** | Without |
| **1** | **CMSHDE___VOC15P_**<br>Multi-stage vacuum pump without vacuum switch and HMI<br>▪ One M12 5-pin male PNP<br>▪ Digital inputs/ outputs mode (SIO) |
| **2** | **CMSHDE___VXC15X_**<br>Multi-stage vacuum pump with integrated vacuum switch and pressure sensor, without HMI<br>▪ One M12 5-pin male configurable as PNP or NPN<br>▪ One M8 4-pin male for remote HMI<br>▪ Electronic vacuum switch<br>▪ Digital Output DO1 "object gripped" 24 V DC / NO<br>▪ Digital input/ outputs mode (SIO) / IO-Link<br>▪ Compatible with HMI (for VI option) |

### EXHAUST

| | |
|---|---|
| **K** | Through-type silencer |

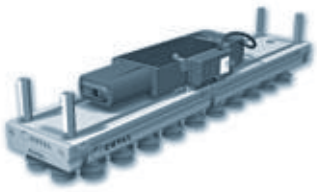
### VACUUM LEVEL DISPLAY

| | |
|---|---|
| Without | **VO** |
| Vacuum switch with electronic display | **VA** |
| Vacuum gauge *(for versions with control, option available for 624 mm in length and longer)* | **VF** |
|  HMI on CMS HDE *(compatible with S2 and V2 versions only)* | **VI** |

# CVGL

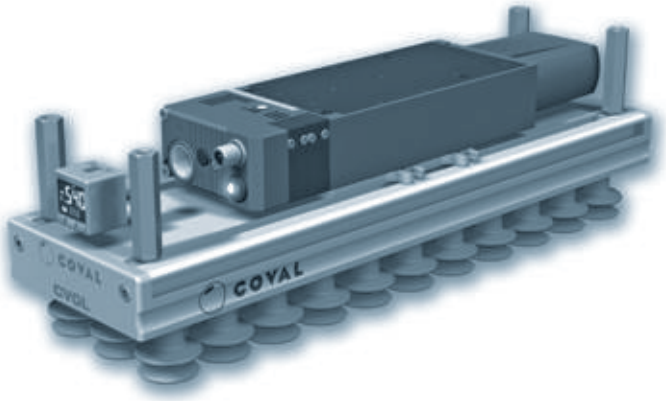
## Compact and Light Vacuum Grippers

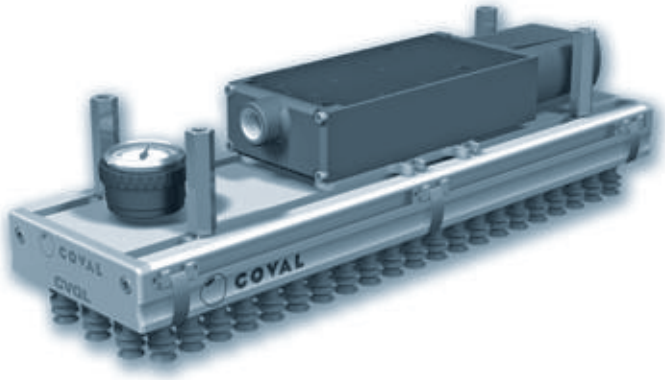
Examples of Composed Part Numbers



**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.



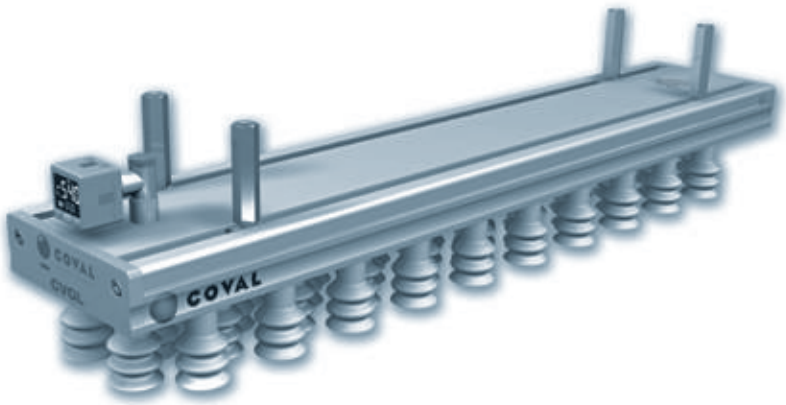


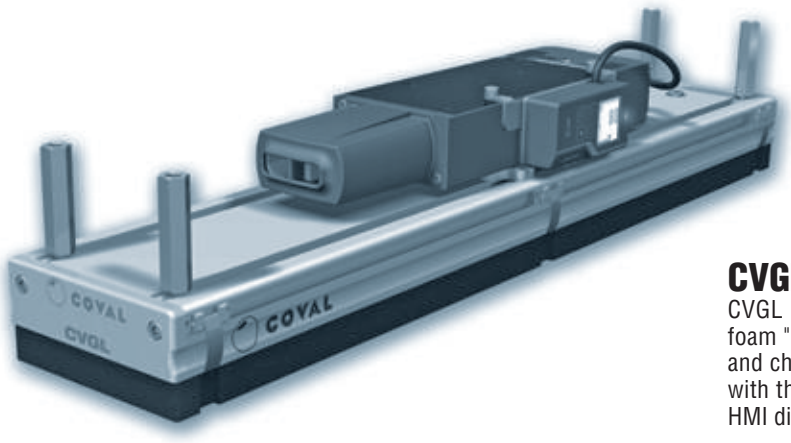
**CVGL424QVSP14BFXHCD1N0KVF**

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.

**CVGL624QMVS30EKXHXG0N0XVA**

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.





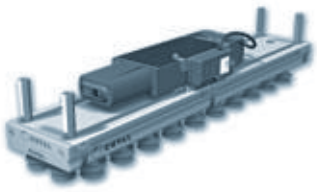
**CVGL624QF2BFVD2S2KVI**

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.

# CVGL

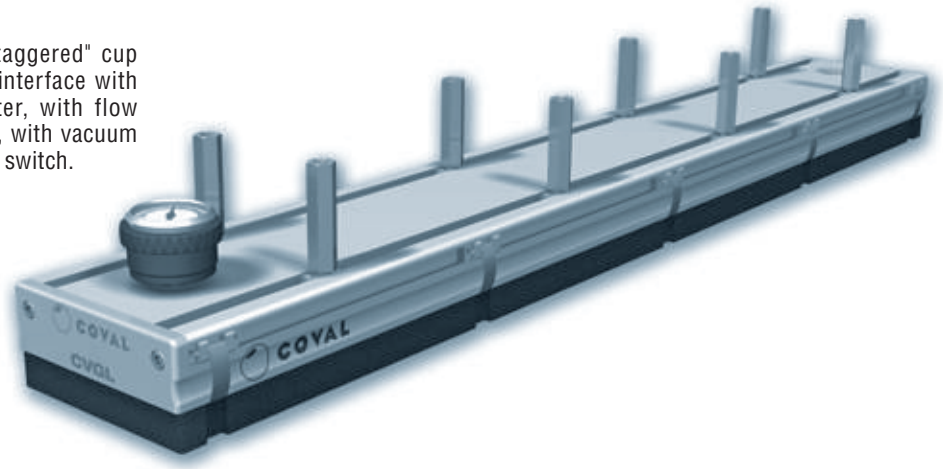
## Compact and Light Vacuum Grippers

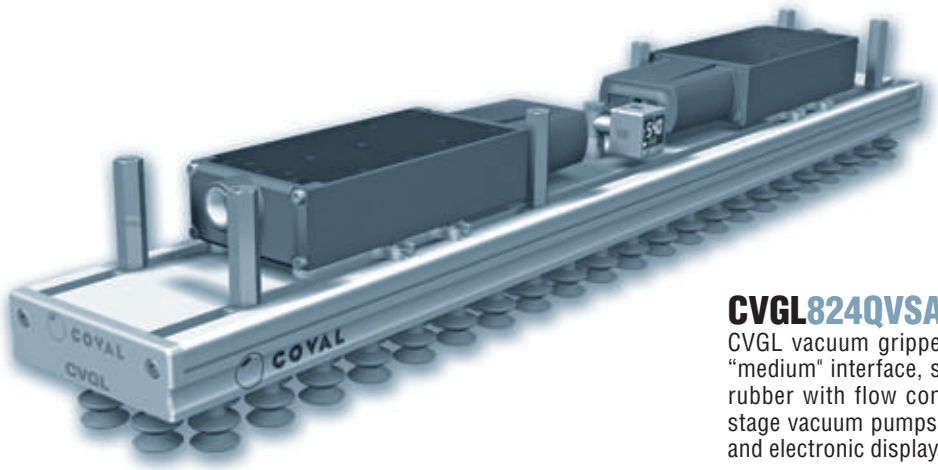
Examples of Composed Part Numbers



### CVGL824QF2SXHCG0N0XVF

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.




### CVGL824QVSA25JIXHXD3N0KVA

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 CMSHDE_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**.

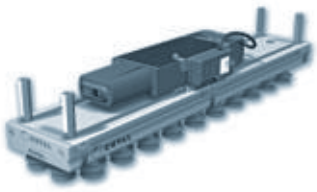
Thanks to their modularity, the MVG vacuum grippers offer the optimal handling solution for various sizes, shapes, and weights.

- 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.

# CVGL

## Compact and Light Vacuum Grippers

Dimensions and Mounting Options



### G0 versions

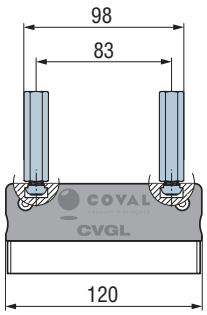
**(with external vacuum generator).**

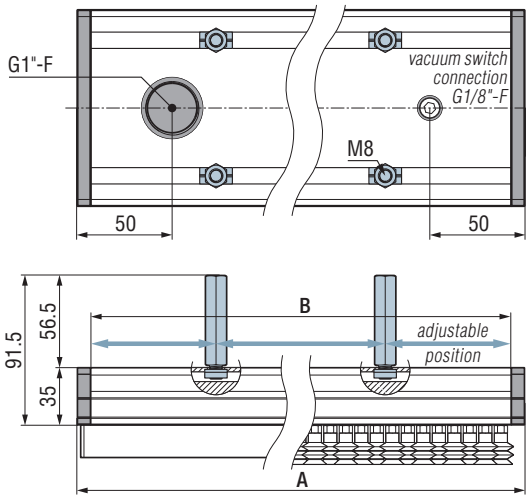
The COVAL CVGL series vacuum grippers G0 version (with external vacuum generator), can be mounted on all types of automated or robotic systems, via M8 spacers, sliding in the grooves of the aluminum profile.

- 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

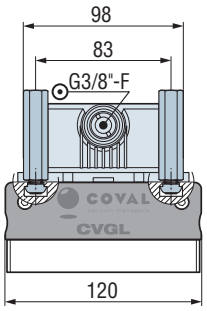
**(1 integrated vacuum generator, CMS HDE series).**

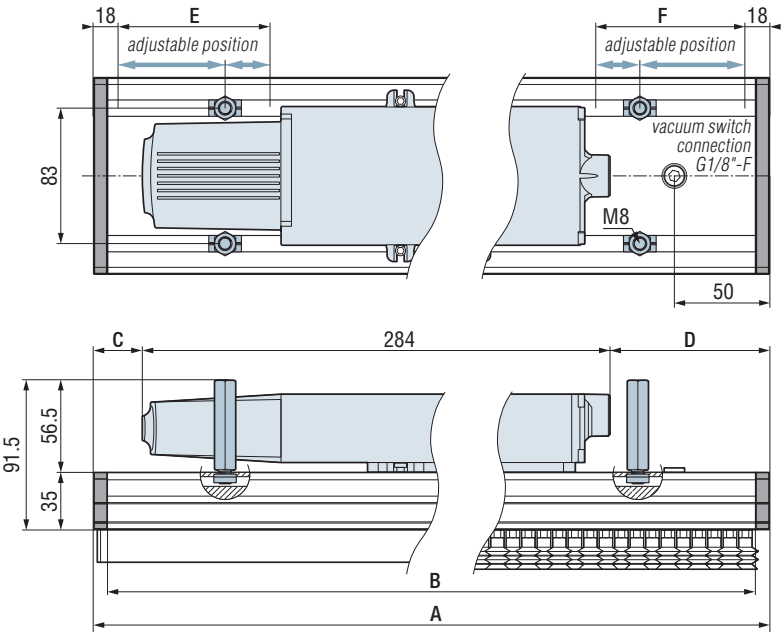
The COVAL CVGL series vacuum grippers, D1 and D2 versions, are mounted on all types of automated systems via M8 spacers pre-installed on sliding nuts.

- 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 |





3D COVAL Data

You can access 3D files of all our products in formats compatible with the main CAD software on our website

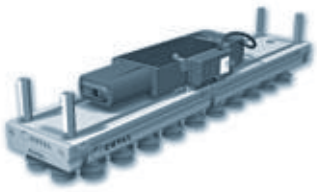
**www.coval.com**


Note: all dimensions are in mm.

# CVGL

## Compact and Light Vacuum Grippers

Dimensions and Mounting Options

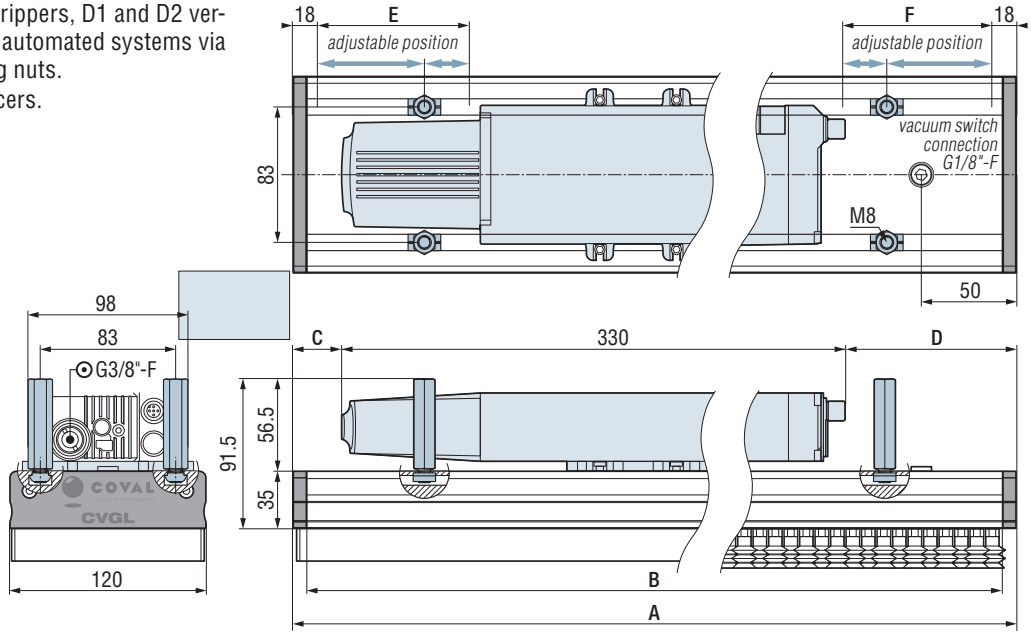


### D1 or D2 versions, with control

**(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

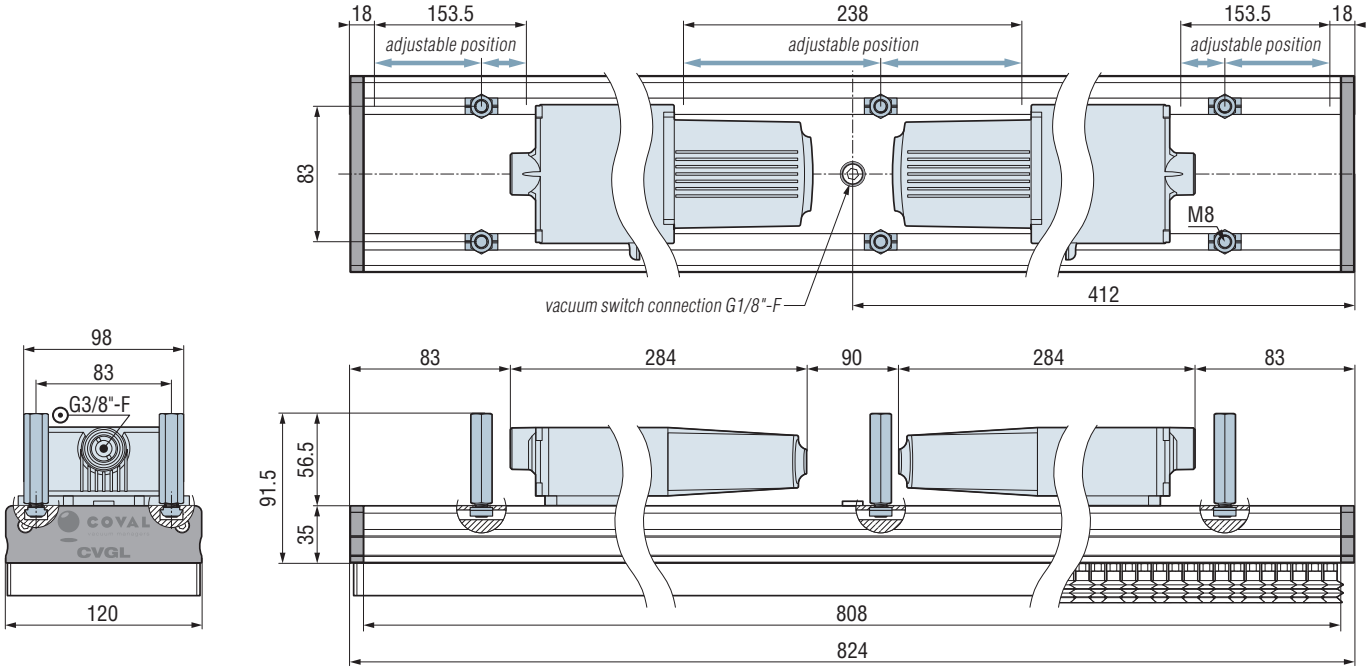
| | CVGL424 | CVGL624 | CVGL824 |
|---|---|---|---|
| A | 424 | 624 | 824 |
| B | 408 | 608 | 808 |
| C | 15 | 134 | 234 |
| D | 78 | 160 | 260 |
| E | 76 | 194 | 294 |
| F | 47 | 129 | 229 |

### 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.

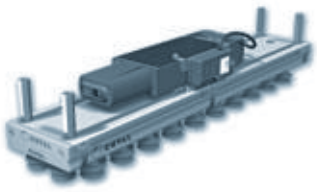



Note: all dimensions are in mm.

# CVGL

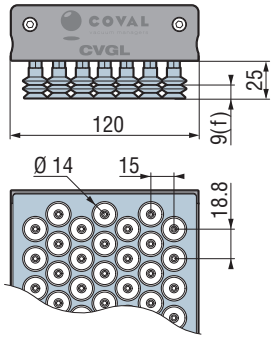
## Compact and Light Vacuum Grippers

Gripping Interfaces and Characteristics

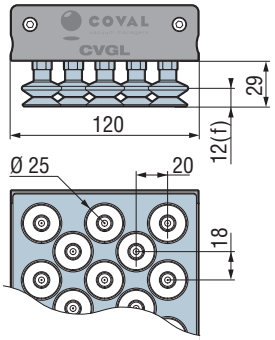


## CVGL Series with Suction Cup Gripping Interface

**"MINI" type suction cup gripping interface**



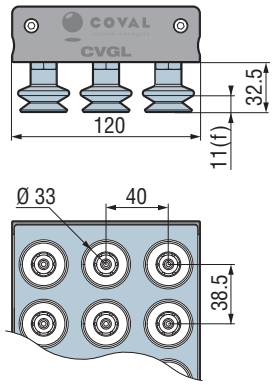

**"MEDIUM" type suction cup gripping interface**



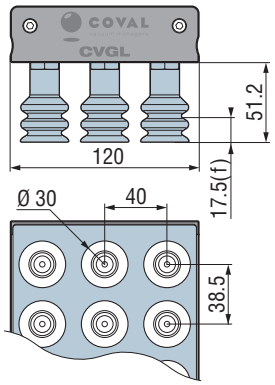

f: suction cup deflection

**"MAXI" type suction cup gripping interface, STRAIGHT PATTERN**

model VSA33

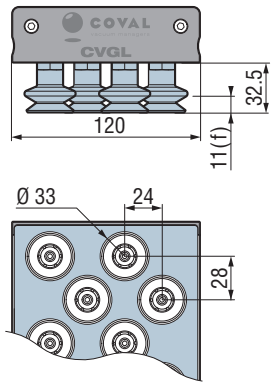



model MVS30

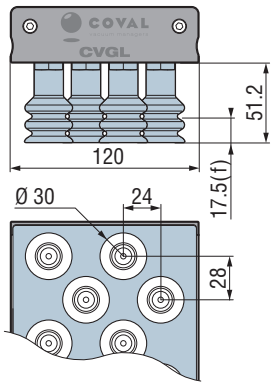



**"MAXI" type suction cup gripping interface, STAGGERED PATTERN**

model VSA33



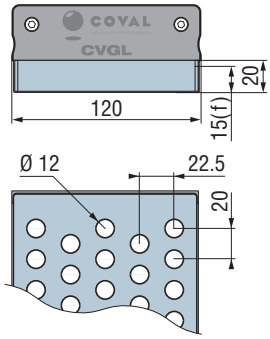

model MVS30



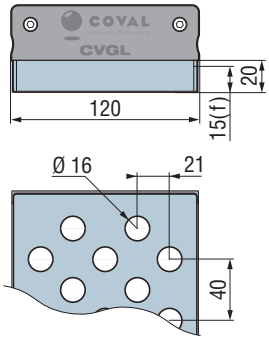

| NUMBER OF SUCTION CUPS PER GRIPPING INTERFACE | CVGL424 | CVGL624 | CVGL824 |
|---|---|---|---|
| "Mini" type suction cup Ø14 mm (Ø16 mm max.) | 150 | 220 | 297 |
| "Medium" type suction cup Ø25 mm (Ø18 to 25 mm) | 55 | 83 | 113 |
| "Maxi" type, STRAIGHT pattern Ø30 or Ø33 mm suction cups (Ø36 mm max.) | 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**

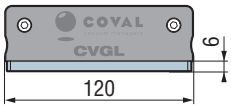



f: foam compression

| 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 |

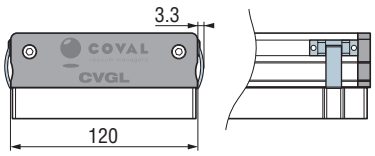
## CVGL Series with "COVAL-flex" Gripping Interface

COVAL-flex



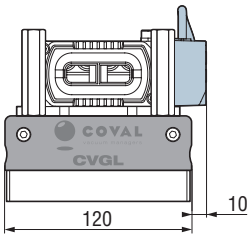

## Option: quick installation of the interface

Option: CVGL ____**C**__
quick installation of the interface via spring clips




## Option: HMI mounted on the vacuum generator

Option: CVGL ____**VI**

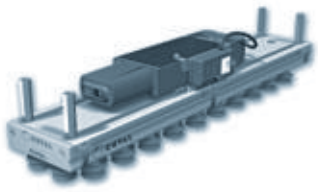



Note: all dimensions are in mm.

# CVGL

## Compact and Light Vacuum Grippers

Technical specifications



### General Characteristics

- Temperature: from 32 to 122° F (0 to 50°C).
- 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:
  - CMSHDE_**NVO** (for CVGL_**G0N**_ grippers) without control: 5.5 bar.
  - CMSHDE_**S**_/ CMSHDE_**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: 24.72 to 77.69 SCFM
- Air consumption: 7.77 to 29.66 SCFM
- 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 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 CMSHDE___**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 CMSHDE___**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 CMSHDE__**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 CMSHDE___**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

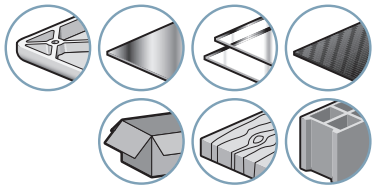
COVAL's MVG series vacuum grippers fully meet integrator and end user expectations in terms of power, robustness, communication, and ease of setup and use, while they remain compact and lightweight for easier integration in a smart factory.

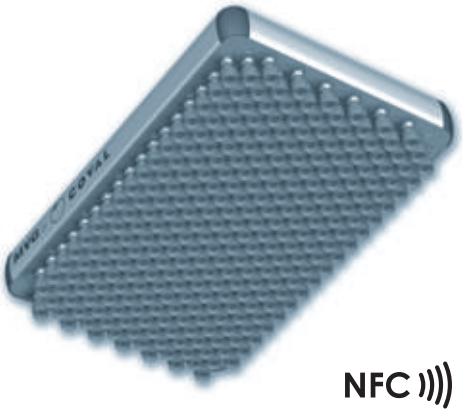
Their highly modular and flexible design makes them an optimal solution for handling objects of various sizes, shapes, and weights.

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 repairability.

Next generation CMS HDE multi-stage vacuum pumps thus further increase the reliability of MVG series vacuum grippers and their adaptability.

Industry-specific applications





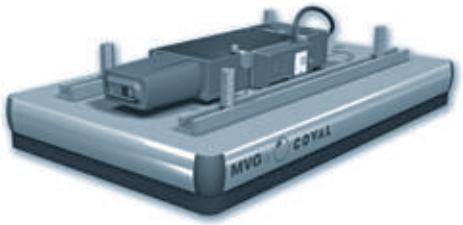
### Custom Made by Design

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.

NFC

IO-Link



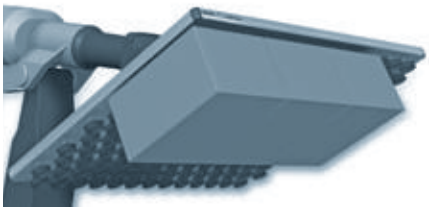
### Advantages

- 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



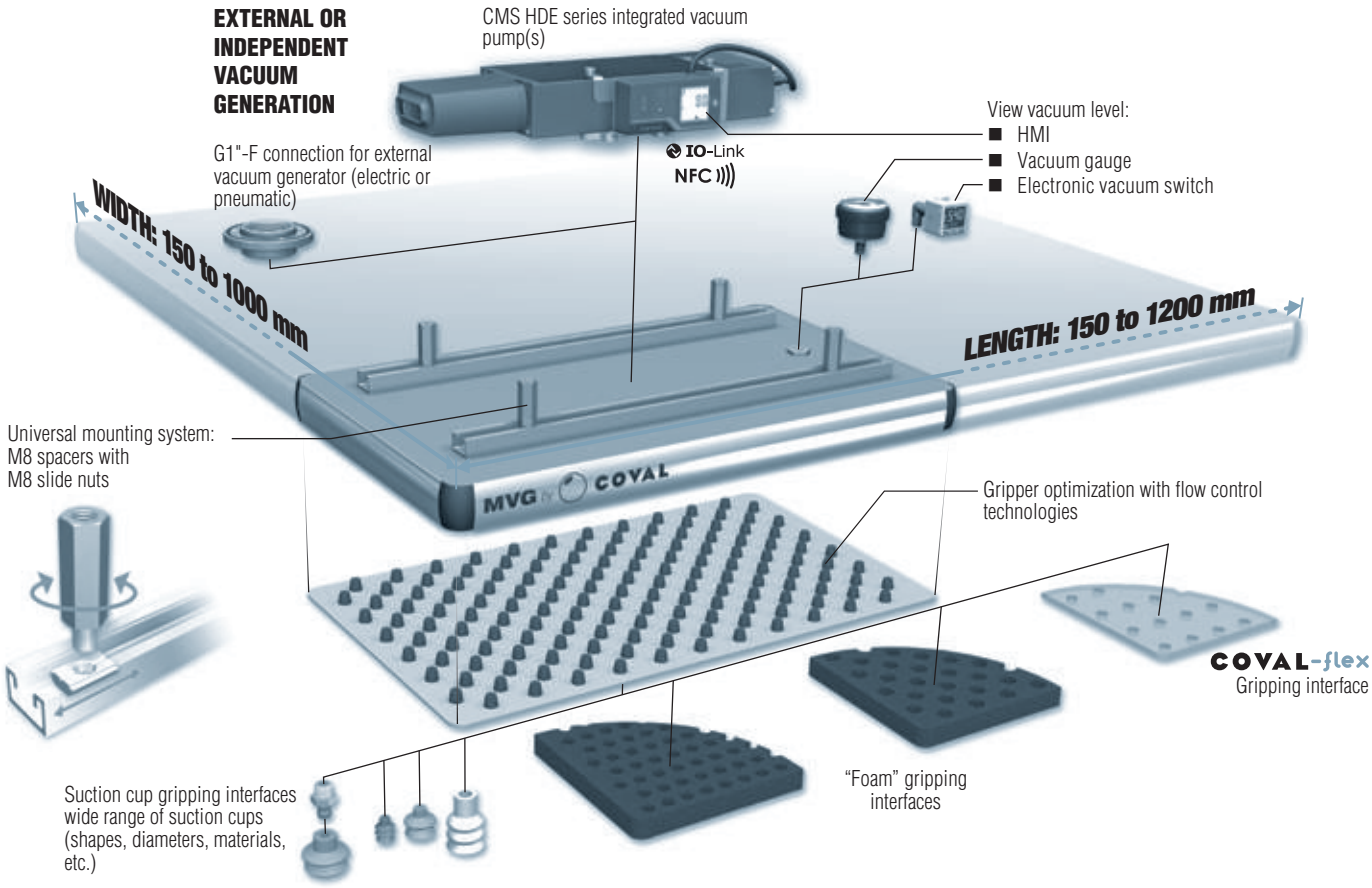
# MVG
## Modular Vacuum Grippers
General Information

**Custom sizes**
From 150 x 150 to 1200 x 1000 mm

**Ultra-lightweight**
Reduced payload weight

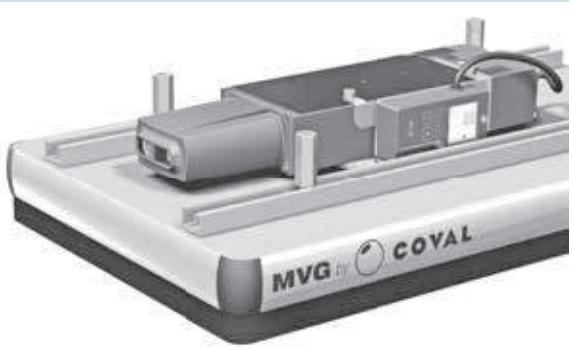
**Configurable gripping interface**
depending on the products to be handled

**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

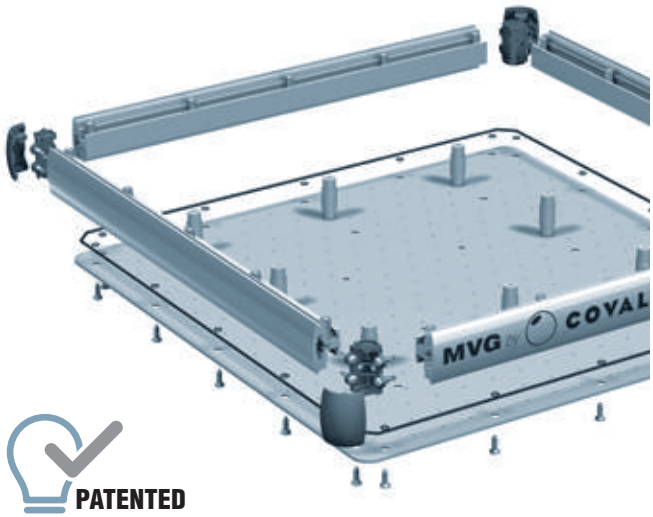
Ultra-Lightweight and Multi-Zone Design

### 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.



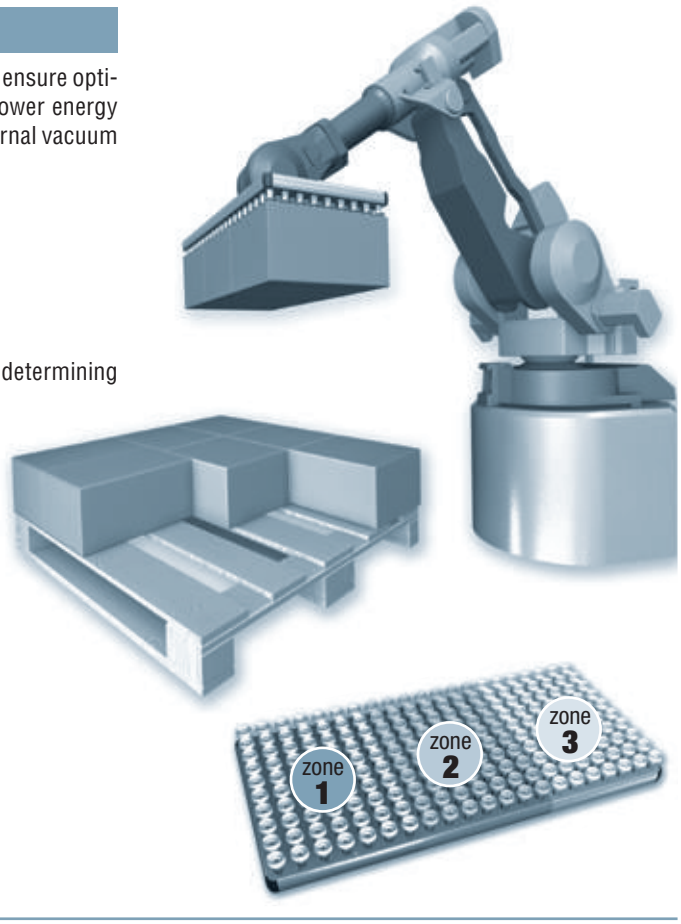

**PATENTED TECHNOLOGY**

### Multi-Zone

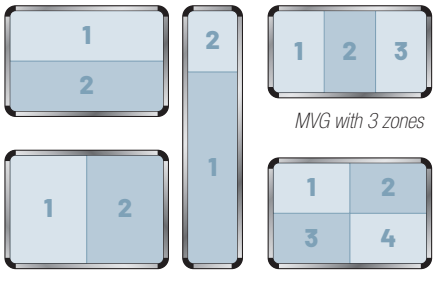
Independent gripping zones can be created on MVG vacuum grippers to ensure optimized vacuum management (higher vacuum levels, fewer leaks, and lower energy consumption). To achieve this, each zone has its own integrated or external vacuum generator.

- ➔ 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 3 zones*

*MVG with 2 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.

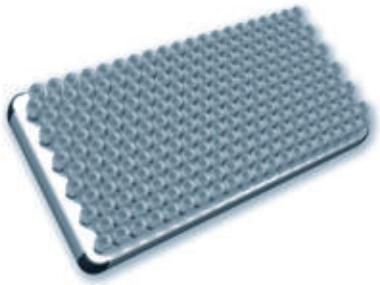
## Choice of Gripping Interface

### "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



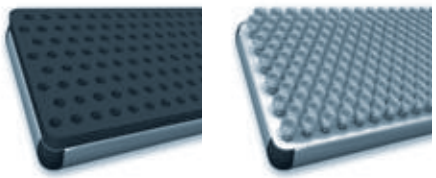
### "COVAL-flex" Interface

- Handle aluminum cans, canned food, glass containers, etc.
- Flexible, extremely tear-resistant interface
- Grip pattern fully customizable according to the application

## Grip Patterns

### "MINI"

- Reduced hole spacing, to grip smaller objects
- Tight grip pattern ensures a strong hold, even with randomly placed objects

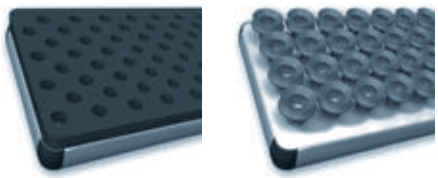


### "MEDIUM"

- 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

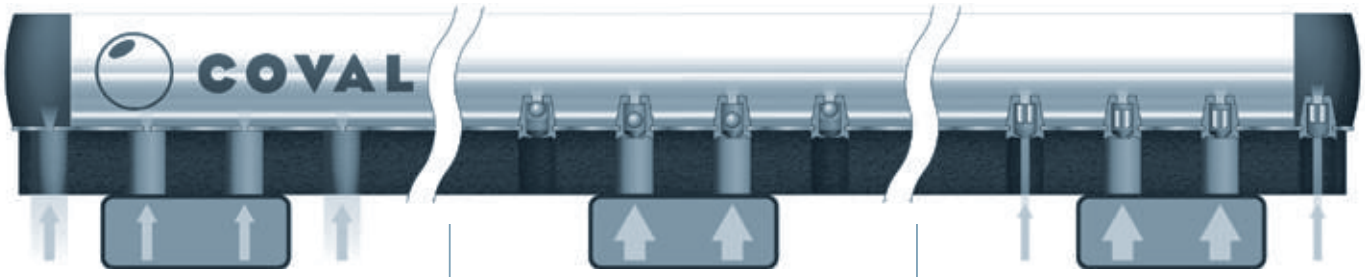


# MVG
## Modular Vacuum Grippers
Integrated Technologies

## 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.




### Flow control nozzles
- Limits the leakage rate in uncovered areas
- Cost-effective solution
- Customizable calibration
- Horizontal and vertical handling

### Airtight valves *(COVAL patent)*
- Isolates uncovered areas
- Saves energy
- Meets specific needs
- Instant gripping
- Quick release with blow-off
- Horizontal handling

### Check valves *(COVAL patent)*
- Limits the leakage rate in uncovered areas
- Instant gripping
- Highly versatile applications
- Quick release with blow-off
- Horizontal handling

## Vacuum Generation

### Integrated vacuum generator, CMS HDE series

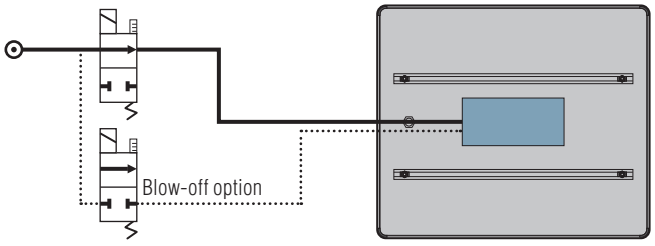
Integrating a multi-stage vacuum generator on the MVG gripper provides a comprehensive and compact gripping solution, and ensures easy integration in your process.
Options: add a vacuum and/or blow-off control valve with M12 connector and a vacuum level display (electronic vacuum switch display or vacuum gauge), or an HMI with LCD display.

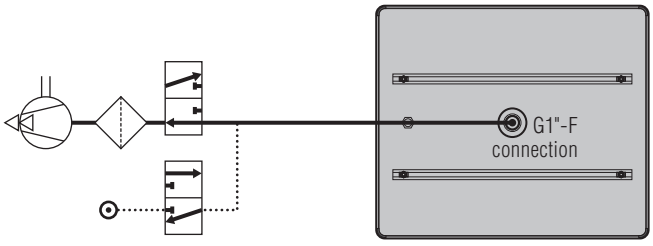
**Advantages:**
- A comprehensive solution
- 3 levels of suction power
- Option: vacuum and blow-off control
- Option: vacuum level display
- Option: IO-Link communication interface

### 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 (SCFM) | Flow rate (SCFM) | Max. vacuum (%) | Noise level (dBA) |
|---|---|---|---|---|---|
| MVG_____D1 | CMSHDE__50 | 7.77 | 24.72 | 80 | 59 |
| MVG_____D2 | CMSHDE__100 | 14.83 | 38.85 | 80 | 62 |
| MVG_____D3 | 2xCMSHDE__100 | 29.66 | 77.69 | 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

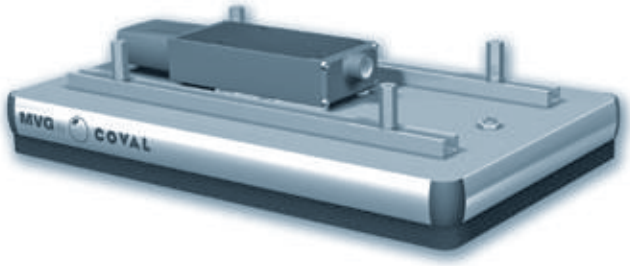
Integrated Multi-Stage Vacuum Pumps

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_**NVO**G4K multi-stage vacuum pump

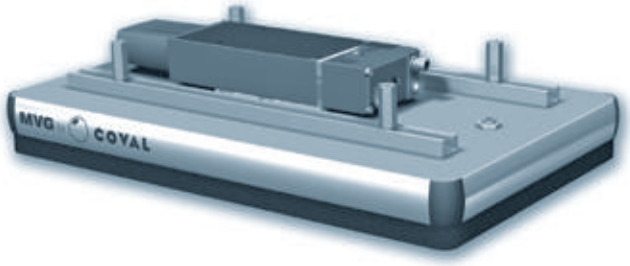
- Without control



### MVG__D_S1 / V1K

CMSHDE__**VOC15P**G4K 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

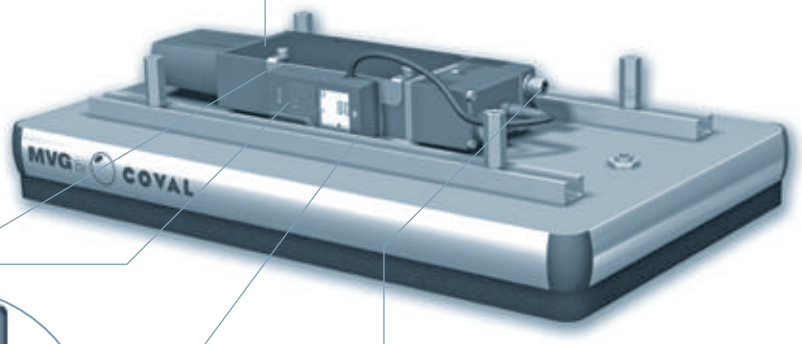


### MVG__D_S2 / V2K

CMSHDE__**VXC15P**G4KD 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

Onboard installation and diagnostic tools:
- Vacuum network clogging detection
- Supply pressure and voltage monitoring



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

Inputs/Outputs
Digital inputs/outputs (SIO)/ IO-Link
- M12 5-pin connector

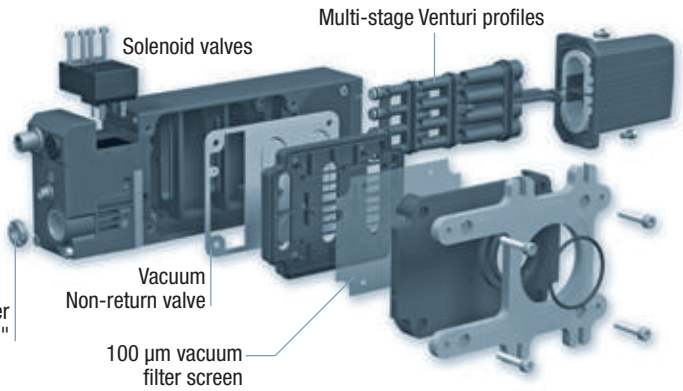
NFC

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.



# 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

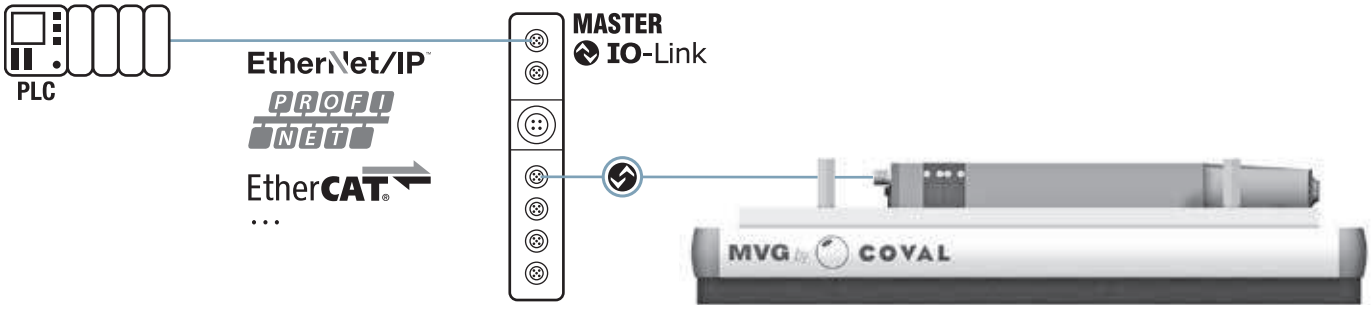
- Instantaneous vacuum level
- Object gripped and object lost information
- Alarms (high/low pressure, high/low voltage)
- Instantaneous pressure level

### 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

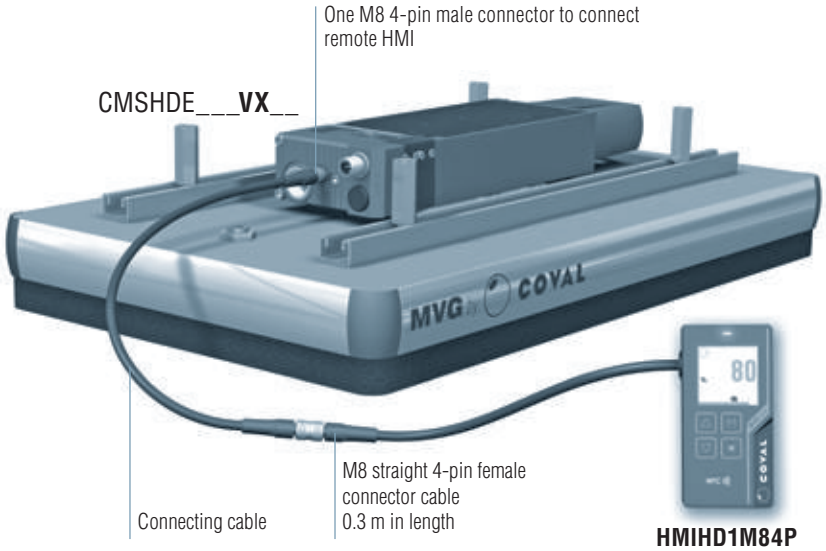
To make it easier to set up and use the vacuum grippers, the MVG range includes an HMI that can be mounted on the vacuum gripper or installed remotely.

### 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

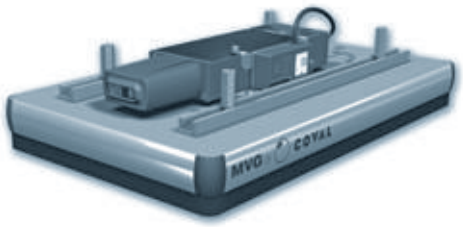
**MVG vacuum grippers compatible with the HMI:**

➔ MVG__**S2** / **V2**___versions with M8 connector

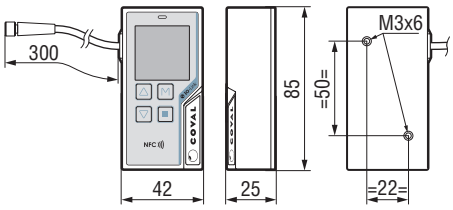



MVG____**VI** version:

- HMI (part no.: **HMIHD1M84P**) + mounting plate (**HMIHD1FIXC**) mounted on the vacuum gripper



Accessory: Remote HMI (part no.: **HMIHD1M84P**)
See accessories for HMI.

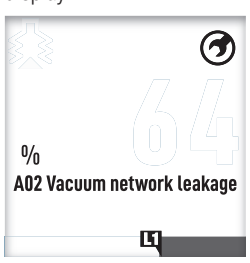



*Note: all dimensions are in mm.*

## HMI Dialog Front Panel

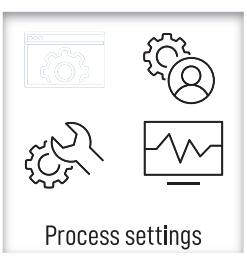
Gripping status indicator light:
- Green: object gripped
- Red: object lost

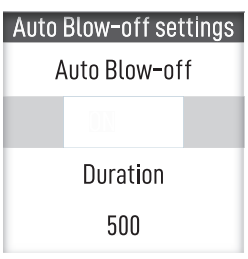
1.54" high-visibility color LCD display




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.

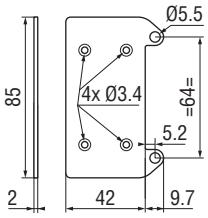
GET IT ON Google Play

Download on the App Store

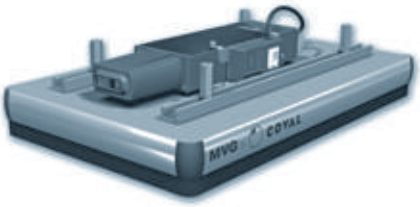
**NFC APP: COVAL Vacuum Manager**
Available for Android and iOS

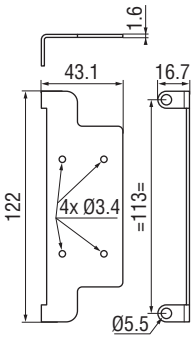
## Accessories for Remote HMI

**Front mounting plate**
+ 2 x TORX M3x6
+ 2 x CHC M5x50
Part no.: **HMIHD1FIXA**

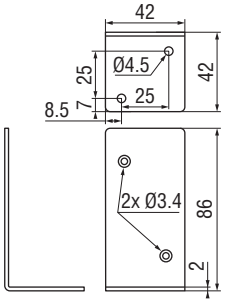



**Side mounting plate**
+ 2 x TORX M3x6
+ 2 x CHC M5x50
Part no.: **HMIHD1FIXC**






**90° angled mounting plate**
+ 2 x TORX M3x6
Part no.: **HMIHD1FIXB**

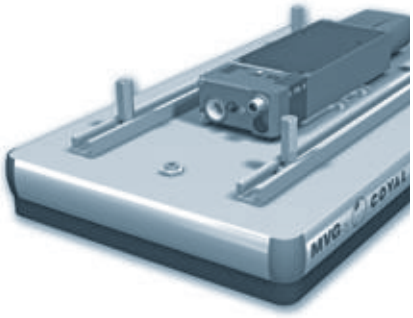



**Connecting cable**
M8 4-pin female/M8 4-pin male, compatible with cable chain

- 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



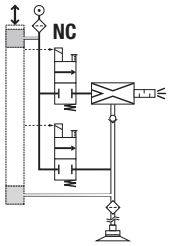
### Multi-Stage Vacuum Pump Control

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

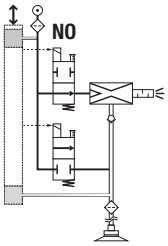
Model MVG__**S**_: vacuum gripper featuring a vacuum pump with **NC** vacuum control and **NC** blow-off control.
In the event of power failure, vacuum is no longer generated. In the event of compressed air failure, the vacuum is no longer maintained.




- 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 (1) |
| **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 (1) |
| **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+) |

(1) *24 V DC suction command, depending on version:*
- ***S**: 24 V DC vacuum control*
- ***V**: 24 V DC vacuum off command*

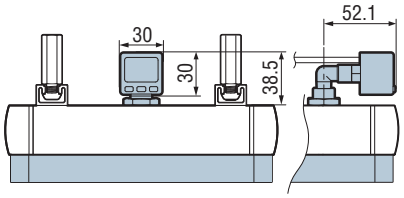
*: connections for* **IO**-Link

# MVG
## Modular Vacuum Grippers
Options, Dimensions, and Mounting Options

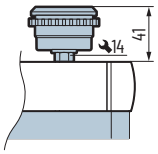
### Vacuum Level Display

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: ≤ 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/cm2, 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)
  - Degree of protection: IP40
  - Operating temperature: 32 - 122° F (0 – 50 °C)
  - Enclosure material: PA 6.6 20%GF



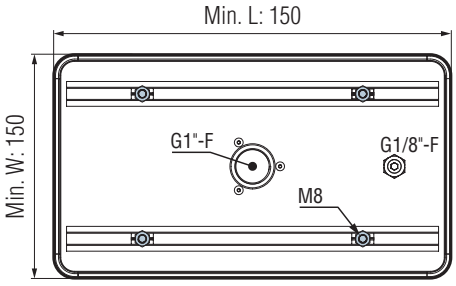
- **Option VF – vacuum gauge (VAF11140): MVG_____X__VF**
  - Damping: by silicone movement (patented)
  - Measuring: Bourdon tube in CuSn
  - Precision: cl. 2.5 (+/- 2.5% of max. scale value)
  - Enclosure: black ABS

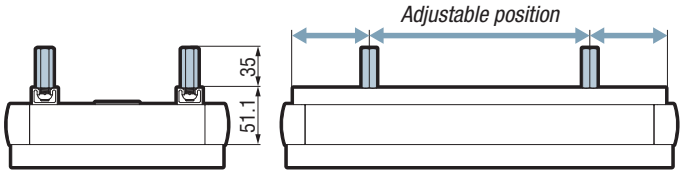


- **Option VI - IHM : MVG_____X__VI**

### Version G0

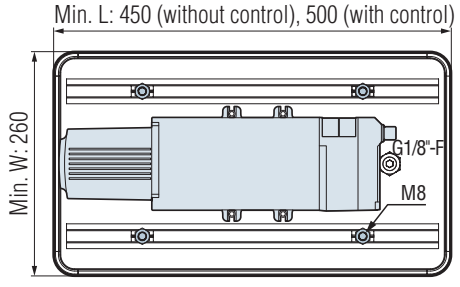
The G0 version of COVAL MVG series vacuum grippers (with external vacuum generator) can be mounted on all types of automated or robotic systems, using M8 spacers that slide in the grooves on the aluminum profile (fastened using M8 screws).
The number of M8 spacers used depends on the vacuum gripper's size.

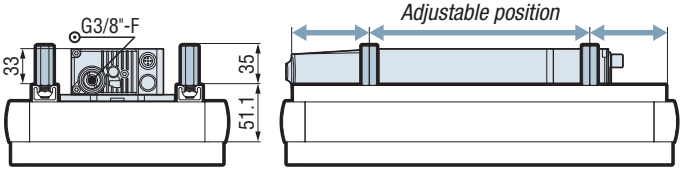



### Version D1 or D2

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.



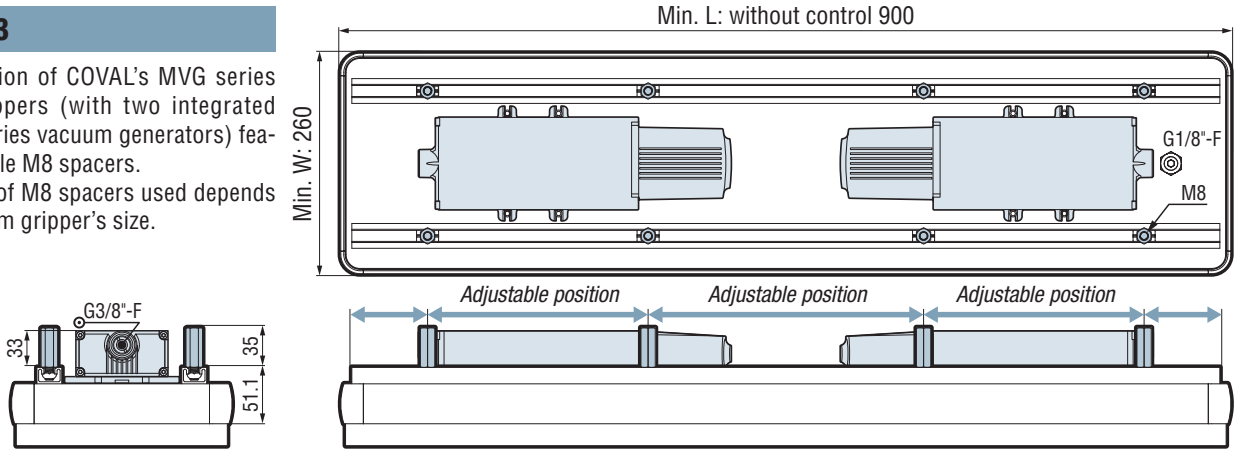

3D COVAL Data — You can access 3D files of all COVAL products in formats compatible with the main CAD software on COVAL's website **www.coval.com**

*Note: all dimensions are in mm. Dimensions are indicative and may change depending on selected options.*

# MVG
## Modular Vacuum Grippers
Dimensions and Mounting Options

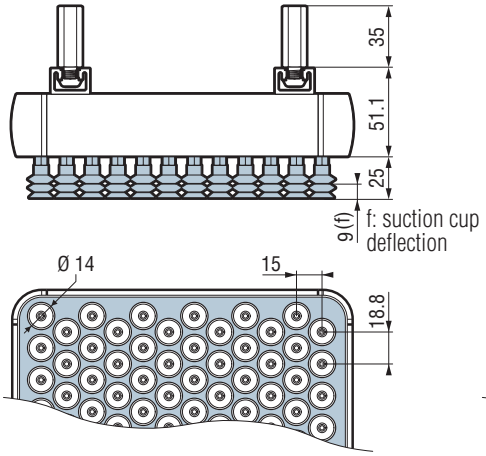
### Version D3

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.

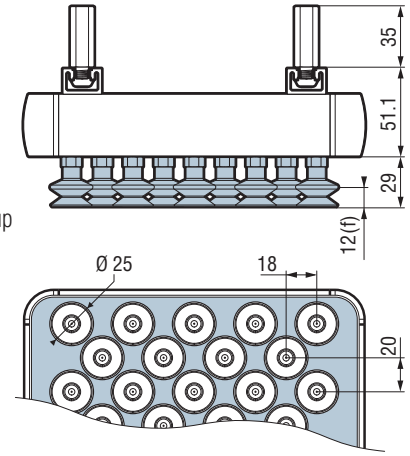



### MVG Series with Suction Cup Gripping Interface

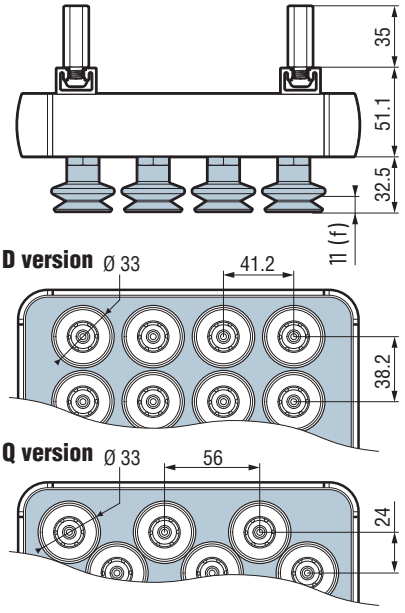
**"Mini" suction cup interface**




**"Medium" suction cup interface**

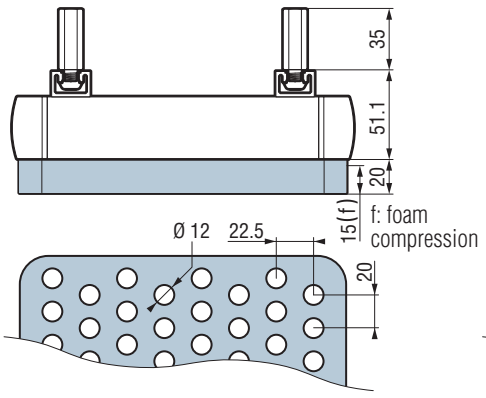



**"Max" suction cup interface**

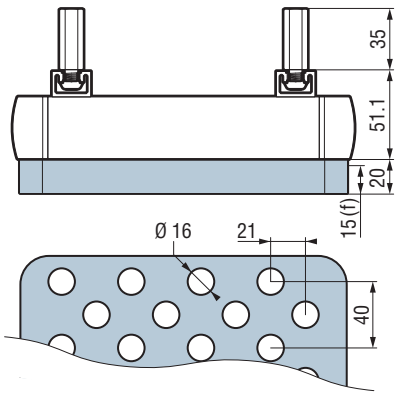



### MVG Series with Foam Gripping Interface

**"Mini" foam interface**



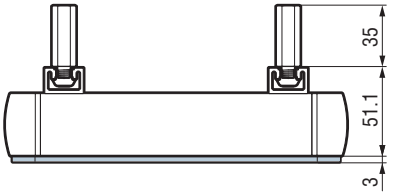

**"Max" foam interface**



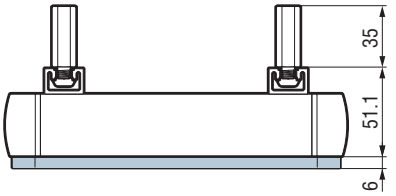

### "COVAL-flex" Gripping Interface

COVAL-flex

"COVAL-flex" interface, 3 mm thick




"COVAL-flex" interface, 6 mm thick




*Note: all dimensions are in mm.*

# MVG

## Modular Vacuum Grippers

Choosing and Ordering a Gripper

| MVG | ... | X | ... | D | VSA33JK | X | | H | X |
|---|---|---|---|---|---|---|---|---|---|

**LENGTH**

Overall length (mm): from 150 to 1200 mm → ...

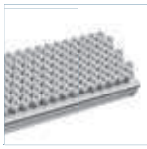
**WIDTH**

Overall width (mm): from 150 to 1000 mm → ...

**GRIP PATTERN LAYOUT**

| | |
|---|---|
| Staggered | Q |
| Straight* | D |

** Only available for "max" suction cup interface with min. suction cup dia. of 26 mm.*



**SUCTION CUP GRIPPING INTERFACES**

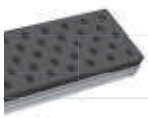
| | |
|---|---|
| **"Mini" interface:** 2.5 bellows suction cups Ø 14 mm made of 35 Shore silicone with flow control nozzles. | VSP14BF |
| **"Medium" interface:** 1.5 bellow suction cups Ø 25 mm made of natural rubber with flow control nozzles. | VSA25JI |
| **"Max" interface:** 1.5 bellow suction cups Ø 33 mm made of natural rubber with flow control nozzles. | VSA33JK |
| **"Max" interface:** 2.5 bellows suction cups Ø 30 mm made of 35 Shore white silicone with flow control nozzles. | MVS30EK |

**FILTER**

| | |
|---|---|
| X | Without |

**TECHNOLOGY**

| | |
|---|---|
| H | Flow control nozzles |



**FOAM GRIPPING INTERFACES**

| | |
|---|---|
| **"Mini" interface:** EPDM (20 mm thick) | F2S |
| **"Max" interface:** EPDM (20 mm thick) | F2B |

**FILTER**

| | |
|---|---|
| X | Without |
| F | With |

**TECHNOLOGY**

| | |
|---|---|
| H | Flow control nozzles |
| E | Airtight valves |
| V | Check valves |

**COVAL-flex GRIPPING INTERFACES**

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

# MVG

## Modular Vacuum Grippers

Choosing and Ordering a Gripper

| D1 | S | | 1 | | K | | VA |
|---|---|---|---|---|---|---|---|

### VERSION WITHOUT VACUUM GENERATOR

| | |
|---|---|
| Without generator | **G0** |

### GENERATOR CONTROL

| | |
|---|---|
| **N** | Without |

### GENERATOR CONFIGURATION

| | |
|---|---|
| **0** | Without |

### EXHAUST

| | |
|---|---|
| **X** | Without |

### VERSIONS WITH VACUUM GENERATOR*

| | |
|---|---|
| 1 x **CMSHDE_50** multi-stage vacuum pump Flow rate: 24.72 SCFM | **D1** |
| 1 x **CMSHDE_100** multi-stage vacuum pump Flow rate: 38.85 SCFM | **D2** |
| 2 x **CMSHDE_100** stage vacuum pumps Flow rate: 77.69 SCFM | **D3** |

** See table: "Vacuum pump configurations by gripper length".*

### GENERATOR CONTROL

| | |
|---|---|
| **N** | Without |
| **S*** | **CMSHDE__S_**<br>Multi-stage vacuum pump with **NC** vacuum control and **NC** blow-off control. Choice of blow-off settings (only on MVG__**S2**_ models):<br>▪ Controlled by external signal<br>▪ Automatic timer from 50 to 9999 ms (advantage: saves one controller output) |
| **V*** | **CMSHDE__V_**<br>Multi-stage vacuum pump with **NO** vacuum control and **NC**.<br>▪ Blow-off controlled by external signal |

** Only for D1 and D2.*

### GENERATOR CONFIGURATION

| | |
|---|---|
| **0** | Without |
| **1** | **CMSHDE____VOC15P_**<br>Controlled multi-stage vacuum pump without vacuum switch or HM<br>▪ One M12 5-pin male PNP<br>▪ Digital inputs/ outputs mode (SIO) |
| **2** | **CMSHDE____VXC15X_**<br>▪ Controlled multi-stage vacuum pump with integrated vacuum switch and pressure sensor, without HMI<br>▪ One M12 5-pin configurable as PNP/NPN<br>▪ One M8 4-pin male for remote HMI<br>▪ Electronic vacuum switch<br>▪ Digital Output DO1"object gripped" 24 V DC/NO<br>▪ Digital inputs/ outputs mode (SIO)/ IO-Link<br>▪ Compatible with HMI (for option **VI**) |

### EXHAUST

| | |
|---|---|
| **K** | Through-type silencer |

### VACUUM LEVEL DISPLAY

| | |
|---|---|
| Without | **V0** |
| Electronic vacuum switch with display | **VA** |
| Vacuum gauge | **VF** |
| HMI on CMS HDE *(option only compatible with versions S2 and V2)* | **VI** |

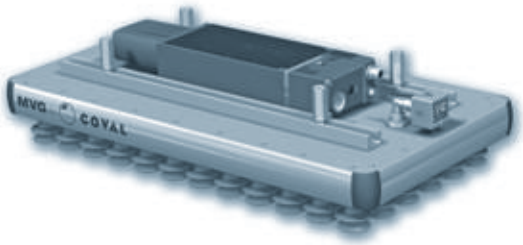
*Integration of the VA, VF, and VI options depends on the gripper size and on the integrated vacuum generator(s).*

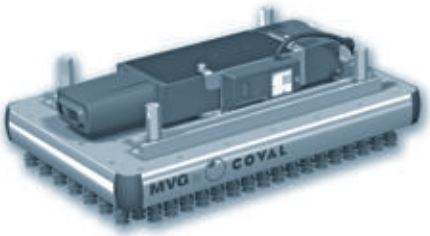
→ *To be confirmed during gripper engineering and design study.*

# MVG
## Modular Vacuum Grippers
Examples of Assembled Part Numbers

### MVG200X200QF2BFHXG0N0XV0
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.

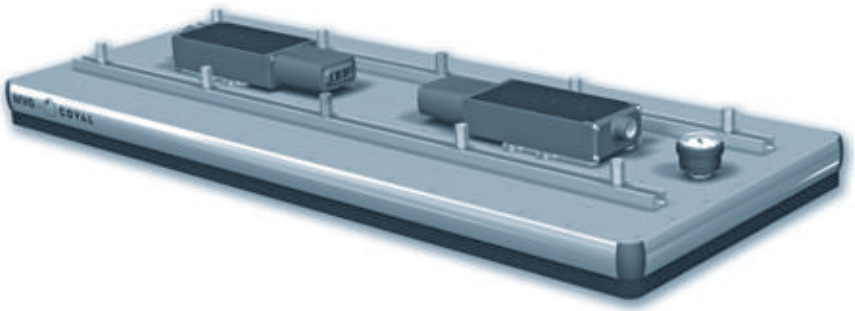
### MVG500X265DVSA33JKXHXD2S1KVA
MVG vacuum gripper, 500 x 265 mm, “straight” grip pattern layout, “max” gripping interface, 1.5 bellow suction cups Ø 33 mm made of natural rubber with flow control nozzles, a CMSHDE_100 multi-stage vacuum pump, NC vacuum and blow-off control, and electronic vacuum switch 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.

### MVG1000X400QF2SXHXD3N0KVF
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.

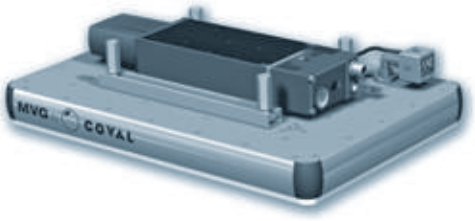


# MVG
## Modular Vacuum Grippers
Examples of Customized Versions

### 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

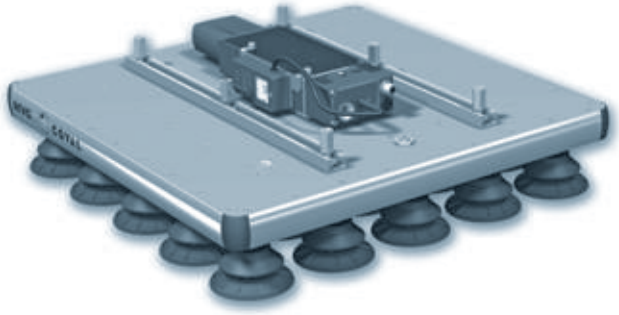
MVG vacuum gripper, 410 x 280 mm, “straight” grip pattern layout, 6 mm-thick COVAL-flex gripping interface with nozzles, a CMSHDE_100 multi-stage vacuum pump with NC vacuum and blow-off control, electronic vacuum switch with display for vacuum level display, and 4 through-holes for customer’s fitting requirements.

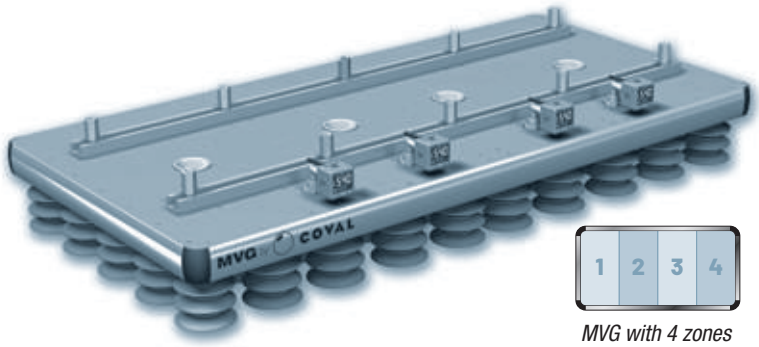
5 kg.

### MVG500X500Z01CBC85HPXHXD2S2KVI

MVG vacuum gripper, 500 x 500 mm, “straight” grip pattern layout, gripping interface with C series 1.5 bellow suction cups Ø 85 mm made of nitrile with nozzles, a CMSHDE_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*

### MVG800X400Z04VS62JNXHXG0N0XVA

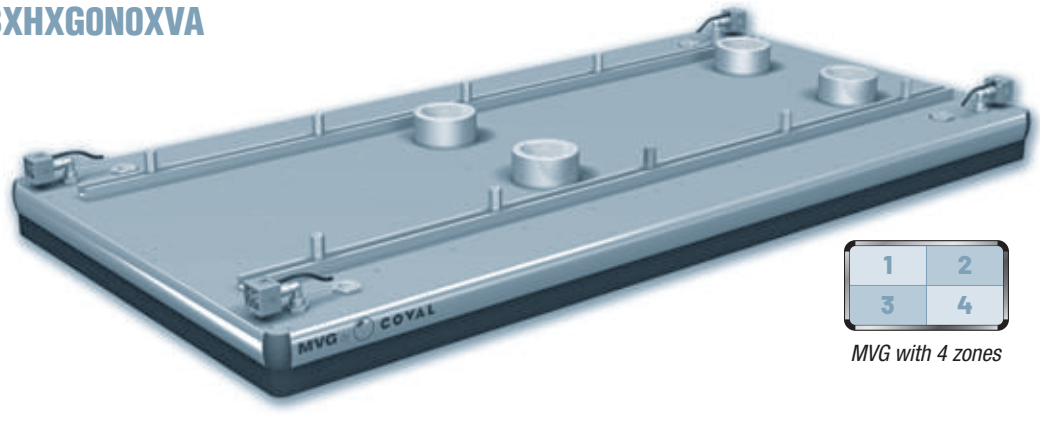
MVG vacuum gripper, 800 x 400 mm, “straight” grip pattern layout, gripping interface with VS series 2.5 bellows suction cups Ø 62 mm made of natural rubber with flow control nozzles, 4 independent zones equipped with an electronic vacuum switch with display, and no integrated vacuum generator.

11 kg.

### MVG1200X600Z04F3BXHXG0N0XVA

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: 32 to 122 °F (0 to 50 °C)
- 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: 24.72 to 77.69 SCFM
- Air consumption: 7.77 to 29.66 SCFM
- 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

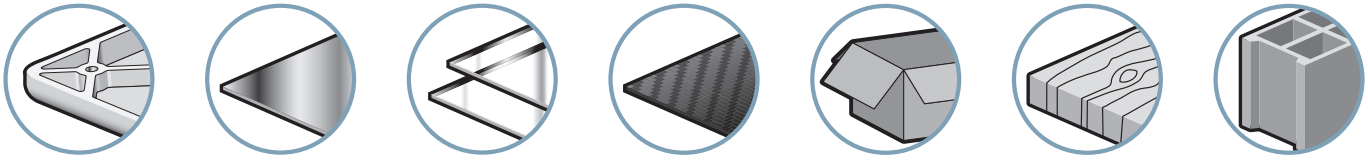
- Revision: 1.1
- Transmission rate: COM3 – 230.4 kbit/s
- Min. cycle time: 1 ms
- SIO mode: Yes
- Process Data Input (PDI): 6 bytes
- Process Data Output (PDO): 1 byte
- IO device description file (IODD) available for download

#### 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

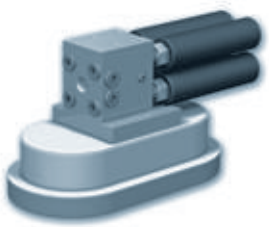
Industry-specific applications



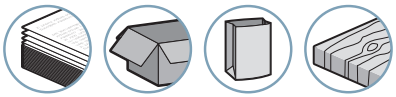
# CSGS

## Bags/sacks Gripping System

## General Information



Industry-specific

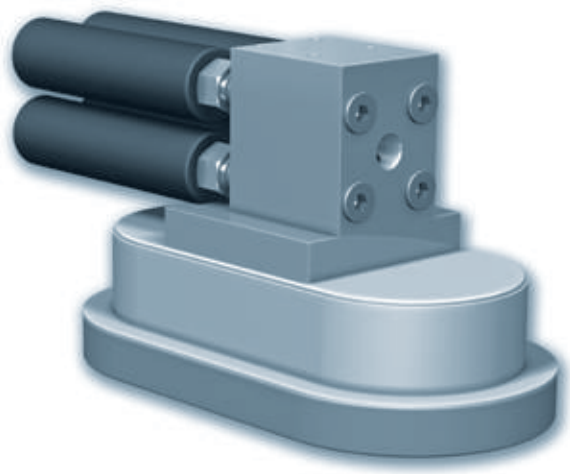


The CSGS system is a comprehensive package that includes a specific suction pad and an optimized vacuum generator and guarantees high reliability for handling plastic or paper bags from 25 to 60 kg, used for packing powder and/or granulated products.

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.

### Specifications

| | |
|---|---|
| **Feed pressure** | Non-lubricated filtered air 2 to 6 bar |
| **Optimal pressure** | 4 bar |
| **Weight** | From 7 to 8.3 kg, depending on model |
| **Materials** | NR, aluminum, CuZn, steel |
| **Temperature** | From 50 to 122 °F |

### Characteristics

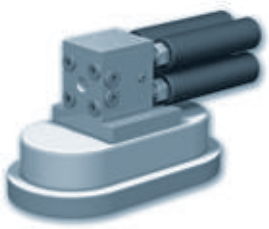
| Model | Air consumed (SCFM) | | | Maximum vacuum (%) | Air drawn (SCFM) |
|---|---|---|---|---|---|
| | 4 bar | 5 bar | 6 bar | | |
| **CSGS4X15X35** | 14.13 | 16.95 | 19.78 | 75 | 25.43 |
| **CSGS4X20X35** | 25.73 | 30.51 | 35.60 | 75 | 35.31 |
| **CSGS4X25X60** | 38.14 | 45.77 | 53.40 | 84 | 50.85 |
| **CSGS4X30X60** | 56.50 | 67.80 | 79.10 | 84 | 63.57 |

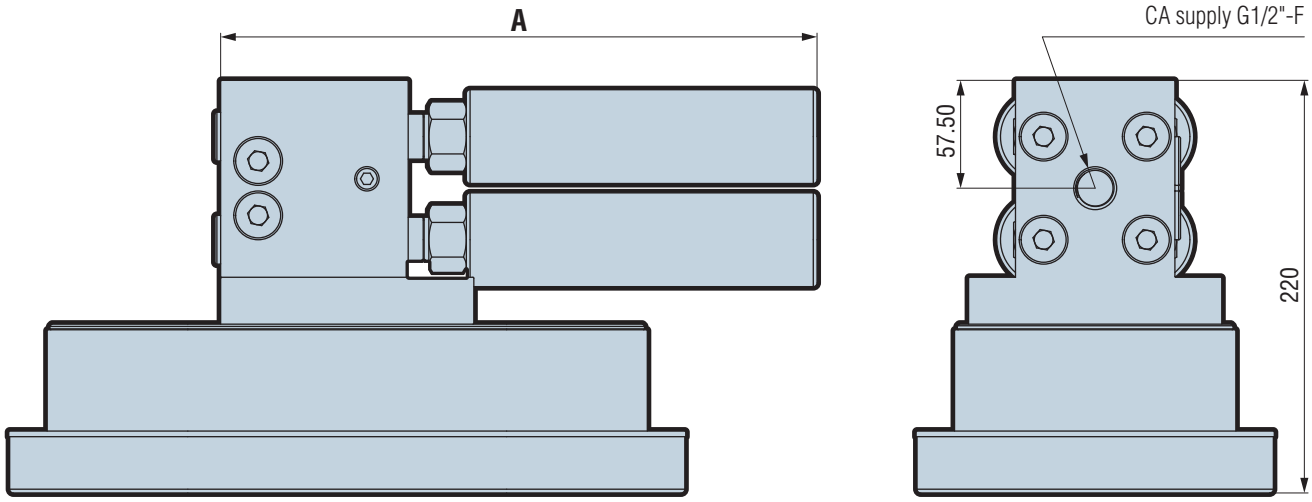
**Please specify model, e.g.: CSGS4X15X35**
**Refer to characteristics table above**

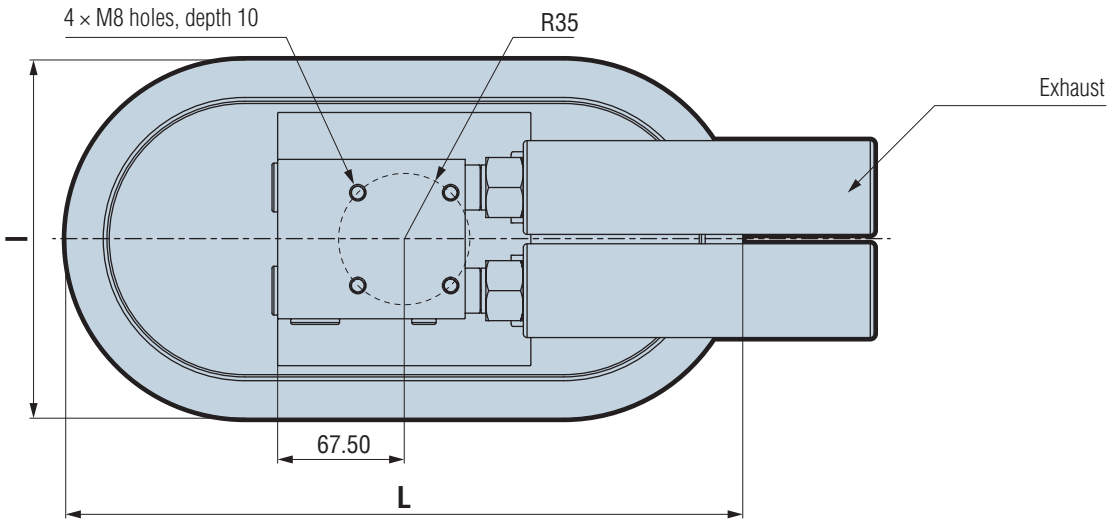
# CSGS

## Bags/sacks Gripping System

Dimensions





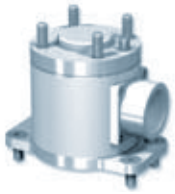

| Model | L | I | A | Silencer |
|---|---|---|---|---|
| **CSGS4X15X35** | 250 | 150 | 229 | SILK12C |
| **CSGS4X20X35** | 250 | 150 | 229 | SILK12C |
| **CSGS4X25X60** | 360 | 190 | 318 | SILK34C |
| **CSGS4X30X60** | 360 | 190 | 390 | SILK34C |

*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: 52.97 SCFM
- Compact and lightweight
- Excellent mechanical resistance
- Continuous rotation
- Ideal for cobotic

P 14/2

## VRS

### Vacuum Rotary Connection

- Connection: G3/4"-F
- Flow Rate: 52.97 SCFM
- 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

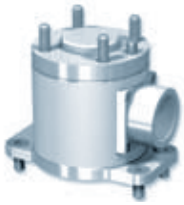
## PA

### 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.

Industry-specific applications

### Advantages

- Compact and lightweight
- Excellent mechanical resistance
- Easy integration: Mounting interface: ISO 9409-1-50-4-M6
- Continuous rotation
- Ideal for cobotic

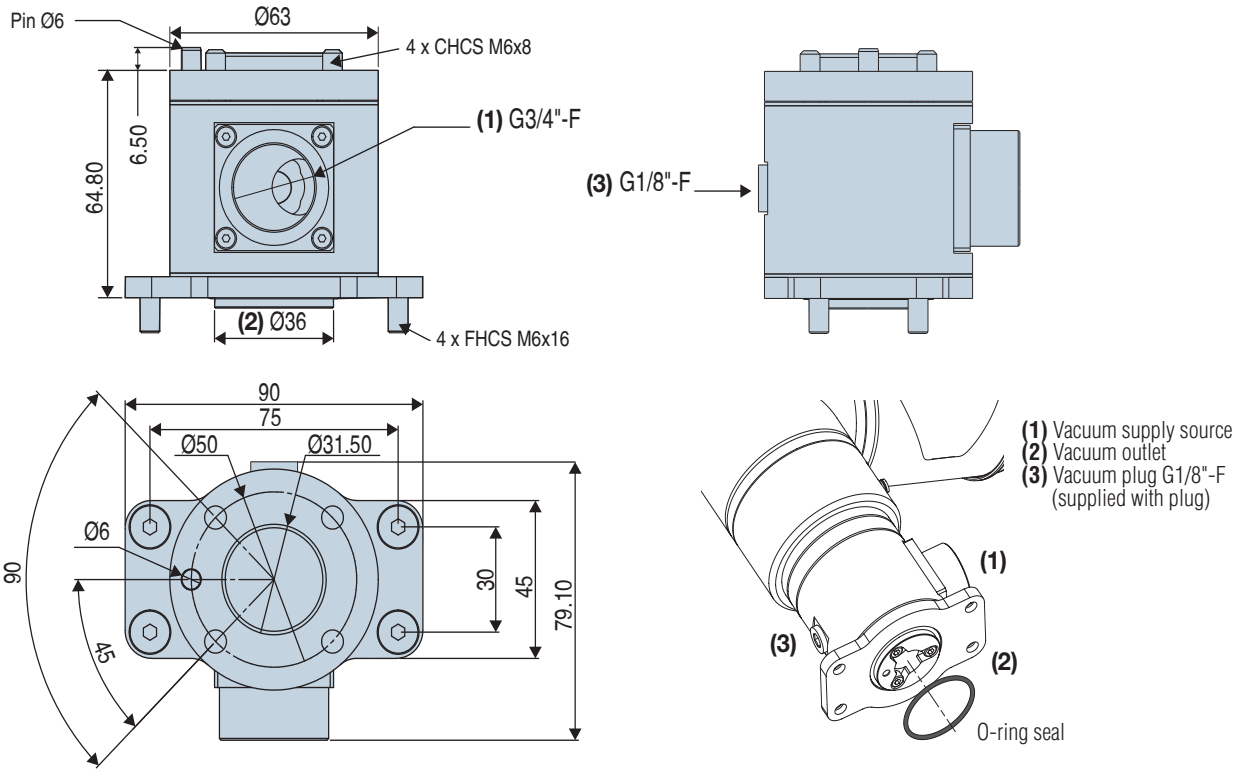
### Characteristics

| Model | Flow Rate (SCFM) | Connection | (g) |
|---|---|---|---|
| **VRU34A50** | 52.97 | G3/4"-F | 440 |

### Specifications

| | |
|---|---|
| **Materials** | Steel - Aluminum - POM - Brass - NBR Nitrile |
| **Temperature range** | From 14 to 122 °F |

### 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

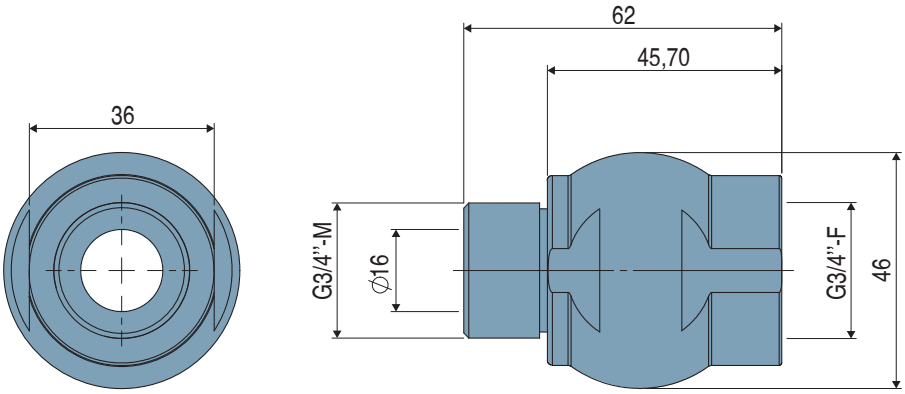
### Characteristics

| Model | Flow Rate (SCFM) | Through bore Ø (mm) | Maximum speed (tr/min) | Connection | (g) |
|---|---|---|---|---|---|
| **VRS34MF** | 52.97 | 16 | 40 | G3/4"-M/F | 135 |

### Specifications

| | |
|---|---|
| **Materials** | Aluminum - NBR Nitrile - Steel |
| **Temperature range** | From 14 to 122 °F |

### 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

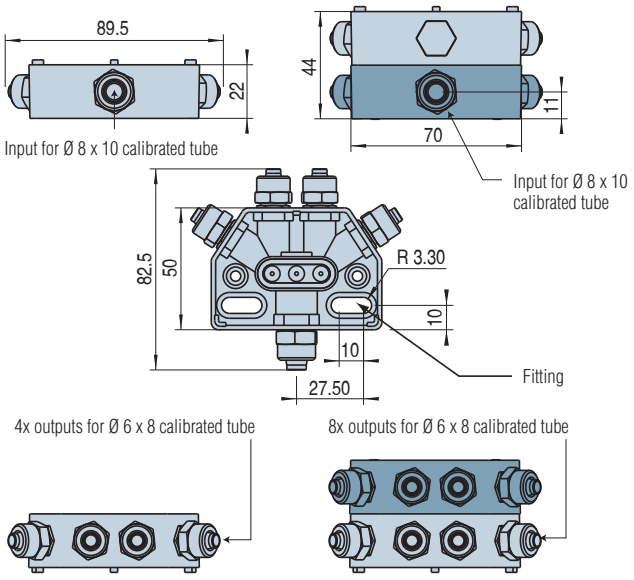
The NVS and NVR series vacuum feeders enable distribution of the vacuum in 4 to 8 channels by a simple unit. The 8/10 inputs and 4 or 8 6/8 outputs eliminate pressure loss.

## Characteristics

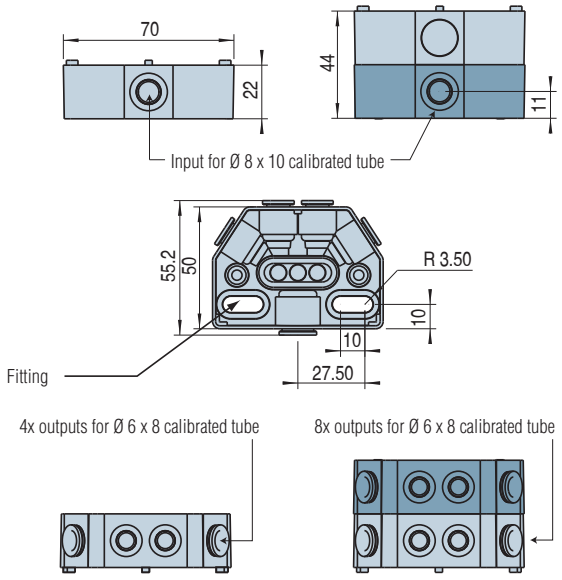
| | | Screwed vacuum fittings | | Push fittings | | Threaded |
|---|---|---|---|---|---|---|
| **Models** | | **NVS 4** | **NVS 8** | **NVR 4** | **NVR 8** | **NVA 4** |
| Material | Body | PA 6.6 – 30 % fiber glass, black, ULVO94 | | | | Aluminium 2014 A |
| | fitting | Nickel-plated brass | | PA | | |
| 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

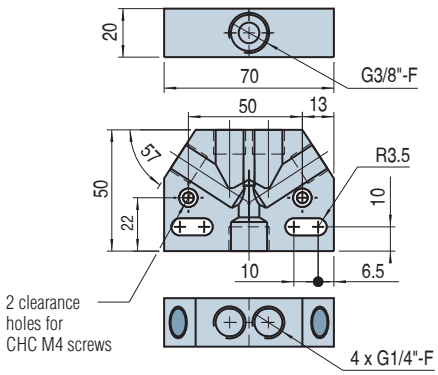
### NVS 4 / NVS 8




### NVR 4 / NVR 8




### NVA 4



**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

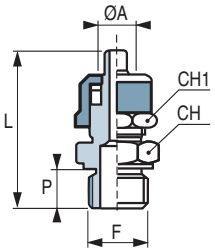
Range of special vacuum-tight fittings, fitted with O-ring (blue).

- 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 |

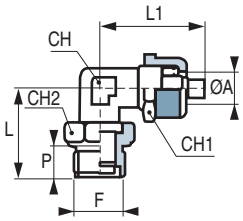
* 6/8 fittings are 5.5/8 compatible.




### 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 |

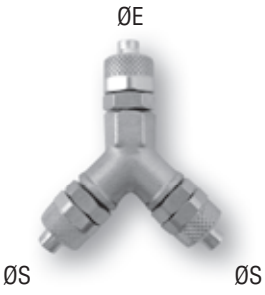
* 6/8 fittings are 5.5/8 compatible.




### 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

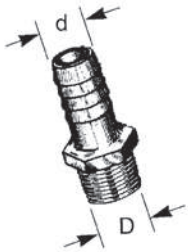
### Fittings RVM, RVF, RVT

Barbed fittings used to connect the vacuum source to the vacuum tube to guarantee a rigid connection.

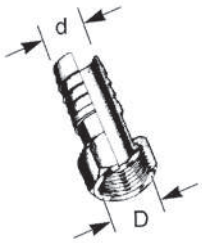
Material: **brass**

| 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 |

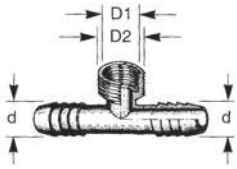
(*) Inside diameter of the suitable pipe



**RVM**



**RVF**



**RVT**

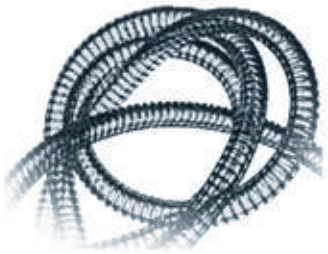
### Vacuum Tubes TVR

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 86°F.

### 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

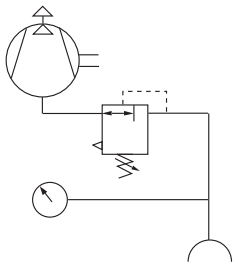
When connected to an electric vacuum pump, the REV series vacuum regulator ensures a precise, stable vacuum. The user can obtain very fine adjustment thanks to the adjustment knob.

### Characteristics

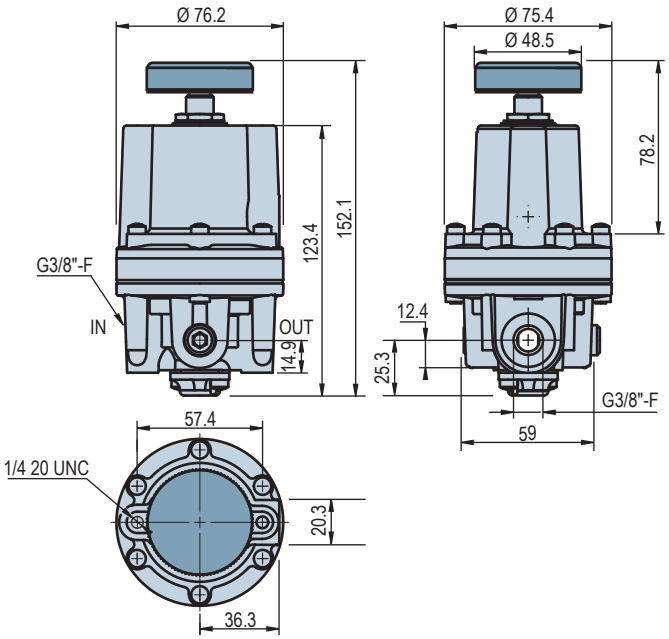
- Vacuum supply (Max): -1013 mbar
- Adjustment precision: 3.4 mbar
- Through flow: 3 SCFM to -846 mbar
- Operating temperature : 40 to 194°F

| Specifications | |
|---|---|
| Adjustment | By threaded pin |

Material:
Body: **Aluminum**
Internal system: **brass, zinc-plated steel**
Elastomer: **Nitrile**



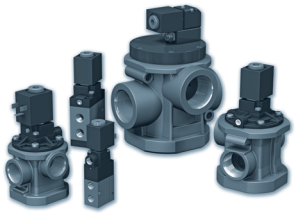
### Dimensions




**For all orders, please specify: REV 38**

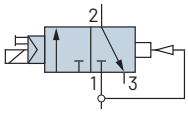
# AG

## Vacuum Valves, 3 channels

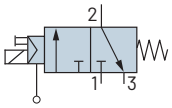


The **3-channel AG vacuum valves** are designed to optimize vacuum networks, offering increased efficiency in various applications. Available in configurations with vacuum or compressed air supplied servos, and in normally open or closed modes, they offer flow rates ranging from 0.9 to 106 CFM and various control voltages, thus meeting diverse industrial needs.

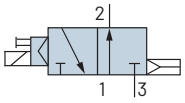
**NC vacuum supplied servo**
1: Pump
2: Use
3: Exhaust



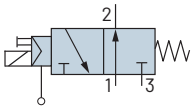

**NC C.A. supplied servo**
1: Pump
2: Use
3: Exhaust




**NO vacuum supplied servo**
1: Pump
2: Use
3: Exhaust




**NO C.A. supplied servo**
1: Pump
2: Use
3: Exhaust

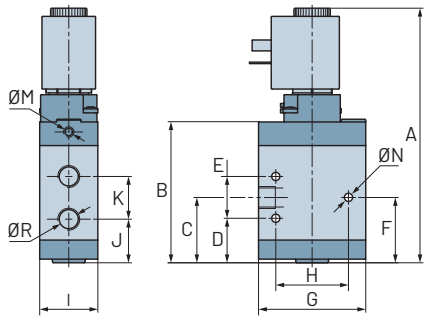



## Characteristics and Dimensions

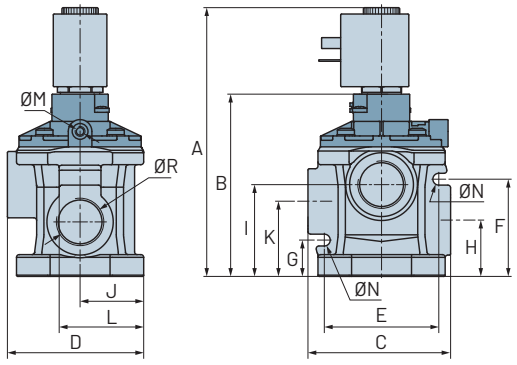
| Ref. NO C.A. servo | Ref. NC C.A. servo | Ref. NO Vacuum servo | Ref. NC Vacuum servo | Ø R | Diagram | A | B | C | D | E | F | G | H | I | J | K | L | Ø M* | Ø N |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AG 3002 | AG 3001 | - | - | G1/8"-F | 1 | 111 | 55.5 | 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.

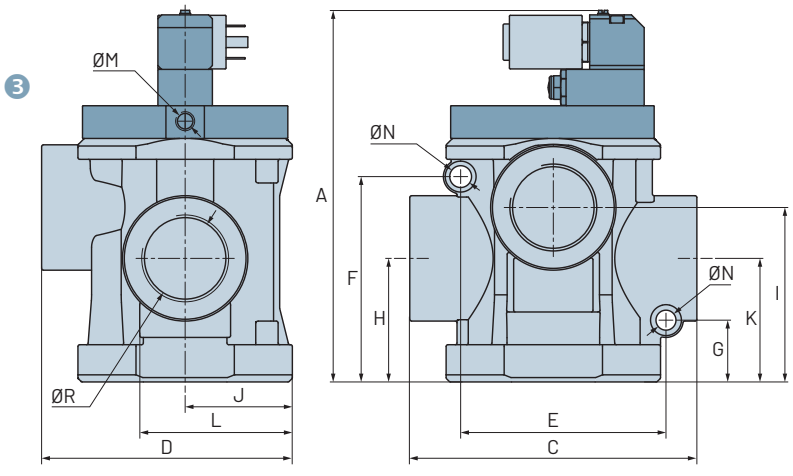
1




2




3



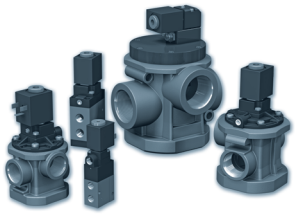





COVAL vacuum managers

# AG

## Vacuum Valves, 3 channels



| Specification | | |
|---|---|---|
| **Fluid** | Non-lubricated 50 micron filtered air. If lubrication is used it must be uninterrupted | |
| **Maximum vacuum** | 97 % | |
| **Operating temperature** | -4 to 104 °F | |
| **Fluid temperature** | Max 104 °F | |
| **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 [CFM] | 0.9 | 2.3 | 5.6 | 11.7 | 20.6 | 53 | 106 |
| Response time (activation)(1) | 15 | 18 | 18 | 20 | 20 | 20 | 60 |
| Response time (deactivation)(1) | 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

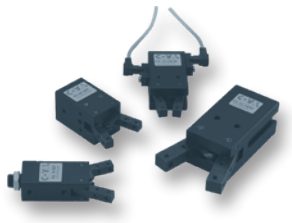
| Voltage code | | | | | | |
|---|---|---|---|---|---|---|
| **Code** | **E1** | **E2** | **E3** | **E4** | **E5** | **E7** |
| **Voltage** | 24 VDC | 220 VAC | 24 VAC | 110 VAC | 48 VAC | 12 VDC |

Note: All dimensions are in mm

**For all orders, please specify:**
**Model + Voltage**
**e.g.: AG3215E1**

# PA

## 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 (table below) x 15/25 = 6.06 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**(1) | 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**(1) | 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**(1) | 22 to 24 | 1 | 490 | yes |
| **PA 50 DE**(1) | 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** | 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 | - | Without |
| | SEO | Simple opening effect | M | For PA 20 - 32 - 50 |
| | DE | Double action | | |

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# 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

## ▶ 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

## ▶ COVAL GERMANY

**COVAL VAKUUMTECHNIK GMBH**
Hohenloher Str. 6
72768 Reutlingen
Deutschland
Fon: +49 (0)7121 7999-250
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

## ▶ 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

## ▶ 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

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901 Jones Franklin Road
Suite 100
Raleigh, NC 27606
U.S.A.
Phone: (919) 233-4855
Fax: (919) 233-4854
www.coval-inc.com

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