COVAL

vacuum managers

DISTRIBUTED BY:

Air-Oil Systems, Inc.
AUTOMATION SOLUTIONS
753 WAMBOLD ROAD SOUDERTON, PA 18964-2715
215.721.9595 800.333.5520 FAX 215.721.7666
www.airoil.com

GLOBAL CATALOG

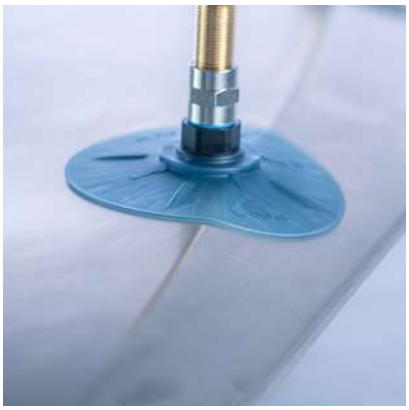
vacuum components

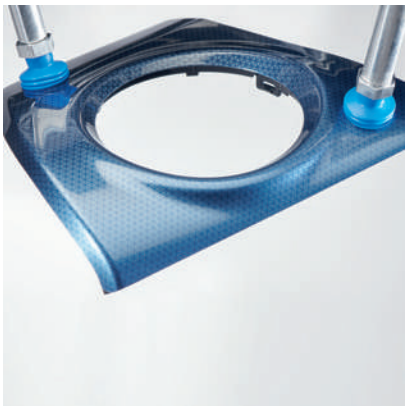
INTERACTIVE VERSION

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.

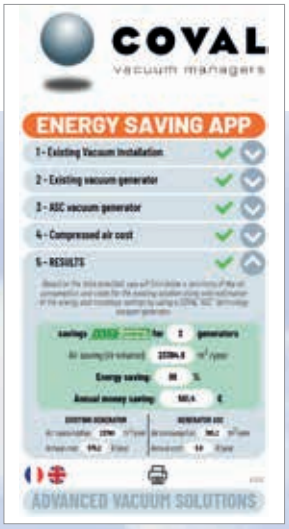
This unique app in the world of vacuum technology is very intuitive to use. Once you've entered the equipment's main characteristics (gripping cycle time, number of cycles, run time, volume to be evacuated), the savings are displayed automatically in euros, air volume, and savings percentage. In most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

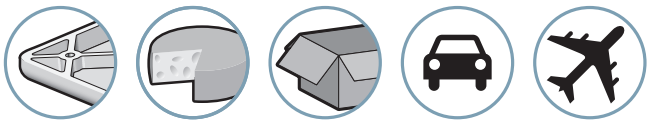
▶ **PRODUCTS** that you can trust:

- 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**:

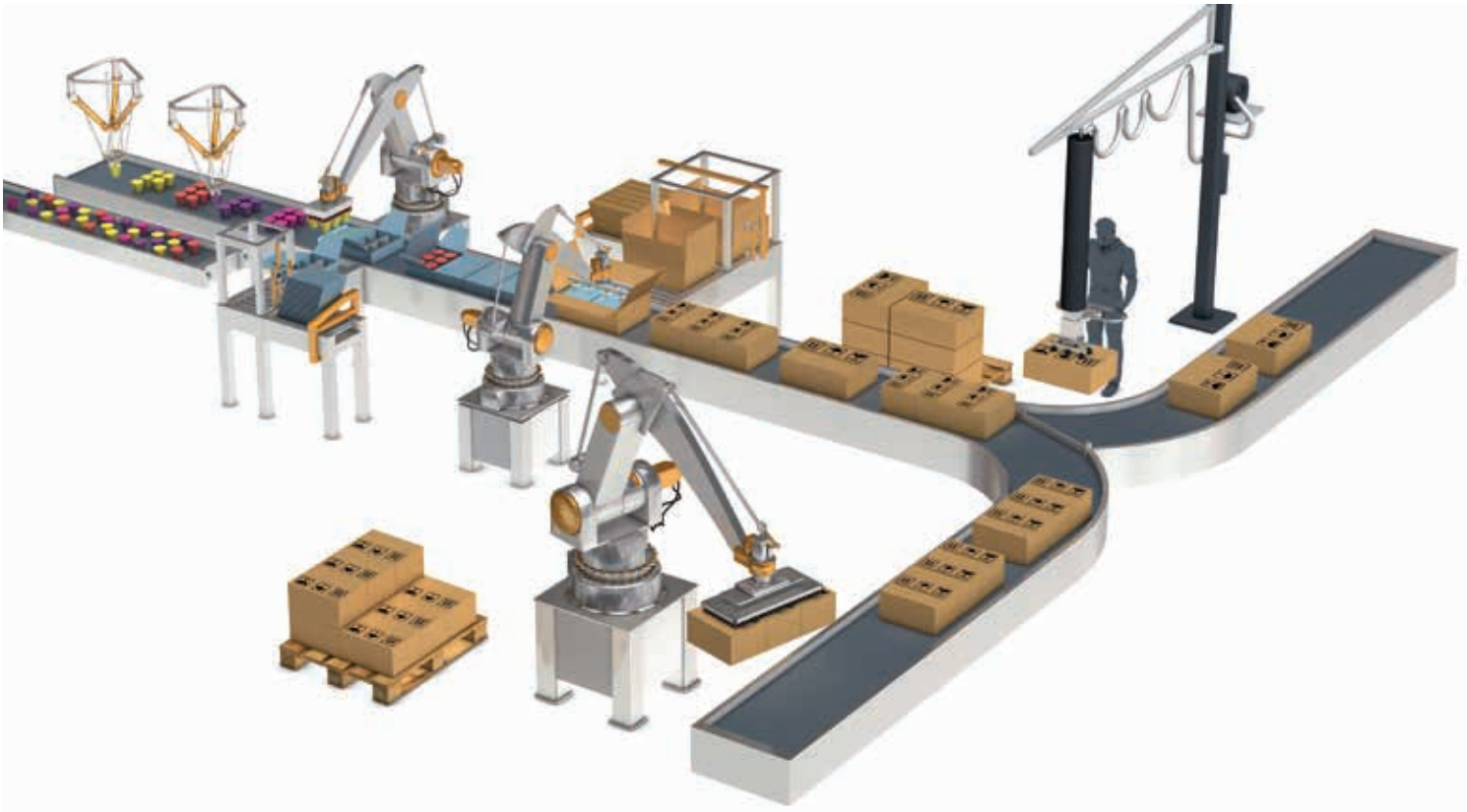
At COVAL, technical and sales teams are dedicated to strategic industry sectors: packaging, food processing, plastics, automotive, aeronautics, and robotics.
The experience they've acquired with major brands and manufacturers allows them to provide quick and efficient answers.

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

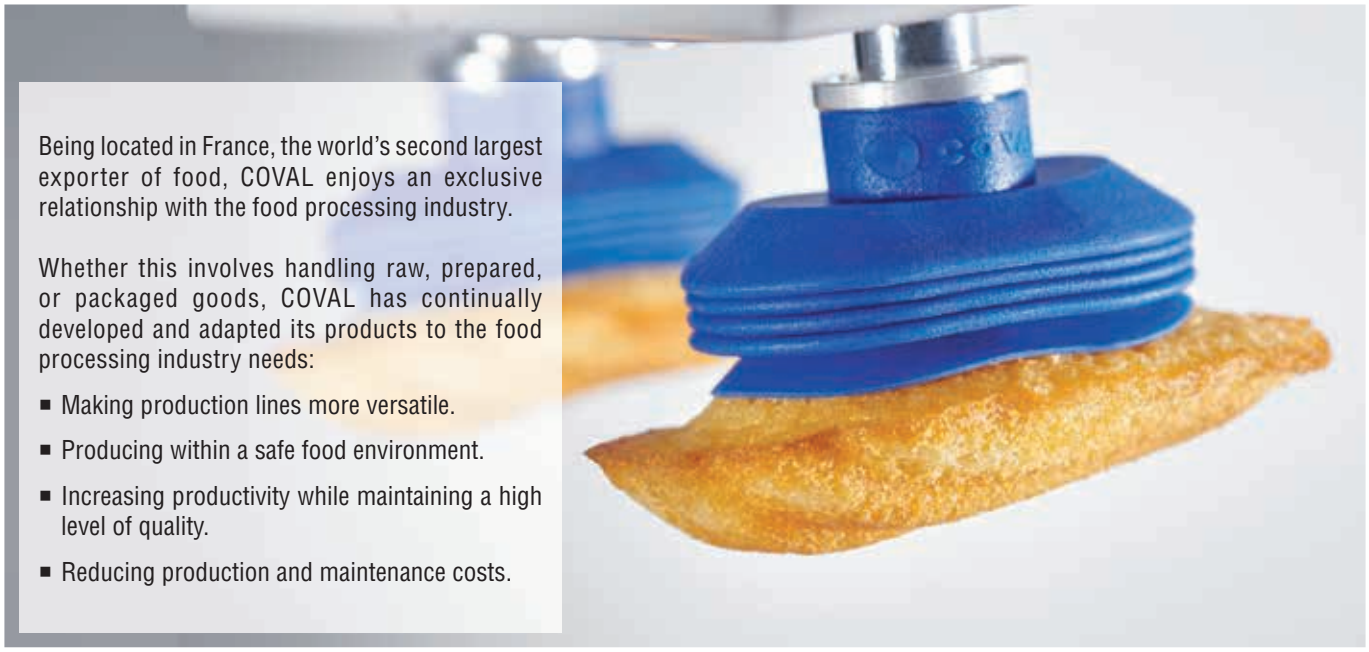
Vacuum grippers are used to grip several products (flow packs, tins, cans, etc.) or packages (palletization) at once.

- **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)

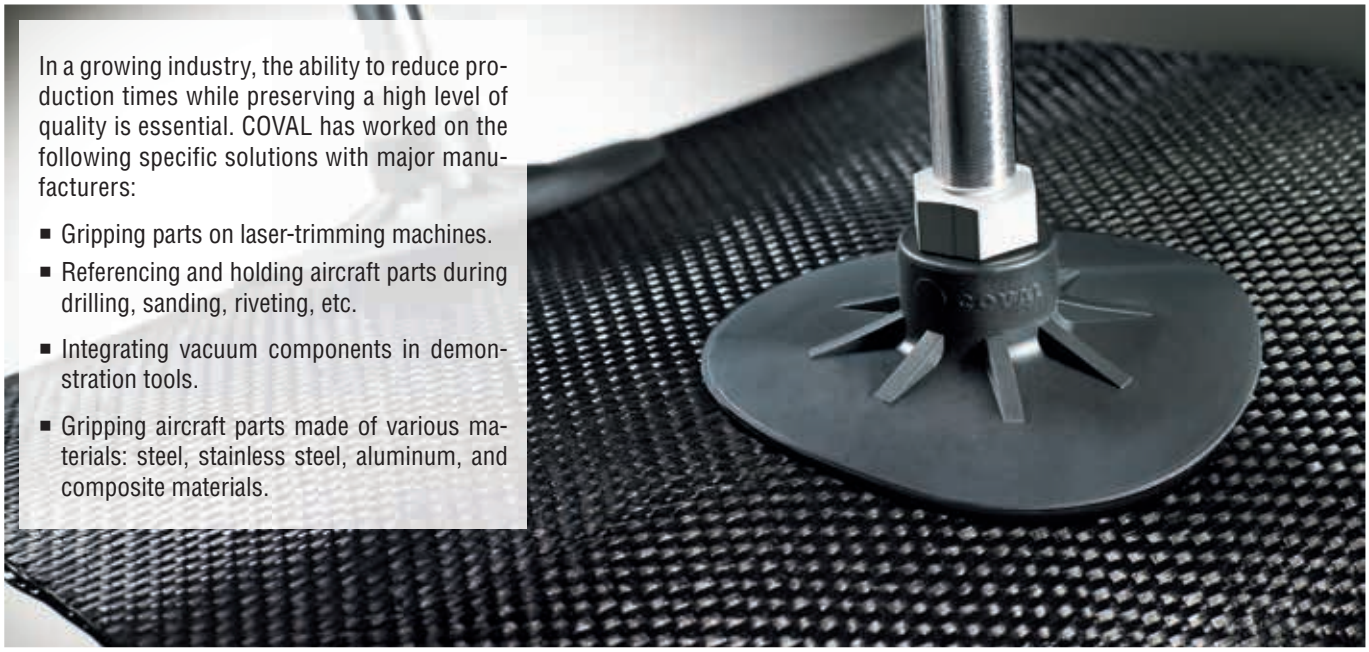
➔ **See chapter 2.**

▶ 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

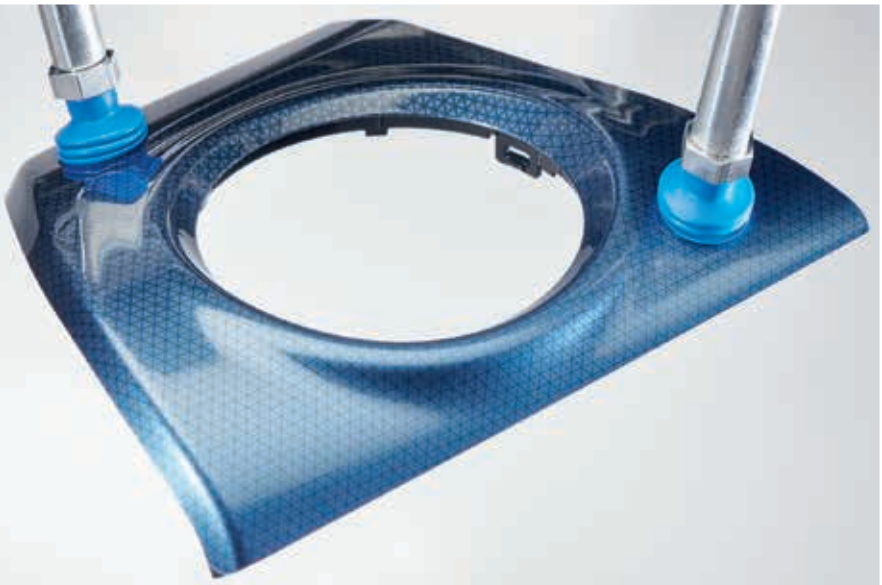
- Integrated pneumatic or electric vacuum pumps.
- Control and monitoring panel allowing you to manually or automatically select the gripping areas on a structure.
- Indicator light for visual alarm.
- Vacuum sequencing to assist with placement of a curved panel.

➔ **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

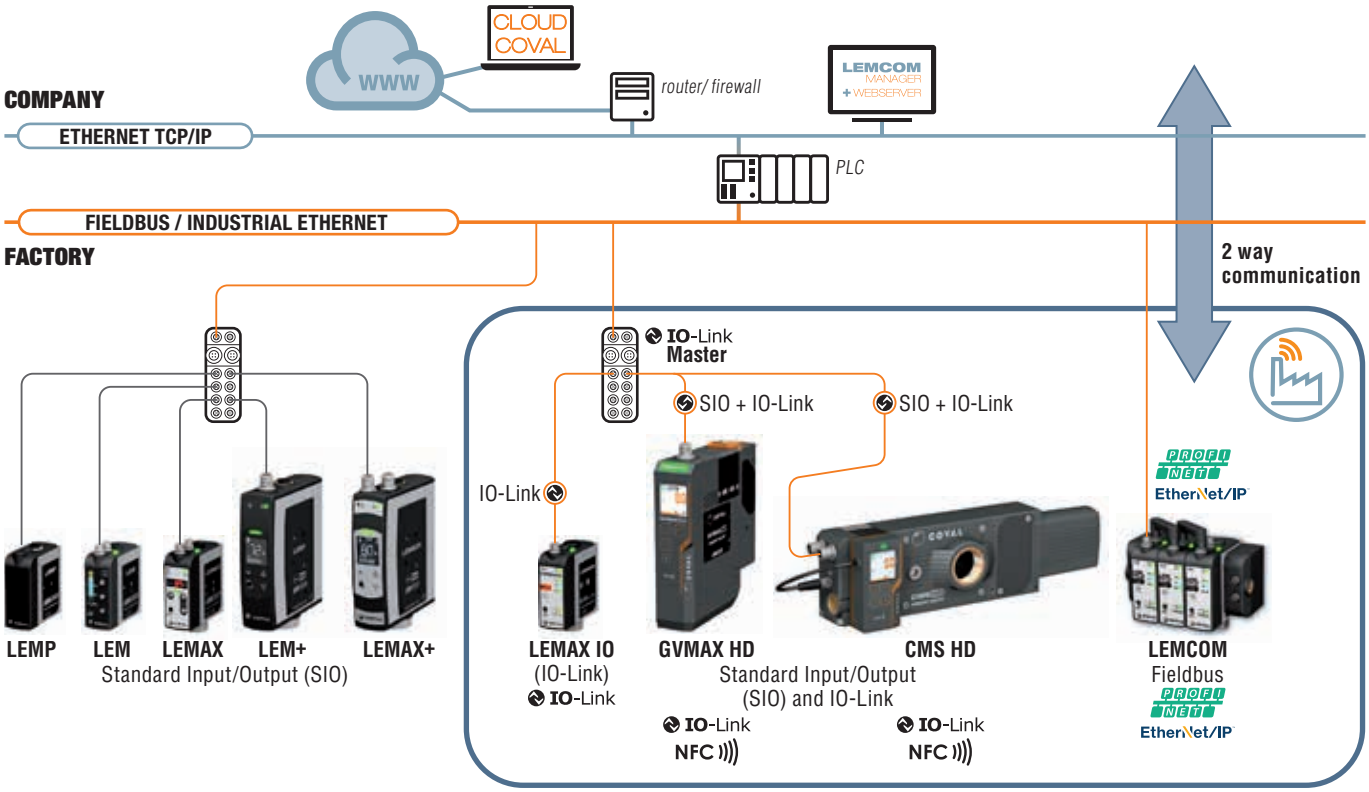
ASC (Air Saving Control)
A vacuum regulation system that auto-adjusts to the product being handled.

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.

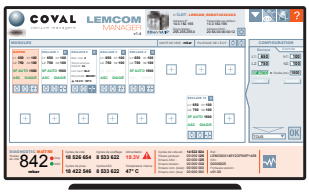
IO-Link

- 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.

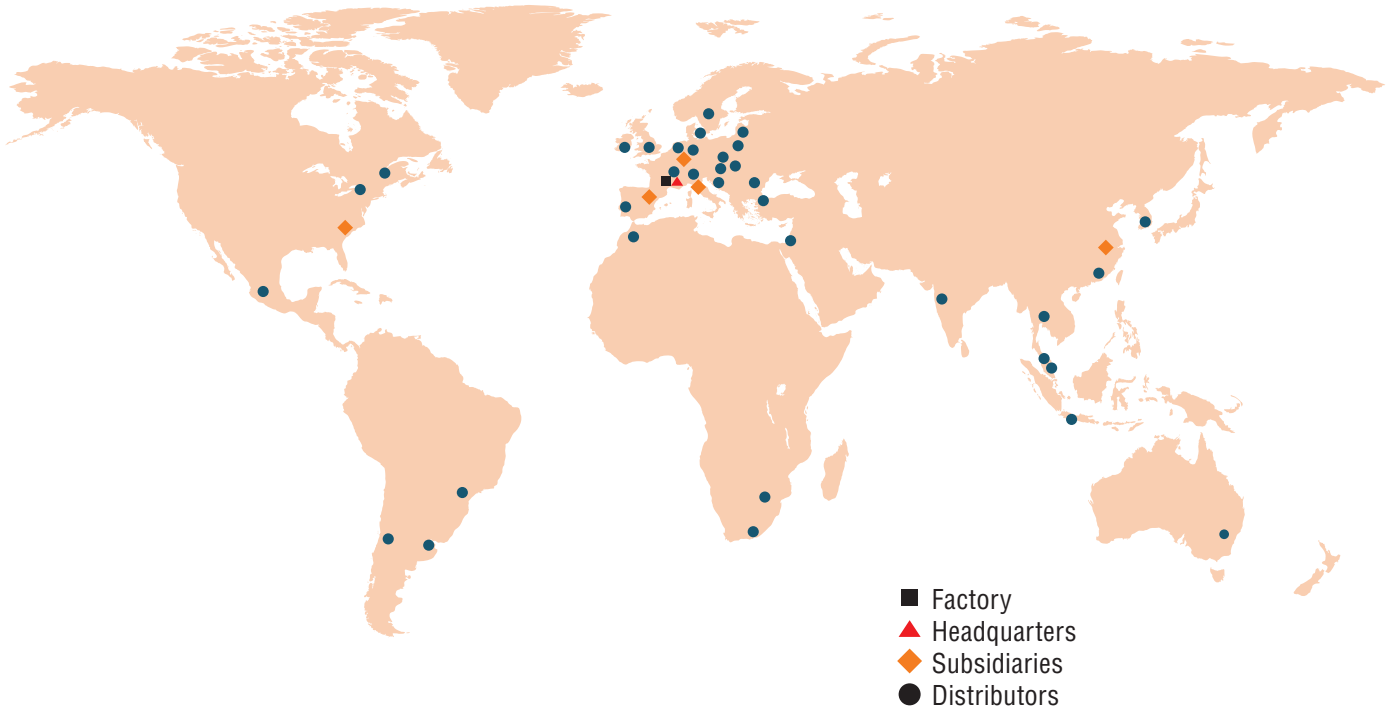
High resolution display

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

COVAL
vacuum managers

A TECHNOLOGICAL PARTNER ON A GLOBAL SCALE

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



▶ **HEADQUARTERS** based in **FRANCE**

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

▶ **5 SALES SUBSIDIARIES**

COVAL Inc. | COVAL Iberica | COVAL Germany | COVAL Italia | COVAL China

▶ A broad network:
- **+ 25** authorized **DISTRIBUTORS in FRANCE**
- **+ 40** authorized **DISTRIBUTORS outside FRANCE**

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

ADVANCED VACUUM SOLUTIONS

Table of Contents

General Points About Suction Cups	Chapter 1
Standard Suction Cups	Chapter 2
Special Purpose Suction Cups	Chapter 3
Suction Cup Accessories	Chapter 4
Vacuum Pumps Overview	Chapter 5
Micro Ejectors / Vacuum Cartridges	Chapter 6
Vacuum Pumps without control	Chapter 7
Intelligent Vacuum Pumps	Chapter 8
High Flow Vacuum Generators	Chapter 9
Electric vacuum pumps and Blowers	Chapter 10
Vacuum Pump Accessories	Chapter 11
Vacuum Switches	Chapter 12
Gripping Solutions	Chapter 13
Peripheral Devices	Chapter 14
Alphabetical Index	

Table of Contents

INTRODUCTION: Guide to Vacuum Handling VII to XII

SUCTION CUPS

Chapter 1 General Points About Suction Cups

Chapter 2 Standard Suction Cups

VP
Flat suction cups Ø 8 to 75 mm **2/3**

VPG
Extra-flat suction cups Ø 2 to 200 mm **2/9**

VPU
Flat suction cups Ø 6 à 50 mm **2/17**

VPF
Flat suction cups with cleats Ø 15 to 50 mm **2/20**

VPO
Oblong flat suction cups **2/23**

VSA
Suction cups with 1.5 bellows Ø 5 to 78 mm **2/27**

VSAB
Suction cups with 1.5 bellows Ø 5 to 50 mm **2/33**

VSAG
Suction cups with 1.5 bellows Ø 10 to 150 mm **2/37**

VSAJ
Suction cups with 1.5 bellows Ø 15 to 30 mm **2/43**

VS
Suction cups with 2.5 bellows Ø 5 to 88 mm **2/47**

VSG
Suction cups with 2.5 bellows Ø 5 and 7 mm **2/53**

VSD
Long stroke suction cups **2/55**

C
High-performance suction cups **2/59**

CTC
High-Performance Bell-type Suction Cups **2/63**

VSA-VS BM
VSA-VS BM-SIF
VSBM
Suction Cups with Foam Ring Seals **2/65**

Chapter 3 Special Purpose Suction Cups

FPC
FlowPack Suction Cups **3/4**

MVS
Soft Suction Cups for High Speed Applications **3/7**

MVP
Suction Cups with 4.5 Bellows **3/10**

VSAF
Suction Cup for Cheese **3/13**

VSAOF
Oblong Suction Cup for Cheese **3/14**

VSD, VSE, VSP
Suction cups for bakery applications **3/15**

VSO
Suction cups for egg-handling **3/17**

VSBO, VSBO+
VSBO LM/BM
Suction cups for bottle handling **3/18**

Table of Contents

VBO
Suction cup for bottle handling via the punt **3/27**

VPBO
Coupler plates for gripping bottles by the punt **3/28**

VPA
Suction cups for paper applications **3/29**

VPAL / VSAPL
Suction cups for labels **3/31**

VPR
Suction cups for mailing applications **3/33**

VPAG
Curved suction cups **3/34**

VPSC
Ultra-flat, Non-Marking Suction Cups **3/35**

VPYR
Radial ball-joint suction cups **3/36**

SPL
Heavy load suction cups **3/37**

STEEL
Steel suction cups **3/38**

Chapter 4 Suction Cup Accessories

TS11
Spring systems **4/3**

TS
Spring systems TS1 – TS2 – TS3 **4/4**

TS
Spring systems TS4 - TS5 **4/5**

RSC
Systems with 4 compensated springs **4/5**

TSOP - TSOG
Anti-rotation spring systems **4/6**

L
Extensions **4/8**

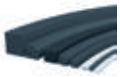
Miscellaneous gripping **4/9**

Flow Control Nozzles **4/10**

PMG2
Mechanical feelers **4/11**

IMU
Axial ball-joints **4/12**

CSP
Piloted Safety Valves **4/13**



BM
Foam strips **4/14**

VACUUM PUMPS

Chapter 5 Vacuum Pumps Overview

General points **5/2**

Choosing a vacuum pump **5/3**

Comparison of vacuum pumps and air amplifiers **5/4**

COVAL's Family of Intelligent Vacuum Pumps **5/6**

Vacuum pump range **5/8**

Evacuation time and weight of vacuum pumps **5/11**

Table of Contents

Chapter 6 Micro Ejectors / Vacuum Cartridges

VR
Heavy-duty in-line ejectors **6/2**

GVR
Heavy-duty in-line ejectors **6/6**

CVP
Vacuum Cartridges **6/8**

CVPC
Controlled Vacuum Cartridges **6/12**

CBP
Pilot Control Cartridge **6/16**

Chapter 7 Vacuum Pumps without control

GVP
Vacuum Pumps **7/2**

GEMP
Simple Vacuum Pumps with "ASR" (Air Saving Regulator) **7/8**

GVEC
«Easy Clean» Vacuum Pumps **7/11**

LEMP
Mini Vacuum Pumps without control with ASR (Air Saving Regulator) **7/14**

Chapter 8 Intelligent Vacuum Pumps

LEM
Integrated Mini Vacuum Pumps with ASR (Air Saving Regulator) **8/3**

LEMAX
Integrated Mini Vacuum Pumps with ASC (Air Saving Control) **8/11**

LEMAX IO IO-Link
Mini Vacuum Pumps with Communication IO-Link **8/19**

LEMCOM PROFINET EtherNet/IP
Mini Vacuum Pumps Communicating via Industrial Field Bus **8/27**

LEM+
Compact High Flow Vacuum Pumps with ASR (Air Saving Regulator) **8/39**

LEMAX+
Compact High Flow Vacuum Pumps with ASC (Air Saving Control) **8/45**

GVMAX HD NFC IO-Link
Heavy Duty Communicating Vacuum Pumps **8/51**

CMS HD NFC IO-Link
Heavy Duty Multi-stage Vacuum Pumps **8/65**

Chapter 9 High Flow Vacuum Generators

M--C
Air amplifiers **9/2**

MD
Air amplifiers **9/5**

TVM
Pipes for air amplifiers **9/6**

Table of Contents

Chapter 10 Electric vacuum pumps and Blowers

PVS
Dry vane vacuum pumps **10/2**

TCL
Side-channel Blowers, single-stage and two-stage **10/6**

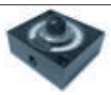
Chapter 11 Vacuum Pump Accessories

QR
Diffuser-type Silencers **11/3**

MS
Blow-off Devices **11/4**

FVI
Vacuum Filters **11/5**

FVUM, FVUG
Vacuum Filters **11/7**



FVG
Mini Vacuum Filters **11/8**

FVL12
In-line Filter **11/9**

FVL68
In-line Vacuum Filter **11/9**

FSLI
Liquid Separator Vacuum Filters **11/10**

SIL GV
Diffuser-type Silencers **11/11**

SIL K--C
Through Type Silencers **11/11**

CD, CC
Screw-type Electrical Connectors **11/12**

Chapter 12 Vacuum Switch Range

PSK
Vacuum Switch **12/3**

PSA 100 C
Electronic Vacuum Switch With Display **12/4**

PSD 100
Vacuum Switch With 3-colour Display **12/5**

PSP 100
Electronic Vacuum Switch **12/7**

PSP 100 ANA
Electronic Vacuum Switch Analog Output **12/8**

PSE 100 E
Electric Vacuum Switch **12/9**

PSE 100 P
Pneumatic Vacuum Switch **12/10**

PSE 100 PK
Pneumatic Vacuum Switch **12/11**

VAF 111
Needle Vacuum Gauge **12/12**

Table of Contents

VACUUM GRIPPERS / GRIPPING SOLUTIONS

Chapter 13 Gripping Solutions

CVGC
Carbon Vacuum Grippers for Collaborative Robots **13/2**

CVGL
Compact and Light Vacuum Grippers **13/6**

MVG
Modular Vacuum Grippers **13/24**

CSGS
Bags/sacks Gripping System **13/42**

ACCESSORIES

Chapter 14 Peripheral Devices

VRU
Vacuum Rotary Union **14/2**

VRS
Vacuum Rotary Connection **14/3**

NVS, NVR, NVA
Vacuum Feeders **14/4**

RDV, RCOV, Y
Screwed Vacuum Fittings With O-ring **14/5**

RVM, RVF, RVT - TVR - COV
Fittings, Vacuum Tubes, Collars **14/6**

REV 38
Vacuum Regulator **14/7**

AG
Vacuum Valves, 3 Channels **14/8**

PA
Angular Jaw Clamps **14/9**

Alphabetical Index **I to III**

Vacuum Handling Guide

Vacuum Applications and Measurements	p. VIII
Suction Cup Performance	p. IX
Vacuum Generation Technologies	p. X and XI
The Process of Defining an Installation	p. XII

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.

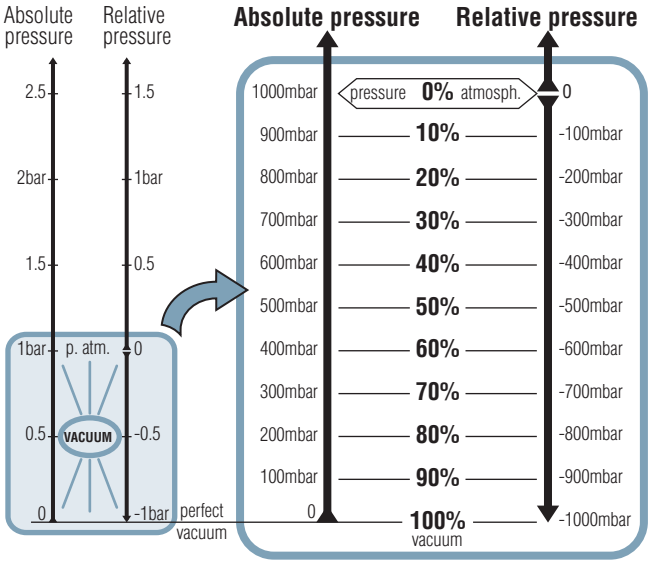
MEASURING VACUUM LEVEL

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

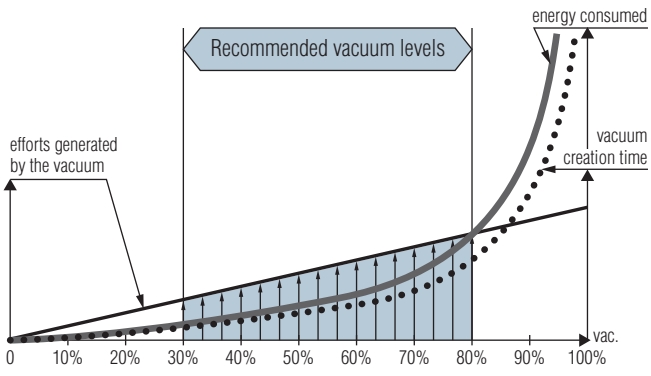
Relative vacuum

%	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

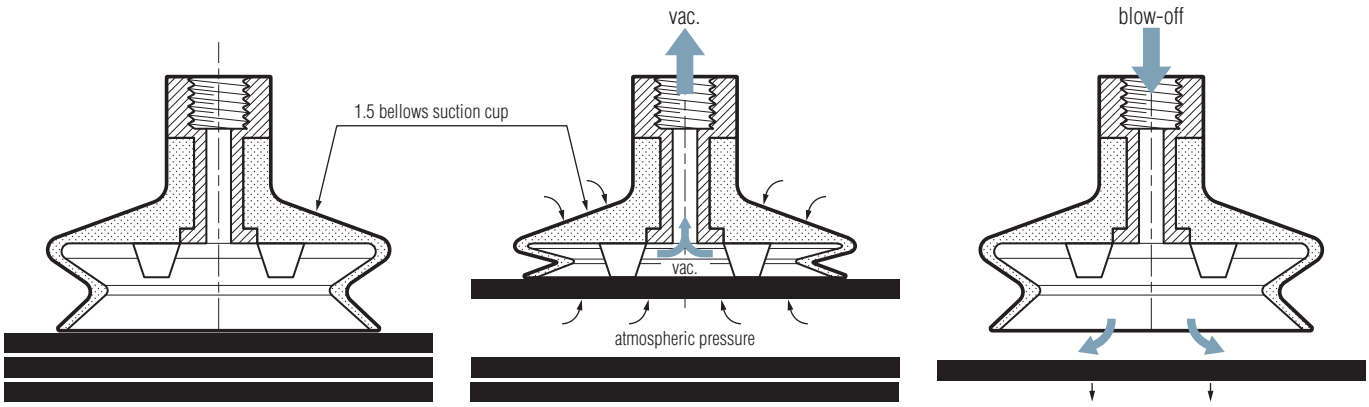
This is why the vacuum levels used should be limited, from 30% when a high flow of vacuum needs to be maintained, to 80% in an airtight circuit (no flow required to maintain the vacuum).



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

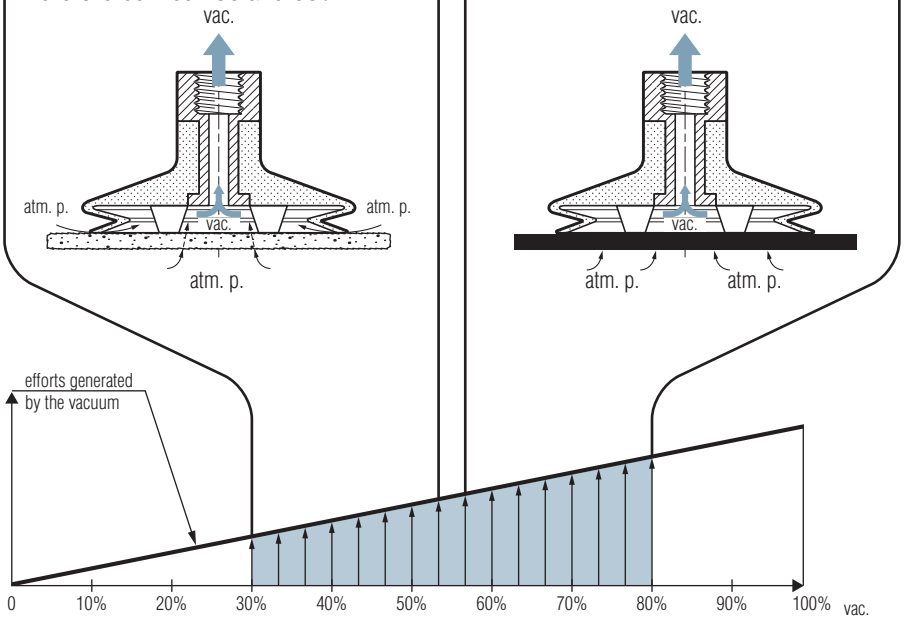
Greater vacuum flow must compensate for products and processes that cause air leaks such as cardbaord, agglomerated materials, rough wood, irregular surfaces, etc.

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

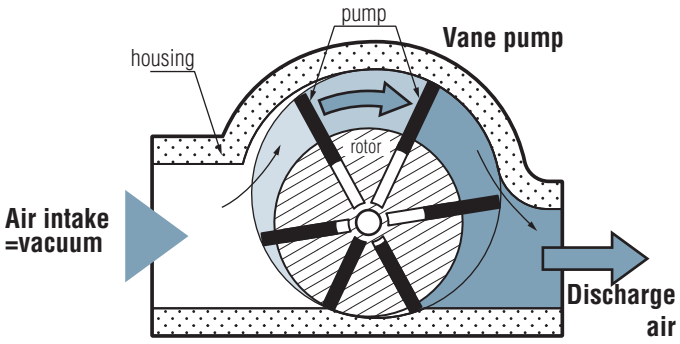
1- CONTINUOUS VACUUM, USING ROTARY VACUUM PUMPS

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

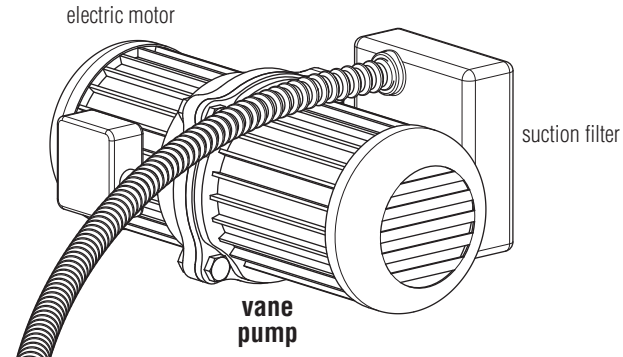
To maintain optimum output, rotary pumps must remain within average power levels: from 1 to 10 Kw. The suction capacity generated is much higher than the normal requirements of industrial suction cups.

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.

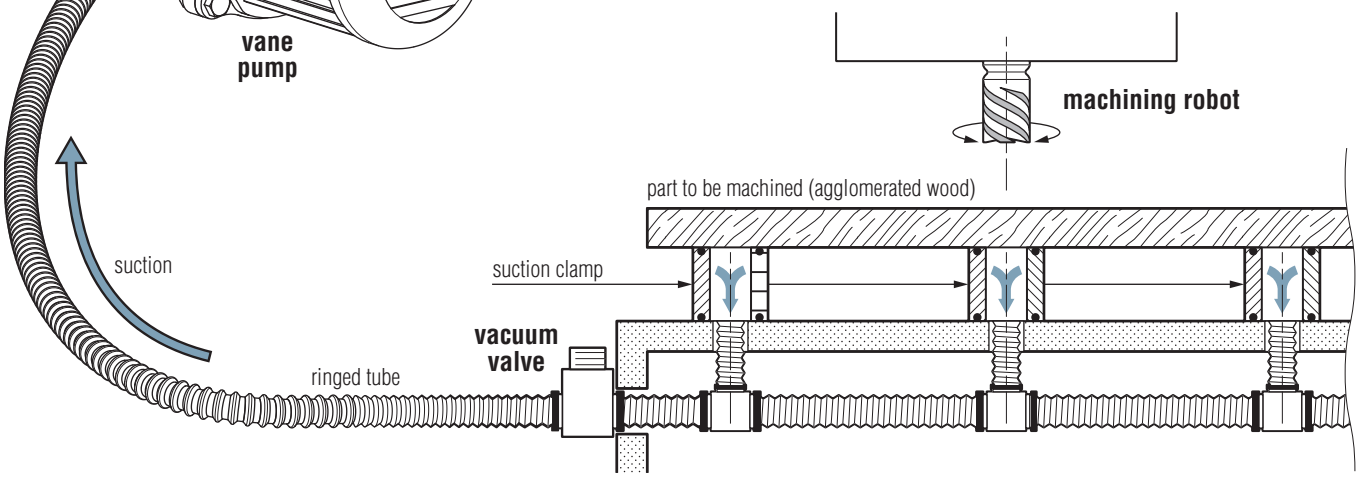
However, in the vast domain of vacuum gripping, rotary pumps are only used in rare instances, where an object requires a high level of suction flow rate that needs to be maintained for a long time during the cycle.

Rotary Vacuum Pumps	
• Constant consumption, continuous generation of vacuum, even for intermittent requirements: not suitable for intermittent vacuum generation requirements. • Located far from the suction cups.	**Applications :** • Vacuum sources for various processes such as vacuum packing, etc. • Clamping maintained throughout the cycle, with high suction flow rate (porous objects etc.)



A Typical Application

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

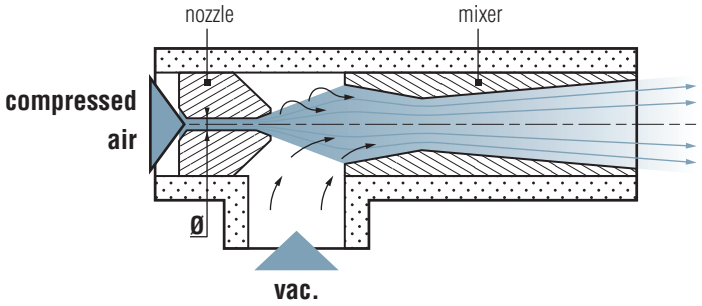


INTERMITTENT VACUUM, USING VENTURI VACUUM PUMPS

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. • Installation very close to the suction cups. • Suction flow rate and vacuum level optimized for each application.	**Applications :** • All intermittent gripping operations, i.e. which only last for a part of the full cycle of the machine

Venturi Vacuum Pump Ranges

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

■ Nozzle diameter 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

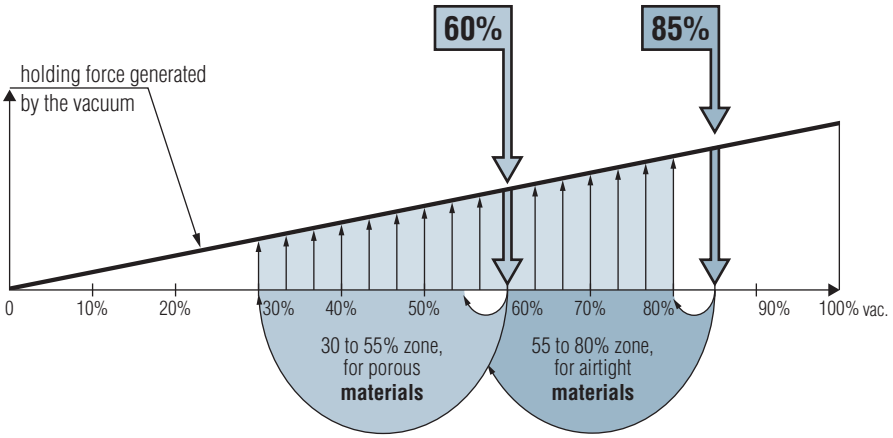
This profile defines the maximum level of vacuum achieved by the venturi.

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

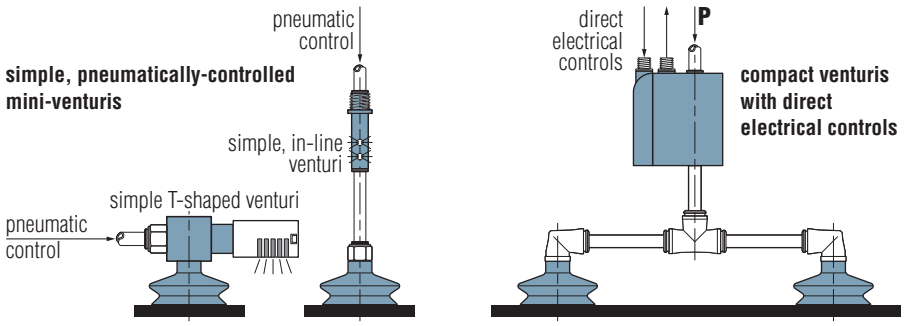
Venturi vacuum pumps are used for all normal vacuum gripping applications.

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

Selection Guide	p. 1/2
Suction Cup Assembly Options	p. 1/6
Assembly Reference: "Suction Cup + Fitting"	p. 1/7
The COVAL Range	p. 1/8
Index of Pictograms and Symbols	p. 1/11

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.

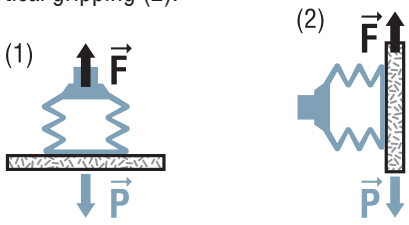
SUCTION CUP FORCE CALCULATION

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

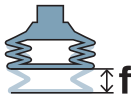
SUCTION CUP TECHNICAL DATA

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	■	■
	SIB5BD (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

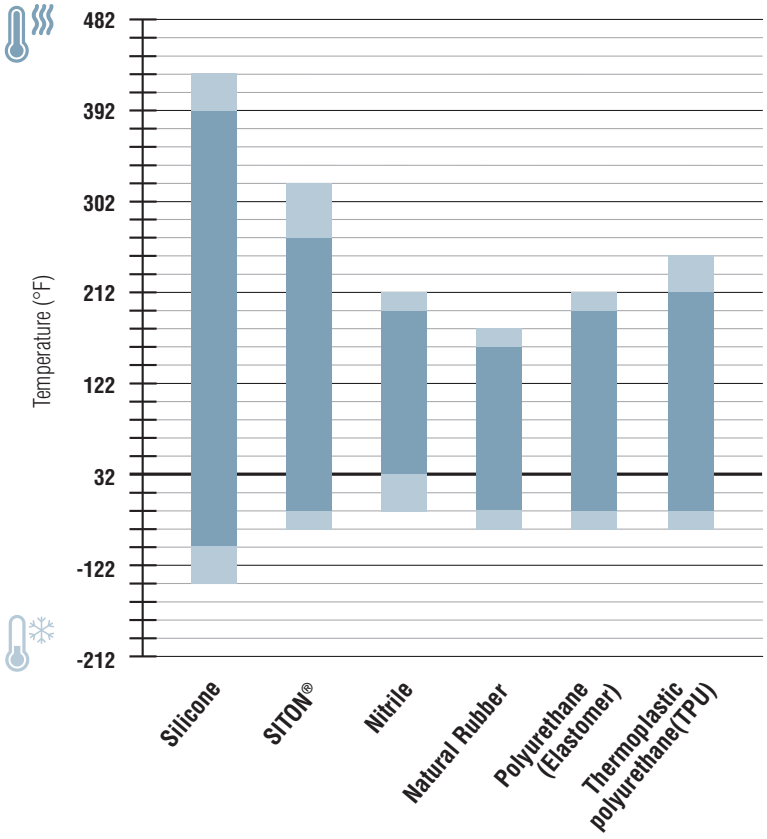
- Non-marking: clear, silicone-free compound.
- Withstands continuous temperatures of 266°F (130°C) up to 320°F (160°C) at peak.
- Excellent abrasion resistance.

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.

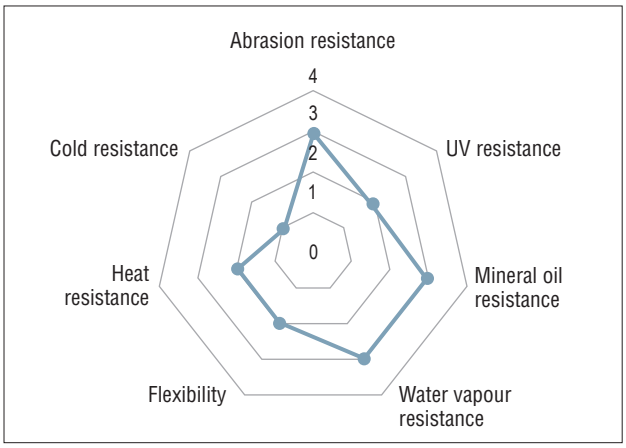
Chemicals may be incompatible with the suction cup material and cause swelling or damage.

Suction Cups

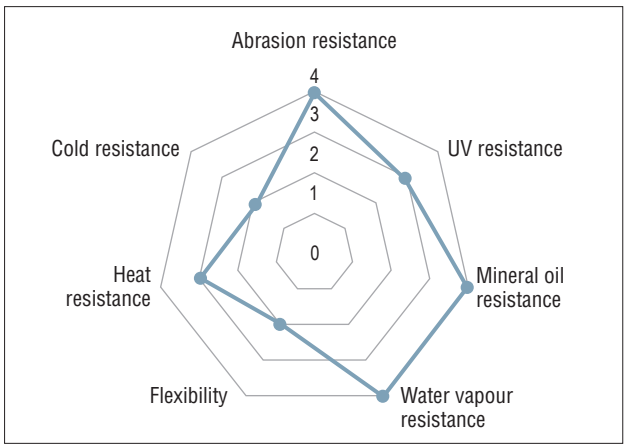
Selection Guide

Characteristics of COVAL materials

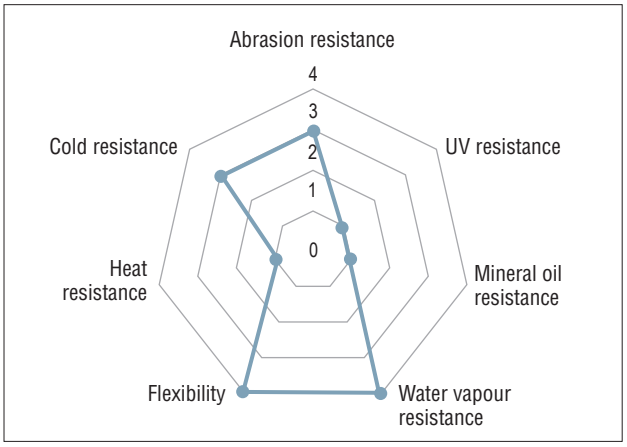
NITRILE (NBR)



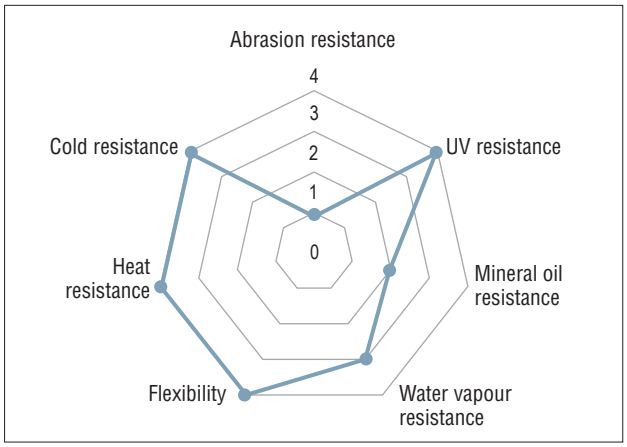
SITON® (STN)



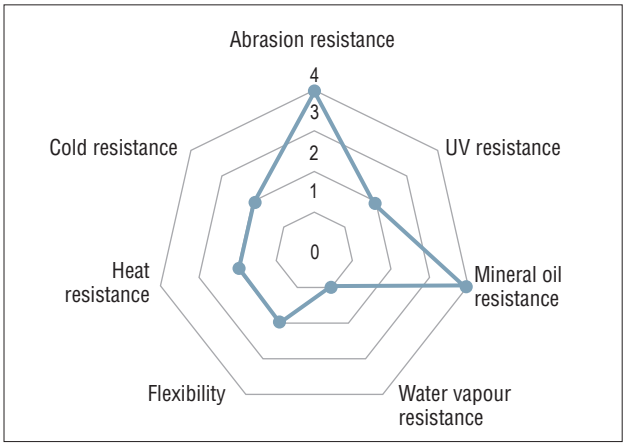
NATURAL RUBBER (NR)



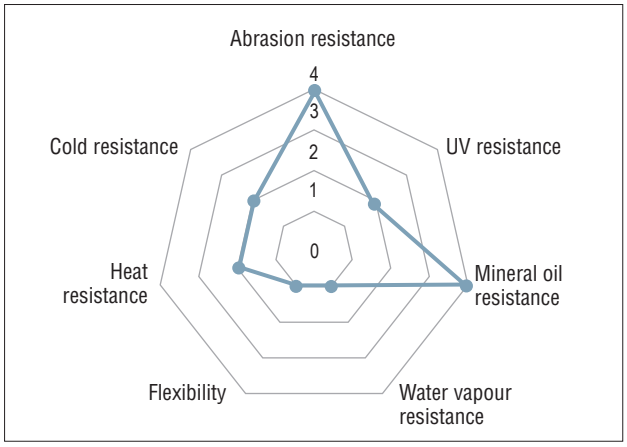
SILICONE (SI_SIT_SIB_SIBL)



POLYURETHANE (PU)

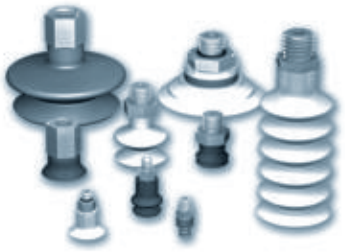


THERMOPLASTIC POLYURETHANE (TPU)



Suction Cups

Suction Cup Fitting Options

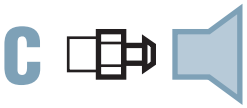


1

Standard Configuration Options

COVAL suction cups offer versatile mounting and fitting options:

Version C:
Barbed fittings.



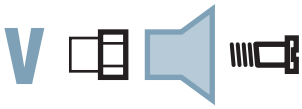
The suction cup is easily pressed onto the fitting.

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)



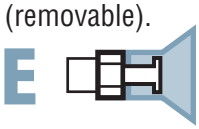
The V mounting utilizes a hollow screw passing through the suction cup and connecting to an adaptor on the opposite side, fixing the suction cup in place.

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).

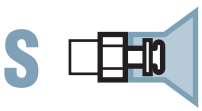


The fitting is factory pressed onto the suction cup.

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



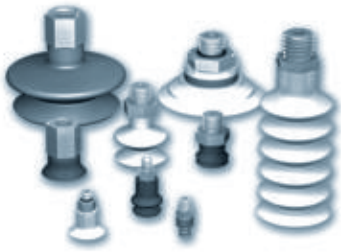
The fitting is factory-crimped onto the suction cup, ensuring a one-piece assembly.

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:

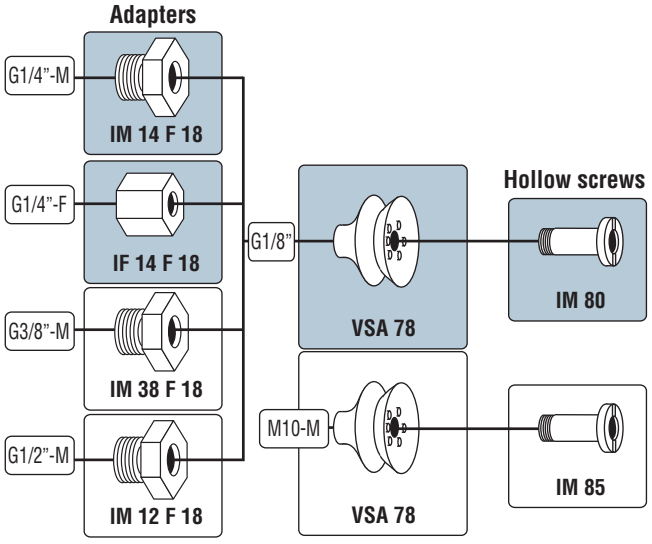
Group 3		V			S	
Ø 78 mm	THREAD	G1/8"-M	G1/4"-M	G1/4"-F	G1/4"-M	G1/4"-F
	VSA78NBR	VSA78NBRIM18V	VSA78NBRIM14V	VSA78NBRIF14V	VSA78NBRIM14	VSA78NBRIF14
	VSA78NR	VSA78NRIM18V	VSA78NRIM14V	VSA78NRIF14V	VSA78NRIM14	VSA78NRIF14
	VSA78SIT5	VSA78SIT5IM18V	VSA78SIT5IM14V	VSA78SIT5IF14V	VSA78SIT5IM14	VSA78SIT5IF14
	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 ■ 4 standard materials	■ High tensile force and precise gripping and releasing ■ High resistance to lateral forces allowing vertical handling
VPG	■ Extra-flat suction cups ■ Ø 2 to 200 mm ■ 3 standard materials	■ Highly precise gripping and releasing of the load ■ High throughput rates
VPU	■ Ø 6 to 50 mm ■ 3 standard materials	■ Suitable for gripping rigid and flat products
VPF	■ Flat suction cups with cleats ■ Ø 15 to 50 mm ■ 3 standard materials	■ Suitable for gripping rigid and flat products ■ Cleats prevent the deformation of the product and provide excellent non-slip properties
VPO	■ Flat oblong suction cuts ■ From 2x4 mm to 30x90 mm ■ 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 ■ 5 standard materials	■ Combines the advantages of flat suction cups with added angle, flexibility and precision ■ Used for gripping slightly concave or convex parts
VSAB	■ Ø 5 to 50 mm ■ 3 standard materials	■ Used for gripping slightly concave or convex parts ■ Suitable for gripping products of various heights
VSAG	■ Ø 10 to 150 mm ■ 3 standard materials	■ Recommended for gripping sensitive products due to the cushioning effect of the bellows ■ Used for gripping slightly concave or convex parts
VSAJ	■ Ø 15 to 30 mm ■ 2 standard materials	■ Used for gripping slightly concave or convex parts ■ Suitable for gripping products of various heights
Suction Cups with 2.5 Bellows		
VS	■ Ø 5 to 88 mm ■ 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 ■ 3 standard materials	■ Suitable for gripping small products, concave or convex ■ Ideal for handling sensitive products
Long Stroke Suction Cups		
VSD	■ Suction cups with 4.5 and 5.5 bellows ■ 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) ■ Ø 35 to 125mm and 25x65mm to 70x140mm ■ Integrated fittings ■ Structure and internal cleats	■ Textured suction cups for gripping thin sheets ■ Non-slip cleats ensure optimum positioning of oily sheet metal ■ Extreme resistance to slipping, ■ Porous integrated fittings ■ Ideal for automated applications
CTC	■ 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
Suction Cups with Foam Rings		
VSA-VS BM **VSA-VS BM-SIF** **VSBM**	■ Foam rings ■ Can be adapted to standard suction cups ■ 2 standard materials	■ Bonded under a suction cup to allow products with an irregular or even-ridged surface to be gripped ■ 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		■ Flexible suction cups ■ 4 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
Soft Suction Cups for High Speed Applications			
MVS		■ 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
Suction Cups with 4.5 Bellows			
MVP		■ 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
Suction Cups for Cheese			
VSAF		■ 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 grill prevents deformation of the food
VSAOF		■ 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 grill prevents deformation of the food
Suction Cups for Bakery Applications			
VSD **VSE** **VSP**		■ 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
Suction Cups for Egg-handling			
VSO		■ 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
Suction Cups for Bottle Handling			
VSBO **VSBO+** **VSBO LM/BM**		■ 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
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. ■ Excellent sealing when gripping different types of bottles.
VPBO		■ 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)

Suction Cups

The COVAL Range

Special Purpose Suction Cups

See chapter 3

1

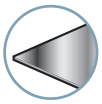
Suction Cups for Paper Applications			
VPA		■ Flat suction cups ■ 9 models ■ Very flexible lip ■ Natural rubber and silicone (FDA and CE standard)	■ Range of suction cups with very flexible lip used to handle very flexible materials ■ Very resistant to abrasion (for paper, cardboard) ■ Very flexible gripping lip which molds to the shape of the object to be handled
VPAL		■ 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
VSAPL		■ 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
VPR		■ Flat suction cups ■ 4 models ■ Natural rubber	■ Range of suction cups designed to meet the requirements of mailing applications. ■ Envelope stuffing, film-wrapping, mailing (picking) ■ Very resistant to abrasion
VPAG		■ Curved suction cups ■ 2 models ■ 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
Ultra-flat, Non-Marking Suction Cups			
VPSC		■ Ultra-flat suction cups ■ Ø 40 and 80 mm ■ Materials : Polyurethane and silicone (FDA and CE standards)	■ Suction cups specially designed not to deform the product being handled. ■ Vacuum distributed across the entire surface of the suction cup for an optimal gripping force. ■ 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 ■ 4 models (Ø 50 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
"Heavy-load" Suction Cups			
SPL		■ "Heavy load" flat suction cups ■ 5 models (Ø 240 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)
STEEL		■ 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

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

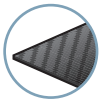
For handling requiring food compatibility, a very flexible lip and a specific shape of suction cup.

- 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

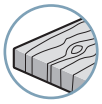
For handling wrapped products for packaging, cardboard products. Cardboard shaping, palletization, transfer, Pick & Place.

- 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

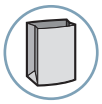
For handling requiring food compatibility, a very flexible lip and a specific shape of suction cup.

- 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	Minimum convex curve radius (R_{min})	Minimum concave curve radius (R_{min})	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

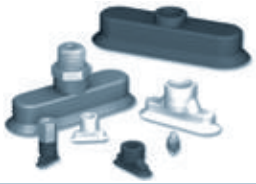
Flat Suction Cups with Cleats Ø 15 to 50 mm

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.

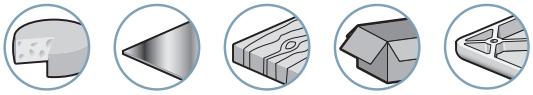
P 2/65

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.

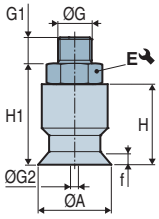
VP

Flat Suction Cups Ø 8 to 75 mm

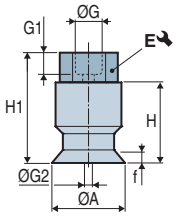
Dimensions "Suction Cup + Fitting"

VP 8 - 10 | Group 1

1

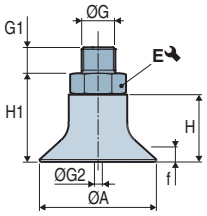


2

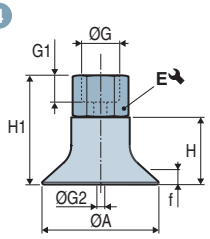


VP 15 - 25 | Group 1

3

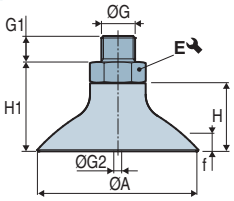


4

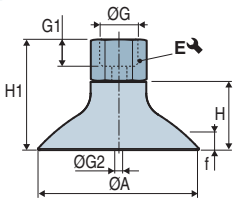


VP 26 - 60 | Group 2

5

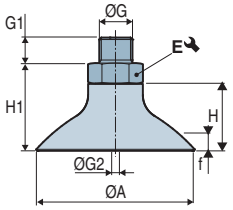


6

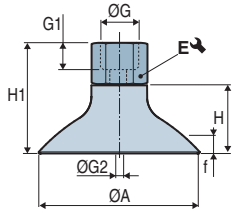


VP 75 | Group 3

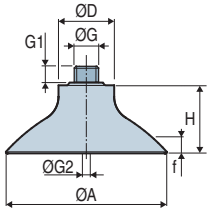
7



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

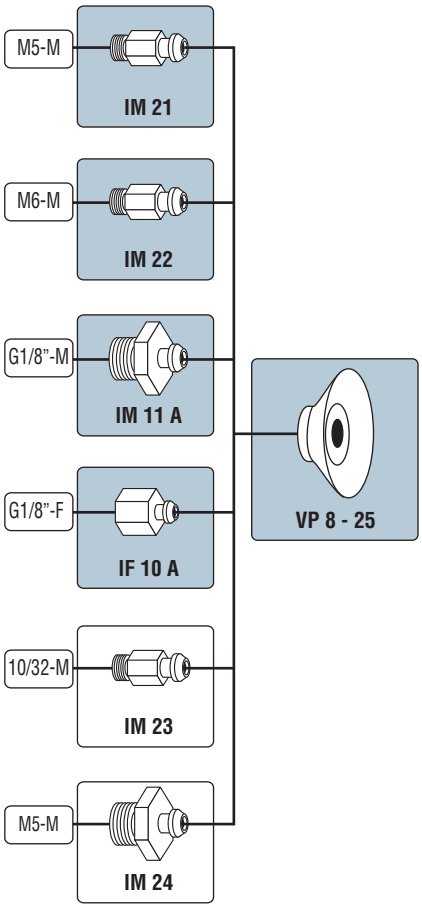
Note: All dimensions are in mm

(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

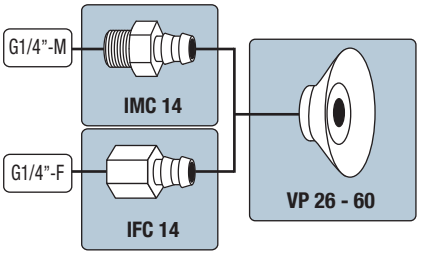
VP 8 - 25 | Group 1

Barbed fittings C

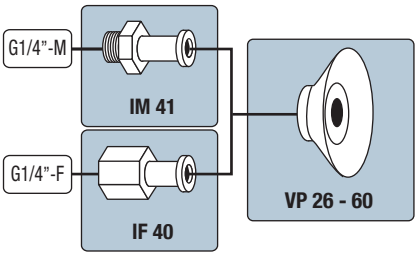


VP 26 - 60 | Group 2

Barbed fittings C

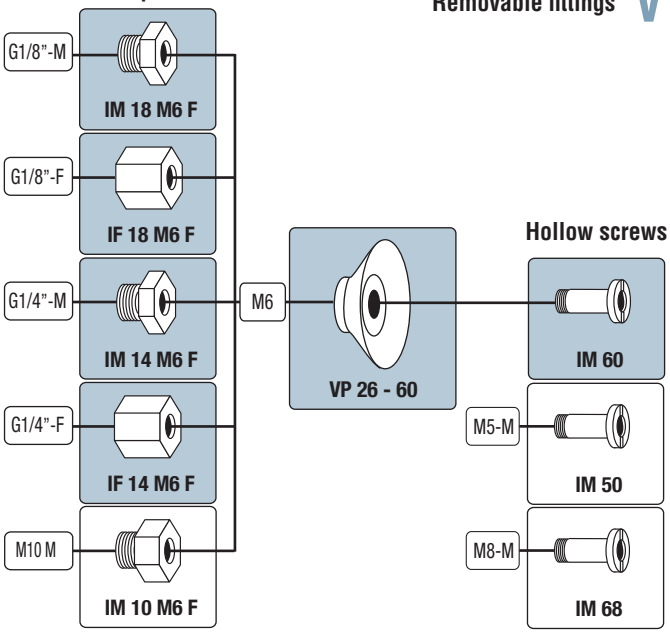


Pressed fittings E



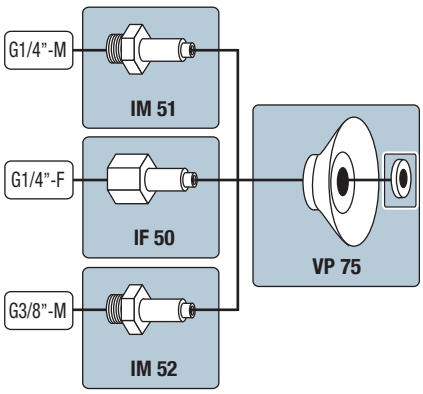
Adapters

Removable fittings V



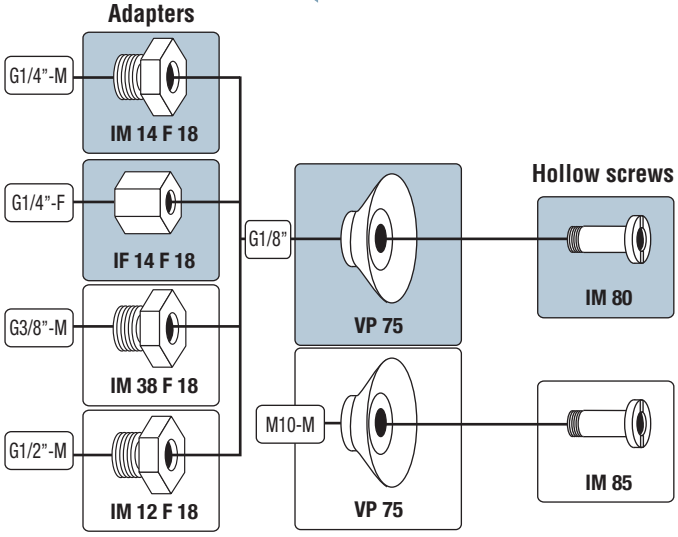
VP 75 | Group 3

Factory-crimped fittings S



Removable fittings V

Adapters



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

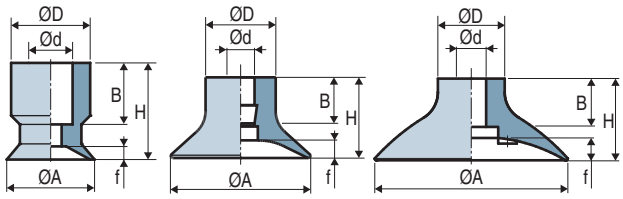
Non-standard configurations must be ordered in seperate part numbers.

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

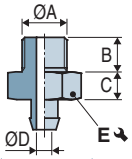


	ØA	H	Ød	ØD	f (1)	B	(g)
VP 8	7.5	10	5	9	1.3	7	0.4
VP 10	10	10.5	4.4	9	1.5	7	0.5
VP 15	15	11	4	9	2.25	7	0.7
VP 20	20	11.5	4	10	3	7	1.2
VP 25	25	12	4	10	3	7	1.4
VP 26	26	19.5	8	16	3	13	3.7
VP 30	30	19	8	16	2.5	13	4
VP 35	35	20	8	16	3	13	5.6
VP 40	40	20	8	16	3	13	9
VP 50	52	22	8	18	4.5	13	14
VP 60	60	22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

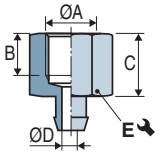
(1) f = Deflection of the suction cup.

Barbed Fittings

Male - IM



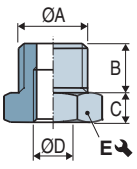
Female - IF



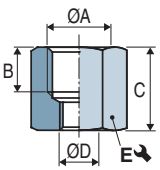
	ØA	B	C	ØD	E	Material	(g)
IM 11 A	G1/8"-M	7.5	6	3.5	14	Aluminum	4.1
IMC 14	G1/4"-M	10	8	7	17	Aluminum	8.7
IM 21 (2)	M5-M	4.5	5	2.5	7	Nickel-plated brass	3.1
IM 22 (2)	M6-M	5	5	3.5	7	Nickel-plated brass	2.7
IM 23	10/32-M	4.5	5	2.5	7	Brass	3
IM 24	M5-M	4.5	2.5	2.5	10	Nickel-plated brass	3.2
IF 10 A	G1/8"-F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



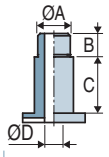
Female- IF

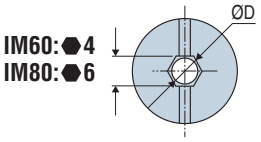


	ØA	B	C	ØD	E	Material	(g)
IM 10 M6F	M10-M	7	3.5	M6-F	13	Brass	5.9
IM 12 F18	G1/2"-M	14	6	G1/8"-F	22	Nickel-plated brass	46.8
IM 14 M6F	G1/4"-M	8	5	M6-F	17	Nickel-plated brass	15.9
IM 14 F18	G1/4"-M	8	5	G1/8"-F	17	Nickel-plated brass	10.6
IM 18 M6F	G1/8"-M	6	4.5	M6-F	13	Nickel-plated brass	6.6
IM 38 F18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

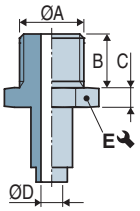




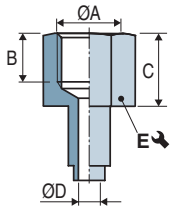
	ØA	B	C	ØD	Material	(g)
IM 50	M5-M	5	11	2.8	Brass	7.4
IM 60 (2) (3)	M6-M	7	11	3.5	Nickel-plated brass	7.5
IM 68	M8-M	8	11	5.2	Nickel-plated brass	6.4
IM 80	G1/8"-M	8	18	6	Nickel-plated brass	23.7
IM 85	M10x150-M	8	18	6	Nickel-plated brass	23.5

Factory-crimped Fittings

Male - IM



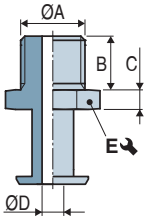
Female- IF



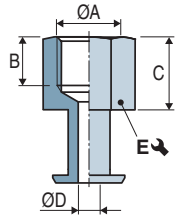
	ØA	B	C	ØD	E	Material	(g)
IM 51	G1/4"-M	11	6	4.4	17	Aluminum	11.8
IF 50	G1/4"-F	10	15	8	21	Aluminum	15.7
IM 52	G3/8"-M	11	6	8	21	Aluminum	14

Pressed Fitting

Male - IM

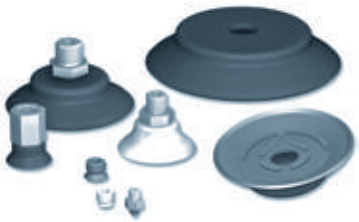


Female - IF



	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®

2

VPG

Suction Cup Properties

	Ø (mm)	(cm³)	(lbf) (1)	(lbf) (1)	R_{min} (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**	**VPG35STN**
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

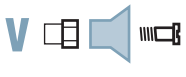
(Ø)	M3-M	M5-M	M5-F	M6-M	M8-M	M10-M	M10x125-F	G1/8"-F	G1/8"-M	G1/4"-F	G1/4"-M	G1/2"-F
2, 3.5	■	■	-	-	-	-	-	-	-	-	-	-
5… 10	-	■	■	-	-	-	-	■	■	-	-	-
15, 20	-	■	-	-	-	-	-	■	■	-	-	-
25… 50	-	-	-	■	□	□	-	■	■	■	■	-
60… 95	-	-	-	-	-	-	■	-	-	■	■	-
60S… 95S	-	-	-	-	-	-	-	-	-	■	-	-
120… 200	-	-	-	-	-	-	-	-	-	-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

■ 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.

Version C: Barbed fitting



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

Accessories

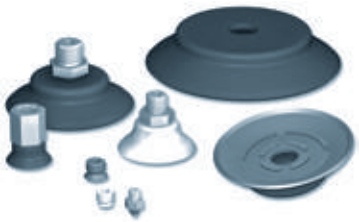
To optimize the use of your suction cups, Coval offers a comprehensive range of accessories (nozzle fittings,spring extensions, and feeder systems, etc.), see chapters **4** and **14**.

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

VPG

Extra-flat Suction Cups Ø 2 to 200 mm

References "Suction Cup + Fitting"



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	VPG20NBRIM18C	VPG20NBRIF18C	VPG20NBRIMM5V	VPG20NBRIM18V	VPG20NBRIF18V
VPG20SI	VPG20SIIM18C	VPG20SIIF18C	VPG20SIIMM5V	VPG20SIIM18V	VPG20SIIF18V
VPG20STN	VPG20STNIM18C	VPG20STNIF18C	VPG20STNIMM5V	VPG20STNIM18V	VPG20STNIF18V

Ø 25 - 50 mm

	C		V				
THREAD	G1/8"-M	G1/8"-F	M6-M	G1/8"-M	G1/8"-F	G1/4"-M	G1/4"F
VPG25NBR	VPG25NBRIM18C	VPG25NBRIF18C	VPG25NBRIMM6V	VPG25NBRIM18V	VPG25NBRIF18V	VPG25NBRIM14V	VPG25NBRIF14V
VPG25SI	VPG25SIIM18C	VPG25SIIF18C	VPG25SIIMM6V	VPG25SIIM18V	VPG25SIIF18V	VPG25SIIM14V	VPG25SIIF14V
VPG25STN	VPG25STNIM18C	VPG25STNIF18C	VPG25STNIMM6V	VPG25STNIM18V	VPG25STNIF18V	VPG25STNIM14V	VPG25STNIF14V
VPG30NBR	VPG30NBRIM18C	VPG30NBRIF18C	VPG30NBRIMM6V	VPG30NBRIM18V	VPG30NBRIF18V	VPG30NBRIM14V	VPG30NBRIF14V
VPG30SI	VPG30SIIM18C	VPG30SIIF18C	VPG30SIIMM6V	VPG30SIIM18V	VPG30SIIF18V	VPG30SIIM14V	VPG30SIIF14V
VPG30STN	VPG30STNIM18C	VPG30STNIF18C	VPG30STNIMM6V	VPG30STNIM18V	VPG30STNIF18V	VPG30STNIM14V	VPG30STNIF14V
VPG35NBR	VPG35NBRIM18C	VPG35NBRIF18C	VPG35NBRIMM6V	VPG35NBRIM18V	VPG35NBRIF18V	VPG35NBRIM14V	VPG35NBRIF14V
VPG35SI	VPG35SIIM18C	VPG35SIIF18C	VPG35SIIMM6V	VPG35SIIM18V	VPG35SIIF18V	VPG35SIIM14V	VPG35SIIF14V
VPG35STN	VPG35STNIM18C	VPG35STNIF18C	VPG35STNIMM6V	VPG35STNIM18V	VPG35STNIF18V	VPG35STNIM14V	VPG35STNIF14V
VPG40NBR	VPG40NBRIM18C	VPG40NBRIF18C	VPG40NBRIMM6V	VPG40NBRIM18V	VPG40NBRIF18V	VPG40NBRIM14V	VPG40NBRIF14V
VPG40SI	VPG40SIIM18C	VPG40SIIF18C	VPG40SIIMM6V	VPG40SIIM18V	VPG40SIIF18V	VPG40SIIM14V	VPG40SIIF14V
VPG40STN	VPG40STNIM18C	VPG40STNIF18C	VPG40STNIMM6V	VPG40STNIM18V	VPG40STNIF18V	VPG40STNIM14V	VPG40STNIF14V
VPG50NBR	VPG50NBRIM18C	VPG50NBRIF18C	VPG50NBRIMM6V	VPG50NBRIM18V	VPG50NBRIF18V	VPG50NBRIM14V	VPG50NBRIF14V
VPG50SI	VPG50SIIM18C	VPG50SIIF18C	VPG50SIIMM6V	VPG50SIIM18V	VPG50SIIF18V	VPG50SIIM14V	VPG50SIIF14V
VPG50STN	VPG50STNIM18C	VPG50STNIF18C	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

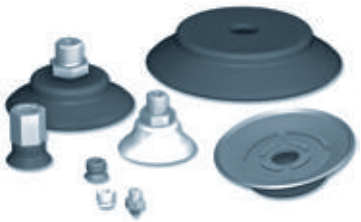
*Configured using fitting n° IFS12120
** Configured using fitting n° IF12120

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

VPG

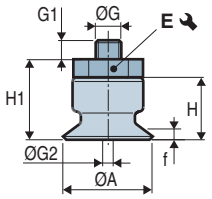
Extra-flat Suction Cups Ø 2 to 200 mm

Dimensions "Suction Cup + Fitting"

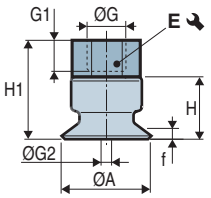


VPG 2 - 10

1

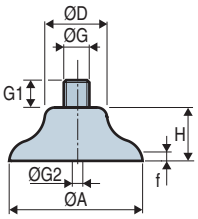


2

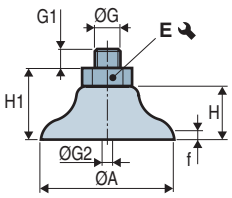


VPG 15 - 50

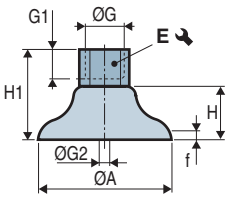
3



4

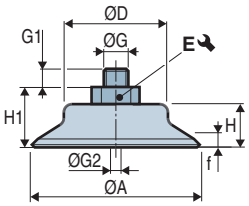


5

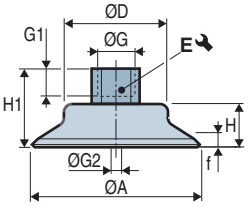


VPG 60 - 95

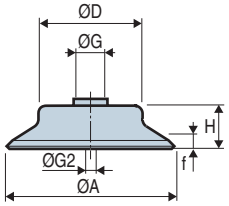
6



7

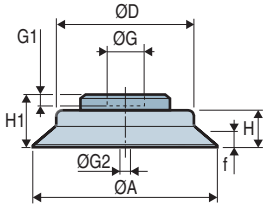


8



VPG 120 - 200

9



10

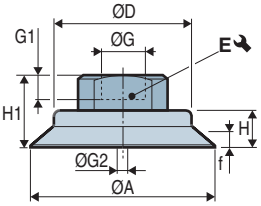


		Diagram	ØA	ØD	f (1)	H	H1	ØG	G1	ØG2 (2)	E	(g)
Ø 2 - 10 mm	VPG2---IMM3C	1	2	-	0.5	4	6	M3-M	3	1	5	0.21
	VPG2---IMM5C	1	2	-	0.5	4	7.5	M5-M	4.5	1	7	0.91
	VPG3.5---IMM3C	1	3.5	-	0.5	4	6	M3-M	3	1	5	0.22
	VGP3.5---IMM5C	1	3.5	-	0.5	4	7.5	M5-M	4.5	1	7	0.65
	VPG5---IMM5C	1	5	-	0.8	6.5	10	M5-M	4.5	2.2	7	0.86
	VPG5---IFM5C	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---IM18C	4	20	-	2.3	10	15	G1/8"-M	8	3	14	5.6
	VPG20---IF18C	5	20	-	2.3	10	25	G1/8"-F	9	3	14	6.9
	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"

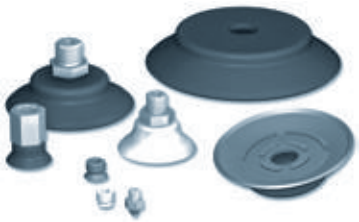
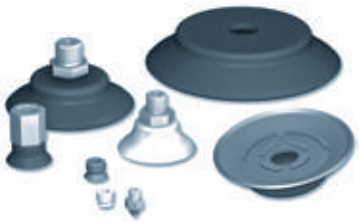


		Diagram	ØA	ØD	f (1)	H	H1	ØG	G1	ØG2 (2)	E	(g)
Ø 25 - 50 mm	VPG25---IM18C	4	25	-	3	14	19	G1/8"-M	8	4	14	6.9
	VPG25---IF18C	5	25	-	3	14	29	G1/8"-F	9	4	14	7.9
	VPG25---IMM6V	3	25	-	3	14	-	M6-M	6	3.5	-	5.5
	VPG25---IM18V	4	25	-	3	14	18.5	G1/8"-M	6	3.5	13	12.1
	VPG25---IF18V	5	25	-	3	14	27	G1/8"-F	7.5	3.5	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---IM18C	4	30	-	2	12	17	G1/8"-M	8	4	14	7.4
	VPG30---IF18C	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---IM18C	4	35	-	3	14	19	G1/8"-M	8	4	14	9.9
	VPG35---IF18C	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---IM18C	4	40	-	3.5	14	19	G1/8"-M	8	4	14	11.4
	VPG40---IF18C	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---IM18C	4	50	-	4	15	20	G1/8"-M	8	4	14	16
	VPG50---IF18C	5	50	-	4	15	30	G1/8"-F	9	4	14	17.4
	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.

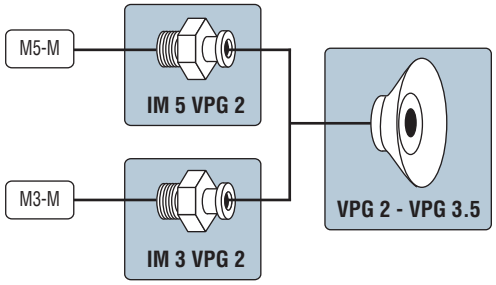
(1) f = Deflection of the suction cup. (2) Ø G2 = Ø internal orifice of the fitting.

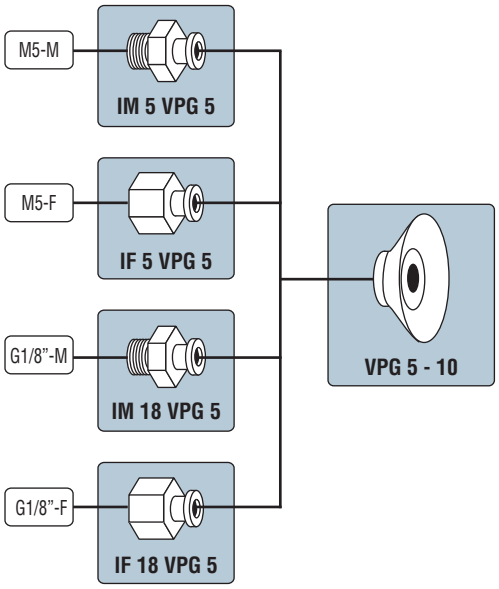
VPG
Extra-flat Suction Cups Ø 2 to 200 mm
Assembly Diagrams



VPG 2 - 10

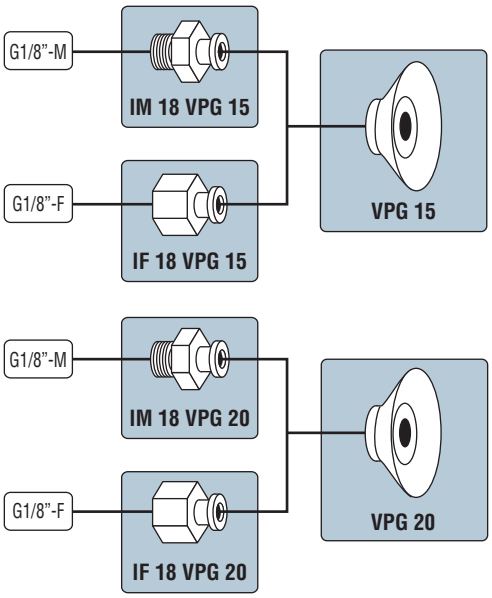
Barbed fittings C



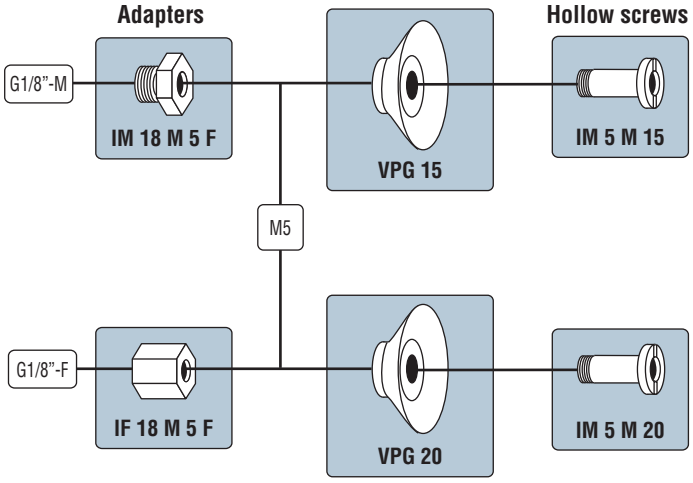


VPG 15 - 20

Barbed fittings C



Removable fittings V

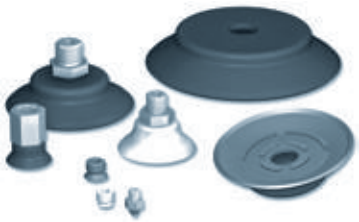


Configurations (suction cup + fitting) refer to page 2/10

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

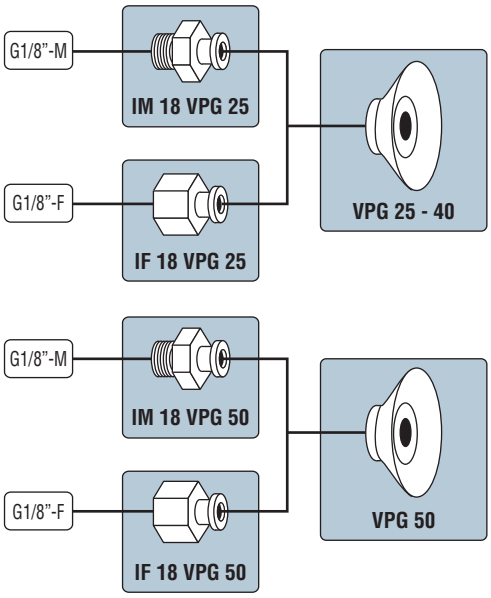
Extra-flat Suction Cups Ø 2 to 200 mm

Assembly Diagrams

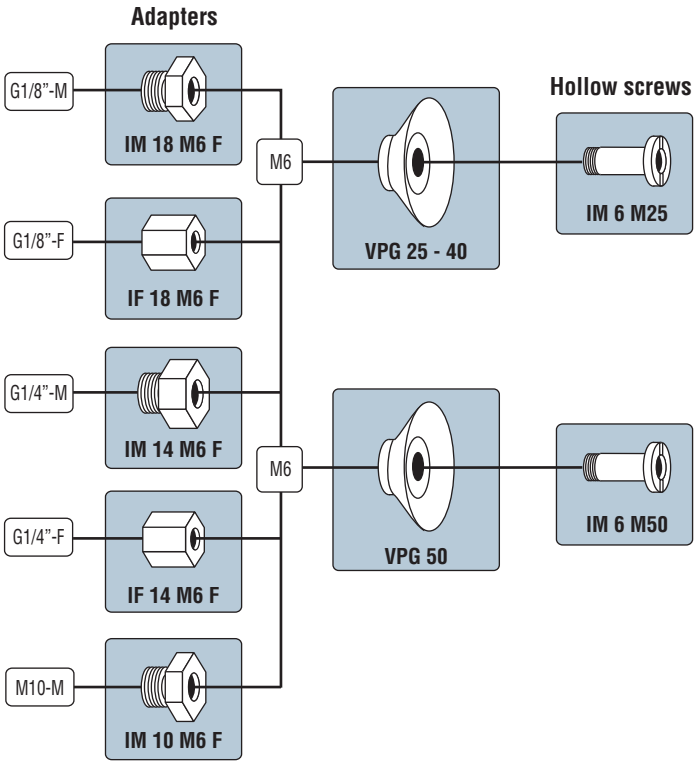


VPG 25 - 50

Barbed fittings C

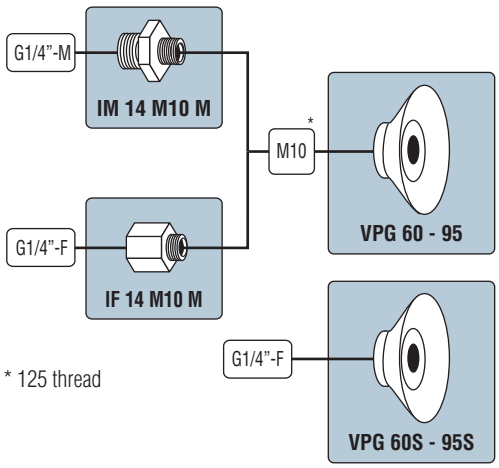


Removable fittings V



VPG 60 - 95

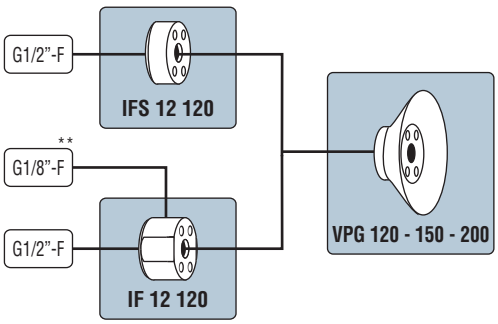
Removable fittings V



* 125 thread

VPG 120 - 200

Removable fittings V



** Female auxiliary radial output

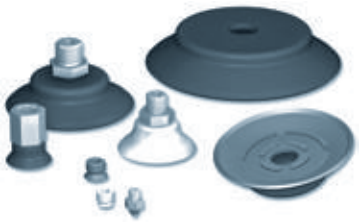
Configurations (suction cup + fitting) refer to page 2/10.

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

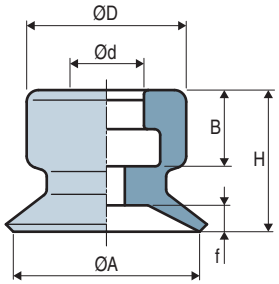
VPG

Extra-flat Suction Cups Ø 2 to 200 mm

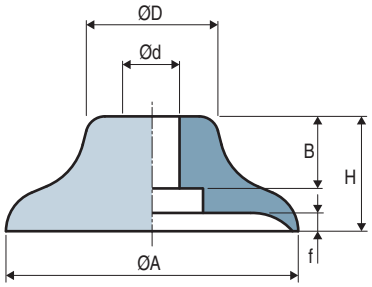
Dimensions - Suction Cups



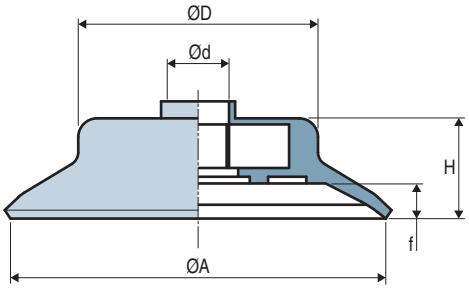
VPG 2 - 10



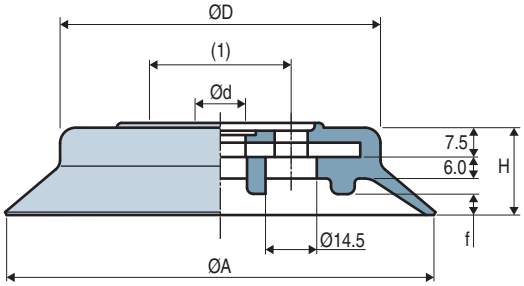
VPG 15 - 50



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

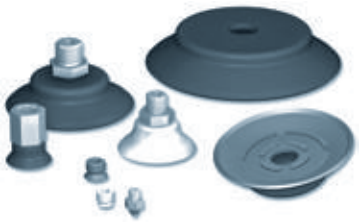
The values represent the average characteristics of our products.
Note: All dimensions are in mm.

(1) f = Deflection of the suction cup.

VPG

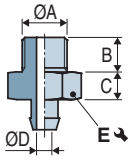
Extra-flat Suction Cups Ø 2 to 200 mm

Dimensions - Fittings

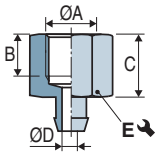


Barbed Fittings

Male - IM

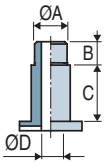


Female - IF



	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
IM 18 VPG20	G1/8"-M	8	5	3	14	Aluminum	4.06
IM 18 VPG25	G1/8"-M	8	5	4	14	Aluminum	4.08
IM 18 VPG50	G1/8"-M	8	5	4	14	Aluminum	4.9
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
IF 18 VPG15	G1/8"-F	9	15	2.5	14	Aluminum	5.2
IF 18 VPG20	G1/8"-F	9	15	3	14	Aluminum	5.4
IF 18 VPG25	G1/8"-F	9	15	4	14	Aluminum	5.5
IF 18 VPG50	G1/8"-F	9	15	4	14	Aluminum	6.3

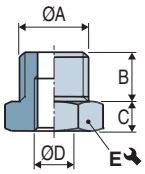
Hollow Screws



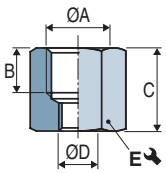
	ØA	B	C	ØD	Material	(g)
IM 5 M15	M5-M	5	2	2.5	Nickel-plated brass	1.3
IM 5 M20	M5-M	5	4	2.5	Nickel-plated brass	2.2
IM 6 M25	M6-M	6	6	3.5	Nickel-plated brass	2.7
IM 6 M50	M6-M	6	6	3.5	Nickel-plated brass	7.5

Adapters for Hollow Screws

Male - IM



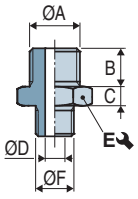
Female - IF



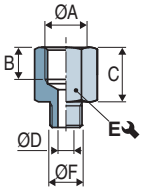
	ØA	B	C	ØD	E	Material	(g)
IM 10 M6F	M10-M	7	3.5	M6-F	13	Brass	5.9
IM 14 M6F	G1/4"-M	8	5	M6-F	17	Nickel-plated brass	15.9
IM 18 M5F	G1/8"-M	6	4.5	M5-F	13	Nickel-plated brass	7.3
IM 18 M6F	G1/8"-M	6	4.5	M6-F	13	Nickel-plated brass	6.6
IF 14 M6F	G1/4"-F	11	16	M6-F	17	Nickel-plated brass	20.5
IF 18 M5F	G1/8"-F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

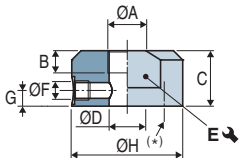
Male - IM



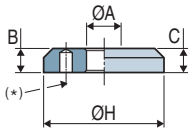
Female - IF



Female - IF 12120



Female - IFS 12120



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

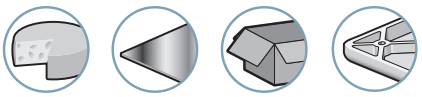
	ØA	B	C	ØD	E	ØF	G	H	Material	(g)
IM 14 M10M	G1/4"-M	10	5	5	17	M10x125-M	-	-	Aluminum	7
IF 14 M10M	G1/4"-F	10	17	5	17	M10x125-M	-	-	Aluminum	8.3
IF 12120	G1/2"-F	24	30	19	48	G1/8"-F	8.7	60	Aluminum	224.8
IFS 12120	G1/2"-F	13	13	-	-	-	-	65	Aluminum	143.5

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

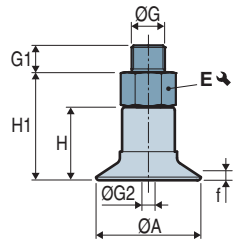
Accessories
To optimize use of your suction cups, Coval offers a comprehensive range of accessories (sensors, spring extensions, and feeder systems, etc.)
see chapters **4** and **14**.

VPU
Flat Suction Cups Ø 6 to 50 mm
Assembly Diagrams

Suction Cups + Fittings

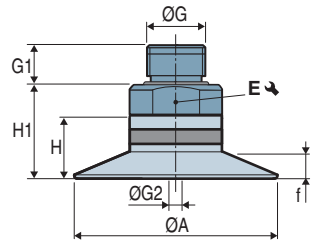
VPU 6 - 15

1



VPU 20 - 30

2



VPU 40 - 50

3

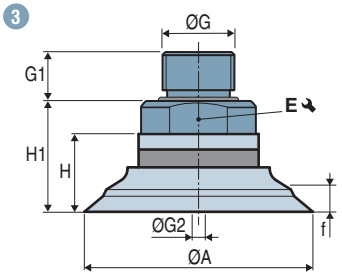
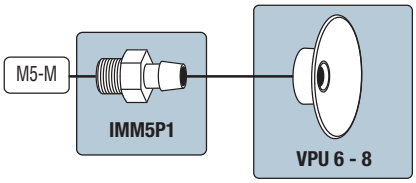
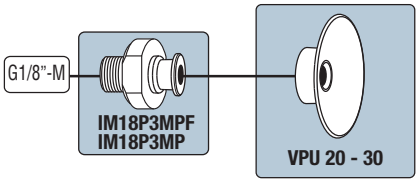


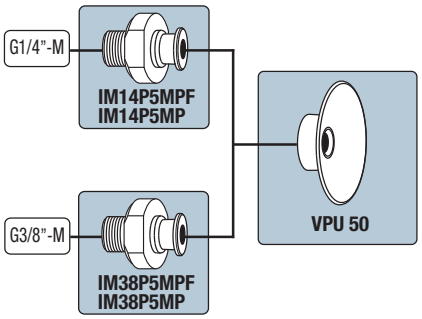
	Diagram	ØA	f (1)	H	H1	ØG	G1	ØG2 (2)	E	(g)
VPU6---IMM5C	**1**	7	0.3	6.5	10	M5-M	4	1.5	7	1.8
VPU8---IMM5C	**1**	9	0.5	7	10.5	M5-M	4	1.5	7	1.9
VPU10---IMM5C	**1**	11	0.5	10.5	15	M5-M	4	2.7	7	1.3
VPU15---IMM5C	**1**	16.5	1.5	11.5	16	M5-M	4	2.7	7	1.6
VPU20---IM18MP-	**2**	22	2.5	8	13	G1/8"-M	7	4	13	4.4
VPU30---IM18MP-	**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

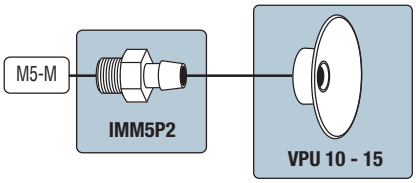
(1) f = Deflection of the suction cup. (2) Ø G2 = Ø internal orifice of the fitting.

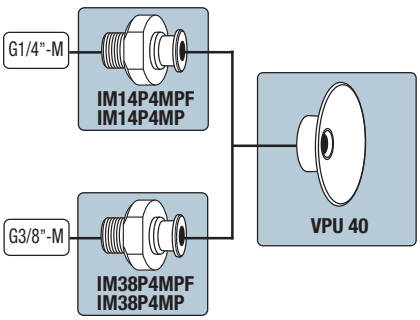
Assembly Diagrams









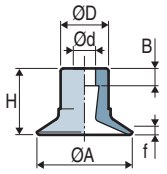


Note: All dimensions are in mm.

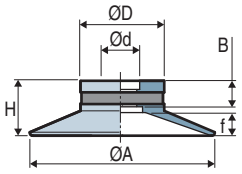
VPU
Flat Suction Cups Ø 6 to 50 mm
Dimensions

Suction Cups

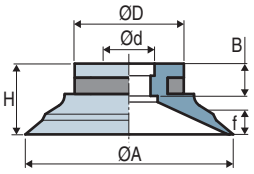
VPU 6 - 15



VPU 20 - 30



VPU 40 - 50

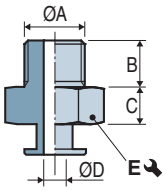


	ØA	H	Ød	ØD	f (1)	B	(g)
VPU 6	7	6.5	2	5	0.3	3.5	0.12
VPU 8	9	7	2	5	0.5	3.5	0.15
VPU 10	11	10.5	3.8	9	0.5	3	0.51
VPU 15	16.5	11.5	3.8	8.3	1.5	3	0.75
VPU 20	22	8	5	14.5	2.5	4.5	1.2
VPU 30	32	9.5	5	14.5	3.5	4.5	1.9
VPU 40	41	13	6.5	20	4.5	6	5
VPU 50	51.4	17.5	10.5	27	6	8	12

(1) f = Deflection of the suction cup.

Barbed Fittings

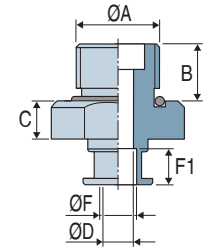
IMM5P1 - IMM5P2

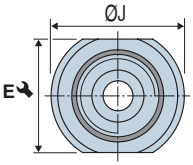


	ØA	B	C	ØD	E	Material	(g)
IMM5P1	M5-M	4	3.5	1.5	7	Brass	1.7
IMM5P2	M5-M	4	4.5	2.7	7	Aluminum	0.8

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

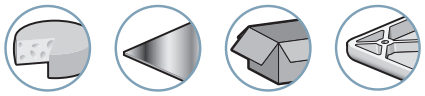
*Male fittings (IM) equiped with O-ring sealing

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**.

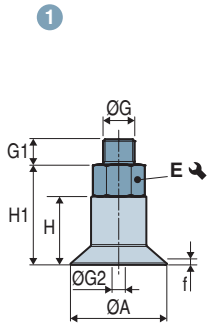
VPF

Flat Suction Cups with Cleats Ø 15 to 50 mm

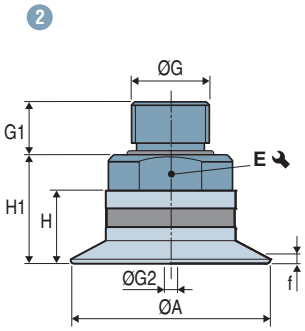
Assembly Diagrams

Suction Cup + Fitting

VPF 15



VPF 20…30



VPF 40…50

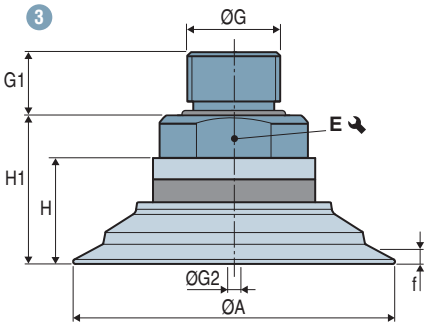
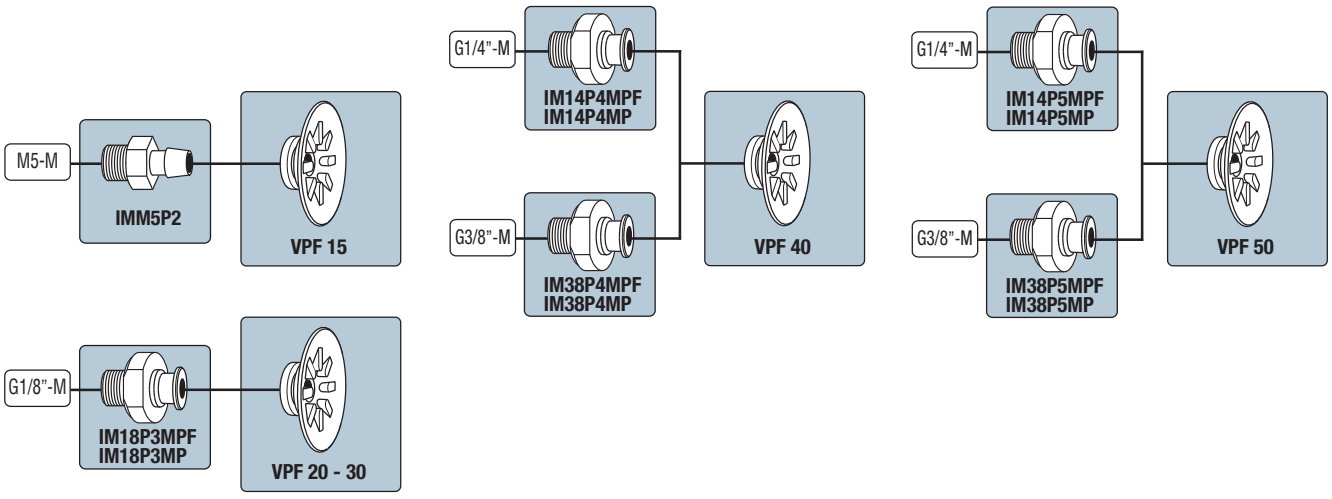


	Diagram	ØA	f (1)	H	H1	ØG	G1	ØG2 (2)	E	(g)
VPF15---IMM5C	**1**	15.7	1	11	15.5	M5-M	4	2.7	7	1.5
VPF20---IM18MP-	**2**	22	1	8	13	G1/8"-M	7	4	13	4.4
VPF25---IM18MP-	**2**	26.8	1.3	9	14	G1/8"-M	7	4	13	4.9
VPF30---IM18MP-	**2**	32	1.8	10	15	G1/8"-M	7	4	13	5.4
VPF40---IM14MP-	**3**	42.5	1.9	13	19	G1/4"-M	9	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.

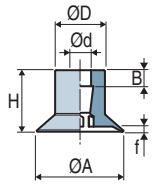
VPF

Flat Suction Cups with Cleats Ø 15 to 50 mm

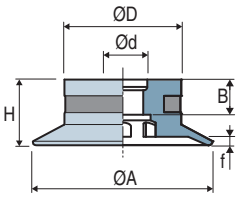
Assembly Diagrams

Suction Cups

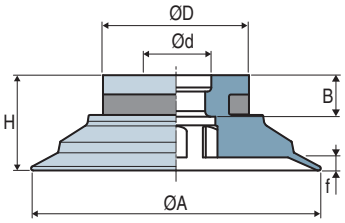
VPF 15



VPF 20…30



VPF 40…50

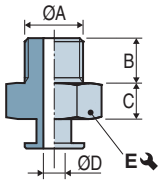


	Ø A	H	Ø d	Ø D	f (1)	B	(g)
VPF 15	15.7	11	4	9	1	3	0.7
VPF 20	22	8	5	14.3	1	4.5	1.2
VPF 25	26.8	9	5	14.3	1.3	4.5	1.7
VPF 30	32	10	5	14.3	1.8	4.5	2.2
VPF 40	42.5	13	7	20	1.9	6	5.6
VPF 50	53	17.5	10.5	27	2.4	7.5	12.7

(1) f = Deflection of the suction cup.

Barbed Fittings

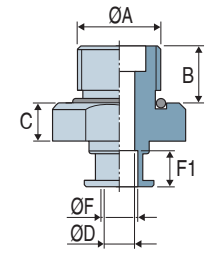
IMM5P2

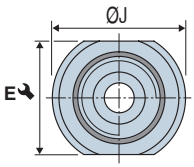


	ØA	B	C	ØD	E	Material	(g)
IMM5P2	M5-M	4	4.5	2.7	7	Aluminum	0.8

Pressed fittings

Male fittings



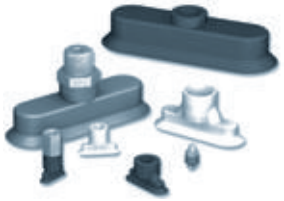


Fitting with stainless steel filter 200 µm	Fitting without filter	ØA	B	C	ØD	E	ØJ	ØF	F1	Materials Fitting*	(g)
IM18P3MPF	**IM18P3MP**	G1/8"-M	7	5	4	13	15	5	4.7	Aluminum	3.2
IM14P4MPF	**IM14P4MP**	G1/4"-M	9	6	5	19	21	6	5.7	Aluminum	7
IM14P5MPF	**IM14P5MP**	G1/4"-M	9	6	6	22	28	10	8.7	Aluminum	12.1
IM38P4MPF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

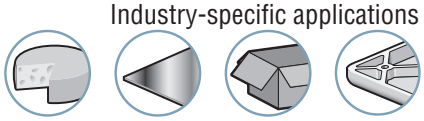
Note: All dimensions are in mm.
The values represent the average characteristics of our products.

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

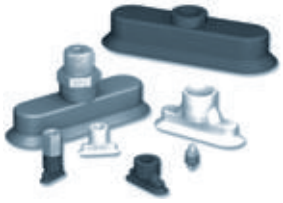
15x45 - 30x90

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

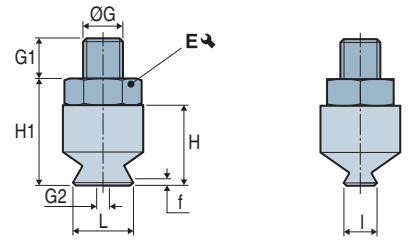
Please specify the part n°. e.g. VPO618NBRIFM5C
See part n° table above

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



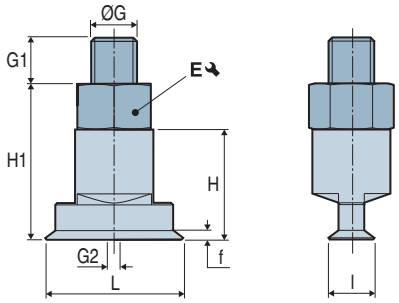
VPO 2x4 - 3.5x7

1

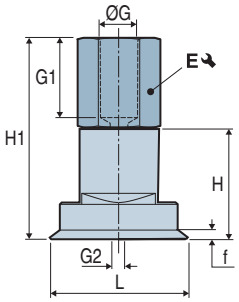


VPO 5x15 - 6x18

2

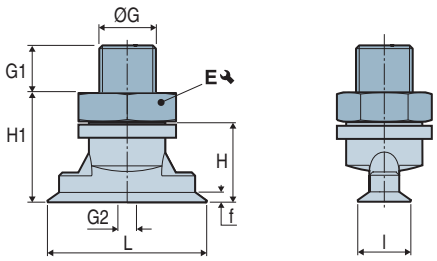


3

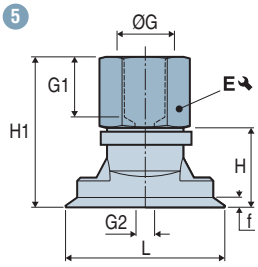


VPO 8x24 - 10x30

4

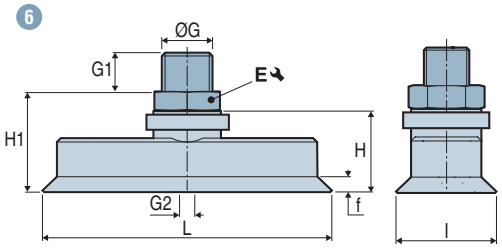


5



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

6



7

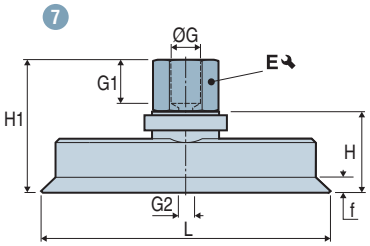


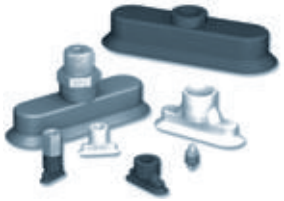
	Diagram	L	l	f (1)	H	H1	ØG	G1	ØG2 (2)	E	(g)
VPO24---IMM3C	1	4	2	0.5	6	8	M3-M	3	1	5	0.4
VPO357---IMM3C	1	7	3.5	0.8	6	8	M3-M	3	1	5	0.3
VPO515---IMM5C	2	15	5	0.7	12	17	M5-M	5	2	8	1.8
VPO515---IFM5C	3	15	5	0.7	12	22	M5-F	8.5	2	8	1.8
VPO618---IMM5C	2	18	6	0.8	12	17	M5-M	5	2	8	1.8
VPO618---IFM5C	3	18	6	0.8	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.

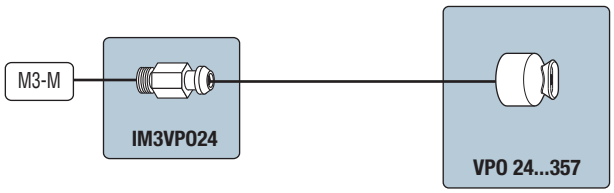
(2) Ø G2 = Ø internal orifice of the fitting.

VPO
Oblong Flat Suction Cups
Assembly Diagrams



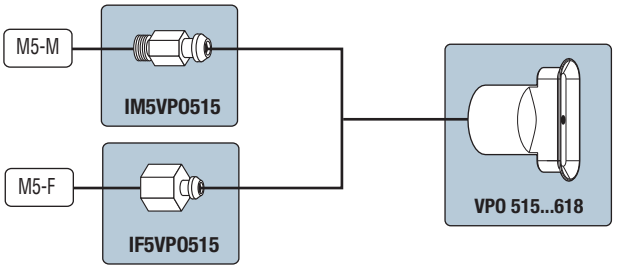
VPO 24 - 357

Barbed fittings C



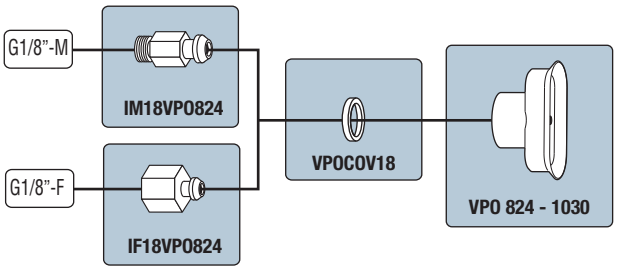
VPO 515 - 618

Barbed fittings C



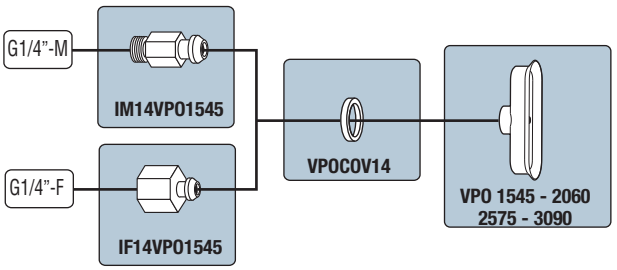
VPO 824 - 1030

Barbed fittings C

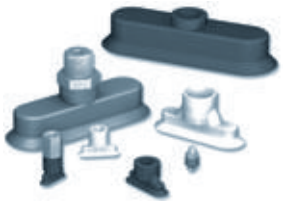


VPO 1545 - 2060 - 2575 - 3090

Barbed fittings C

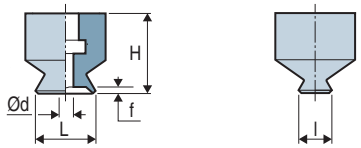


VPO
Oblong Flat Suction Cups
Dimensions

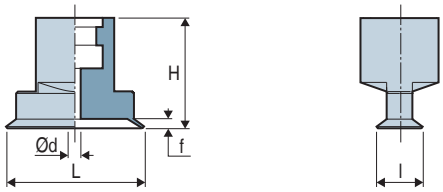


Dimensions Suction Cups

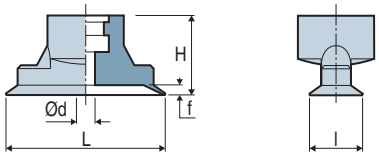
VPO 24 - 357



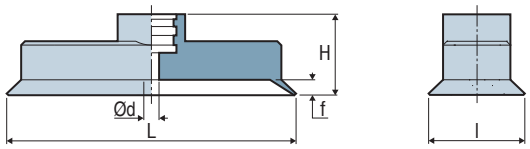
VPO 515 - 618



VPO 824 - 1030



VPO 1545 - 2060 - 2575 - 3090



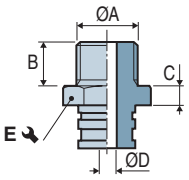
Suction Cups

	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

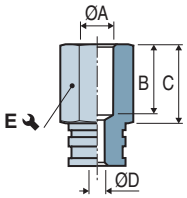
(1) f = Deflection of the suction cup.

Barbed Fitting

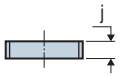
Male - IM



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.

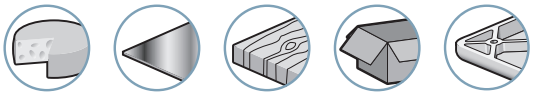
VSA
Suction Cups with 1.5 Bellows Ø 5 to 78 mm

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.

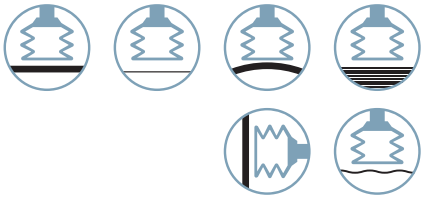
■ Flexibility ■ Precision ■ Deflection

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

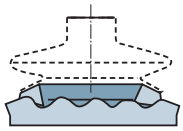
S **Version S**
Factory-crimped fitting

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

References - "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	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 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
	VSA63SIT	VSA63SITIM14C	VSA63SITIF14C	VSA63SITIM14	VSA63SITIF14	VSA63SITIM18V	VSA63SITIF18V	VSA63SITIM14V	VSA63SITIF14V
	VSA63STN	VSA63STNIM14C	VSA63STNIF14C	VSA63STNIM14	VSA63STNIF14	VSA63STNIM18V	VSA63STNIF18V	VSA63STNIM14V	VSA63STNIF14V

Group 3 — V / S

	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
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

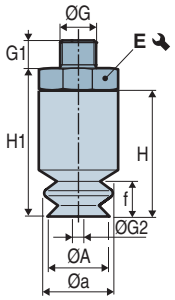
VSA

Suction Cups with 1.5 Bellows Ø 5 to 78 mm

Dimensions - "Suction Cup + Fitting"

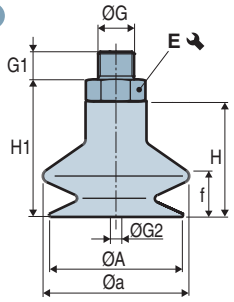
VSA 5 | **Group 1**

1

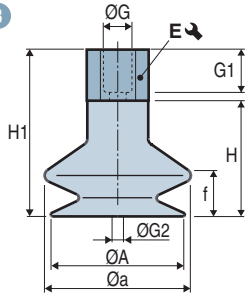


VSA 11 - 25 | **Group 1**

2

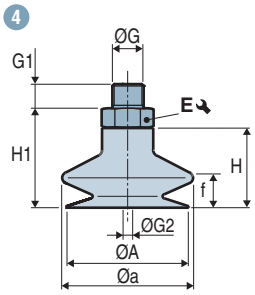


3

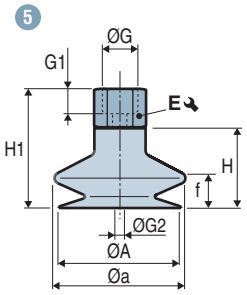


VSA 26 - 43 | **Group 2**

4

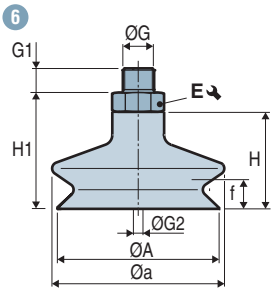


5

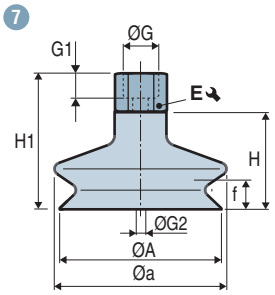


VSA 53 - 63 Group 2 / VSA 78 Group 3

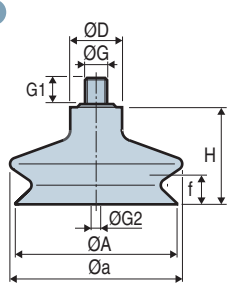
6



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	-	12	23	28	M5-M	4.5	2.5	7	6
	VSA25---IMM6C	2	24	25	-	12	23	28	M6-M	5	3.5	7	5.8
	VSA25---IM18C	2	24	25	-	12	23	29	G1/8"-M	7.5	3.5	14	7
	VSA25---IF18C	3	24	25	-	12	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.

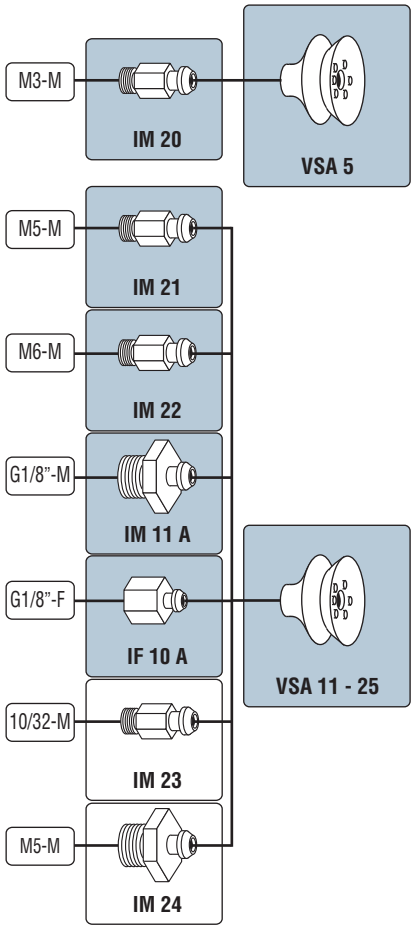
VSA

Suction Cups with 1.5 Bellows Ø 5 to 78 mm

Assembly Diagrams

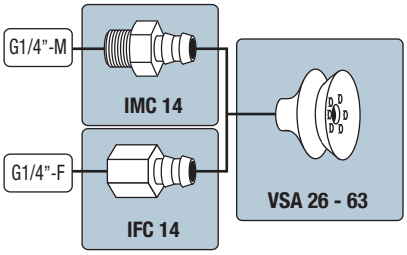
VSA 5 - 25 | Group 1

Barbed fittings C

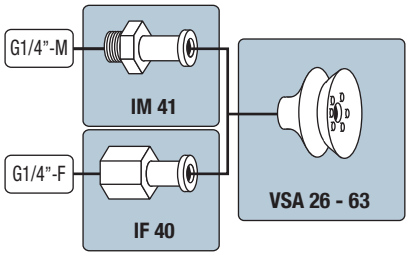


VSA 26 - 63 | Group 2

Barbed fittings C

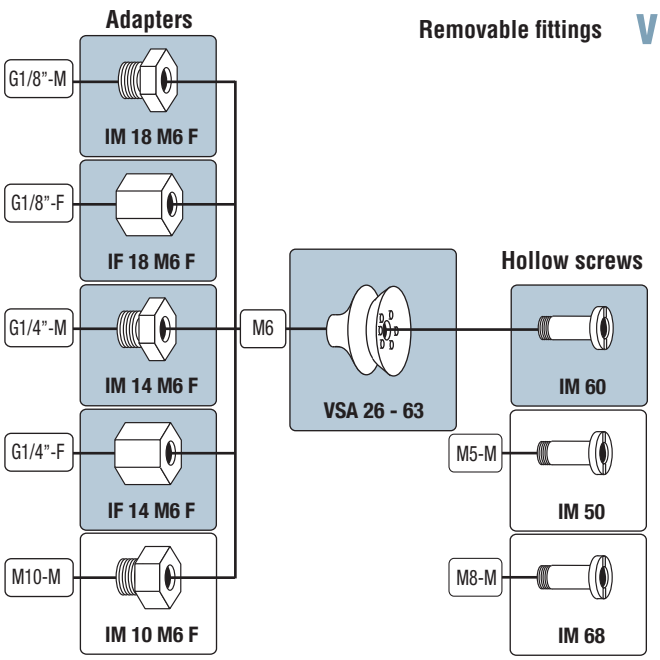


Pressed fittings E



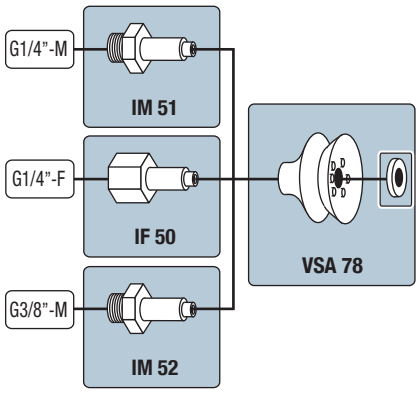
Adapters

Removable fittings V



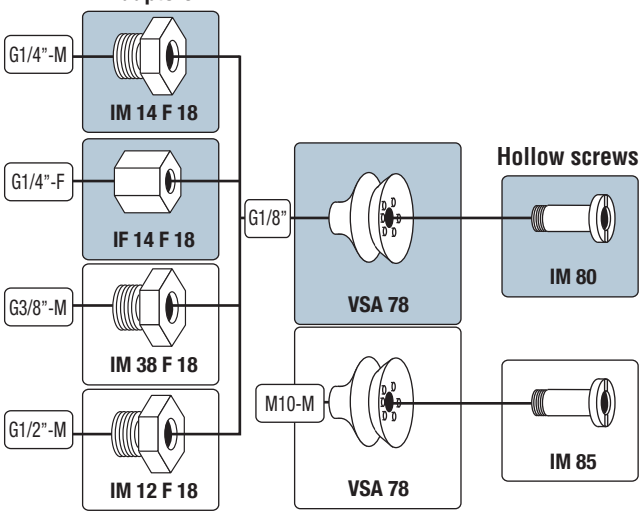
VSA 78 | Group 3

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.

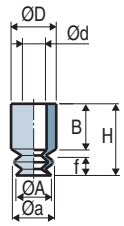
VSA

Suction Cups with 1.5 Bellows Ø 5 to 78 mm

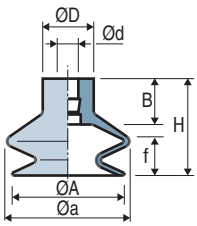
Dimensions

Suction Cups

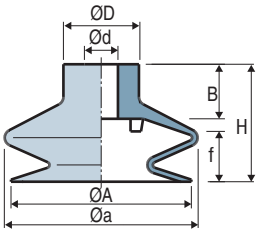
VSA 5



VSA 11 - 25



VSA 26 - 78

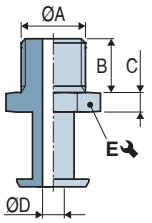


	Ø A	H	Ø a	Ø d	Ø D	f (1)	B	(g)
VSA 5	5.5	11	6	4	7	2	7	0.3
VSA 11	11	16	12.2	4	10	5.5	9	0.9
VSA 14	13	16	14	4	10	5	9	1.1
VSA 16	16	19	17.3	4	10	8.5	9	1.3
VSA 18	18	16.5	18	4	10	5	9	1.5
VSA 20	19	16	20	4	10	5	9	1.7
VSA 22	22	19	24	4	10	8	9	2.1
VSA 25	24	23	25	4	10	12	9	2.9
VSA 26	25	25	30	8	16	6	13	4.6
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

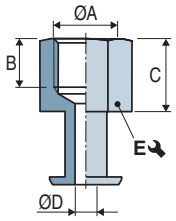
(1) f = Deflection of the suction cup.

Pressed Fittings

Male - IM



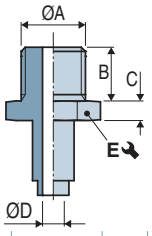
Female - IF



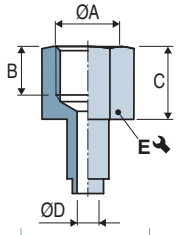
	ØA	B	C	ØD	E	Material	(g)
IM41	G1/4"-M	11	4	4.4	17	Aluminum	7.8
IF40	G1/4"-F	10	15	4.4	17	Aluminum	8.4

Factory-Crimped Fittings

Male - IM

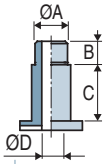


Female - IF

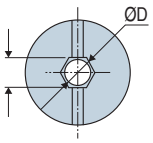


	ØA	B	C	ØD	E	Material	(g)
IM 51	G1/4"-M	11	6	4.4	17	Aluminum	11.8
IF 50	G1/4"-F	10	15	8	21	Aluminum	15.7
IM 52	G3/8"-M	11	6	8	21	Aluminum	14

Hollow Screws



IM60: ⬢4
IM80: ⬢6

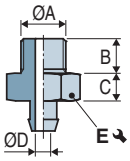


	ØA	B	C	ØD	Material	(g)
IM 50	M5-M	5	11	2.8	Brass	7.4
IM 60 (2) (3)	M6-M	7	11	3.5	Nickel-plated brass	7.5
IM 68	M8-M	8	11	5.2	Nickel-plated brass	6.4
IM 80	G1/8"-M	8	18	6	Nickel-plated brass	23.7
IM 85	M10x150-M	8	18	6	Nickel-plated brass	23.5

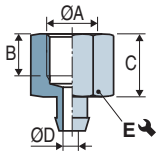
The values represent the average characteristics of our products.
(2) Flow restrictor version available: orifice calibrated to reduce leaks when used with a multi-cup gripper (see page 4/10)
(3) Available in stainless steel

Barbed Fittings

Male - IM



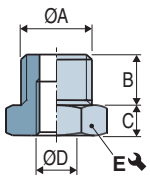
Female - IF



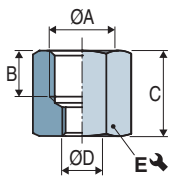
	ØA	B	C	ØD	E	Material	(g)
IM 11 A	G1/8"-M	7.5	6	3.5	14	Aluminum	4.1
IMC 14	G1/4"-M	10	8	7	17	Aluminum	8.7
IM20	M3-M	3	2	1.4	5	Aluminum	0.4
IM 21 (2)	M5-M	4.5	5	2.5	7	Nickel-plated brass	3.1
IM 22 (2)	M6-M	5	5	3.5	7	Nickel-plated brass	2.7
IM 23	10/32-M	4.5	5	2.5	7	Brass	3
IM 24	M5-M	4.5	2.5	2.5	10	Nickel-plated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



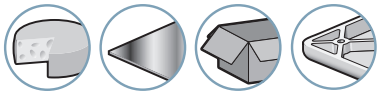
	ØA	B	C	ØD	E	Material	(g)
IM 10 M6F	M10-M	7	3.5	M6-F	13	Brass	5.9
IM 12 F18	G1/2"-M	14	6	M6-F	22	Nickel-plated brass	46.5
IM 14 M6F	G1/4"-M	8	5	M6-F	17	Nickel-plated brass	15.9
IM 14 F18	G1/4"-M	8	5	G1/8"-F	17	Nickel-plated brass	10.6
IM 18 M6F	G1/8"-M	6	4.5	M6-F	13	Nickel-plated brass	6.6
IM 38 F18	G3/8"-M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

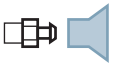
(1) Actual force of the suction cup in use with a 65% vacuum and including a safety factor of 2 for horizontal handling and a factor of 4 for vertical handling.

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

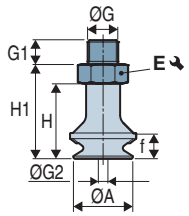
Suction Cups with 1.5 Bellows Ø 5 to 50 mm

Dimensions

Suction Cup + Fitting

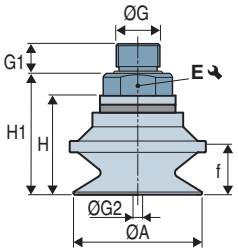
VSAB 5…15

1



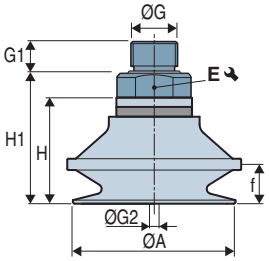
VSAB 20…30

2



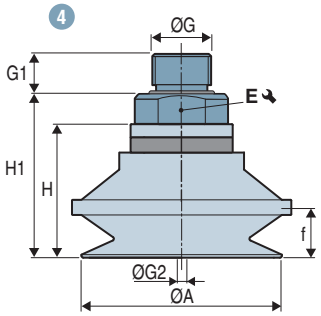
VSAB 40

3



VSAB 50

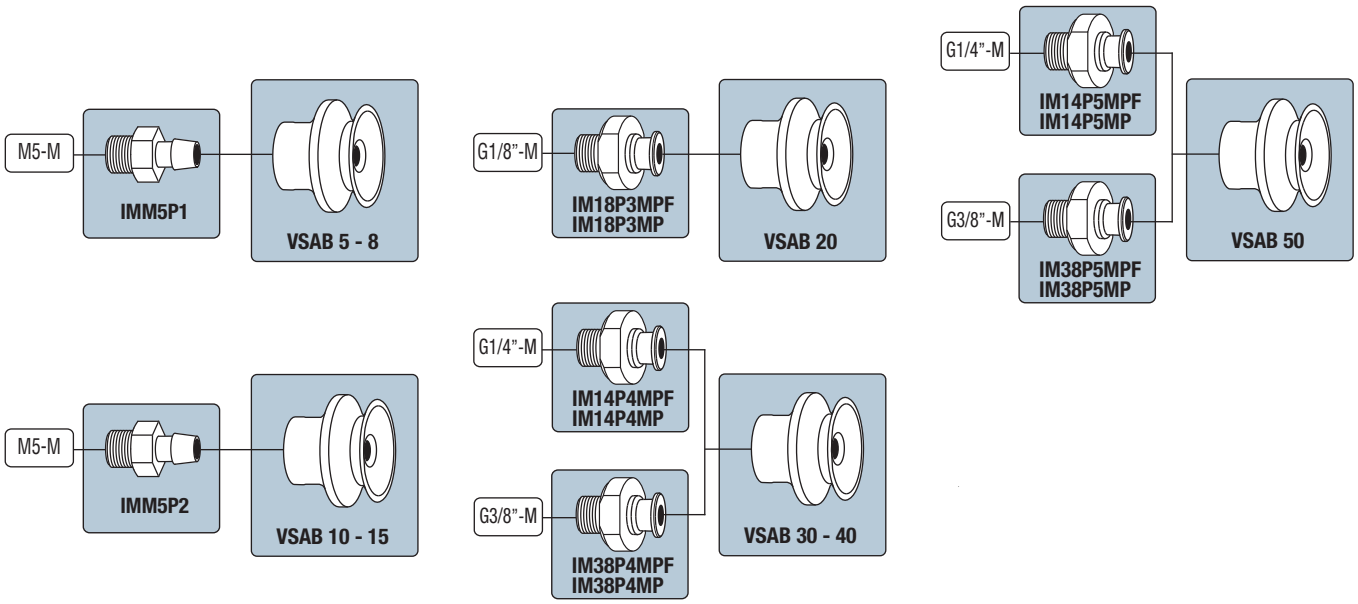
4



	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

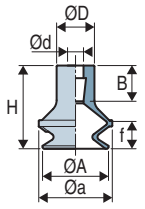


Note: All dimensions are in mm.

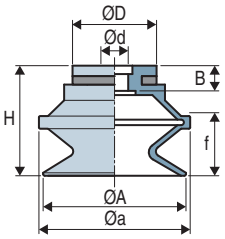
VSAB
Suction Cups with 1.5 Bellows Ø 5 to 50 mm
Dimensions

Suction Cups

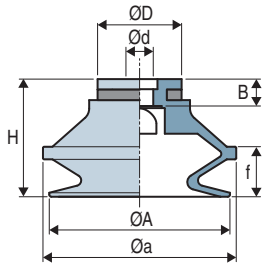
VSAB 5…15



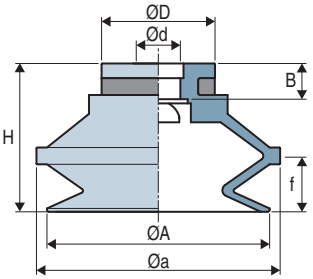
VSAB 20…30



VSAB 40



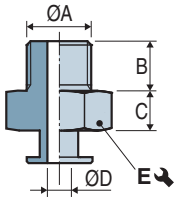
VSAB 50



	ØA	H	Øa	Ød	ØD	f (1)	B	(g)
VSAB 5	5.6	9.2	6.2	2	4.5	1.5	3.5	0.12
VSAB 8	8.8	11.9	9.6	2	5.5	3.5	3.5	0.27
VSAB 10	11	16.4	12	3.8	9	4.5	5	0.8
VSAB 15	15.7	19.8	17.5	3.8	9	6.5	3	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.

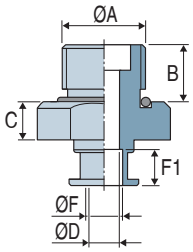
Barbed Fittings

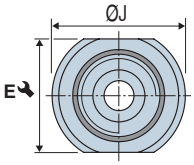


	ØA	B	C	ØD	E	Material	(g)
IMM5P1	M5-M	4	3.5	1.5	7	Brass	1.7
IMM5P2	M5-M	4	4.5	2.7	7	Aluminum	0.8

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

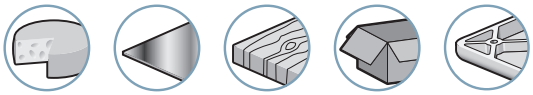
*Male fittings (IM) equiped with O-ring sealing

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)	Rmin (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)

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

		C		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	VSAG20BNBRIM18C	VSAG20BNBRIF18C	VSAG20BNBRIMM6V	VSAG20BNBRIM18V	VSAG20BNBRIF18V	VSAG20BNBRIM14V	VSAG20BNBRIF14V
	VSAG20BSI	VSAG20BSIIM18C	VSAG20BSIIF18C	VSAG20BSIIMM6V	VSAG20BSIIM18V	VSAG20BSIIF18V	VSAG20BSIIM14V	VSAG20BSIIF14V
	VSAG20BSTN	VSAG20BSTNIM18C	VSAG20BSTNIF18C	VSAG20BSTNIMM6V	VSAG20BSTNIM18V	VSAG20BSTNIF18V	VSAG20BSTNIM14V	VSAG20BSTNIF14V
	VSAG30NBR	VSAG30NBRIM18C	VSAG30NBRIF18C	VSAG30NBRIMM6V	VSAG30NBRIM18V	VSAG30NBRIF18V	VSAG30NBRIM14V	VSAG30NBRIF14V
	VSAG30SI	VSAG30SIIM18C	VSAG30SIIF18C	VSAG30SIIMM6V	VSAG30SIIM18V	VSAG30SIIF18V	VSAG30SIIM14V	VSAG30SIIF14V
	VSAG40NBR	VSAG40NBRIM18C	VSAG40NBRIF18C	VSAG40NBRIMM6V	VSAG40NBRIM18V	VSAG40NBRIF18V	VSAG40NBRIM14V	VSAG40NBRIF14V
	VSAG40SI	VSAG40SIIM18C	VSAG40SIIF18C	VSAG40SIIMM6V	VSAG40SIIM18V	VSAG40SIIF18V	VSAG40SIIM14V	VSAG40SIIF14V
	VSAG50NBR	VSAG50NBRIM18C	VSAG50NBRIF18C	VSAG50NBRIMM6V	VSAG50NBRIM18V	VSAG50NBRIF18V	VSAG50NBRIM14V	VSAG50NBRIF14V
	VSAG50SI	VSAG50SIIM18C	VSAG50SIIF18C	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

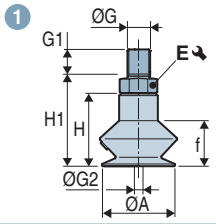
Additional mounting configurations are available (see page 2/40).
For standard configurations (suction cup+fitting), the C and V versions are delivered unassembled.

VSAG

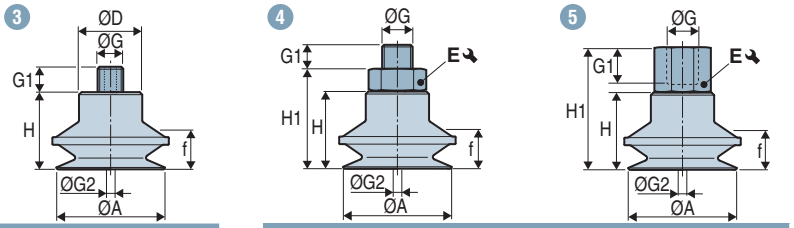
Suction Cups with 1.5 Bellows Ø 10 to 150 mm

Dimensions - "Suction Cup + Fitting"

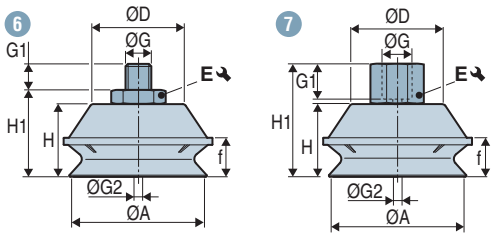
VSAG 10 - 15



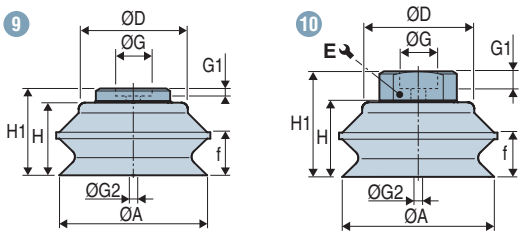
VSAG 20B - 50



VSAG 75



VSAG 110 - 150



		Diagrams	ØA	ØD	f (1)	H	H1	ØG	G1	ØG2 (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 20B - 40 mm	VSAG20B---IM18C	4	20	-	12	22	27	G1/8"-M	8	4	14	7.1
	VSAG20B---IF18C	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---IM18C	4	30	-	17	30.5	35.5	G1/8"-M	8	4	14	13.2
	VSAG30---IF18C	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---IM18C	4	40	-	15.5	30.5	35.5	G1/8"-M	8	4	14	18.8
	VSAG40---IF18C	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---IM18C	4	50	-	20	36.5	41.5	G1/8"-M	8	4	14	27.4
	VSAG50---IF18C	5	50	-	20	36.5	51.5	G1/8"-F	9	4	14	28.8
	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.

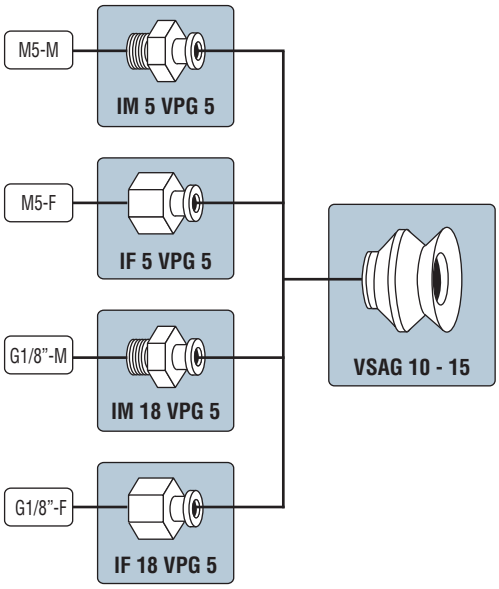
VSAG

Suction Cups with 1.5 Bellows Ø 10 to 150 mm

Assembly Diagrams

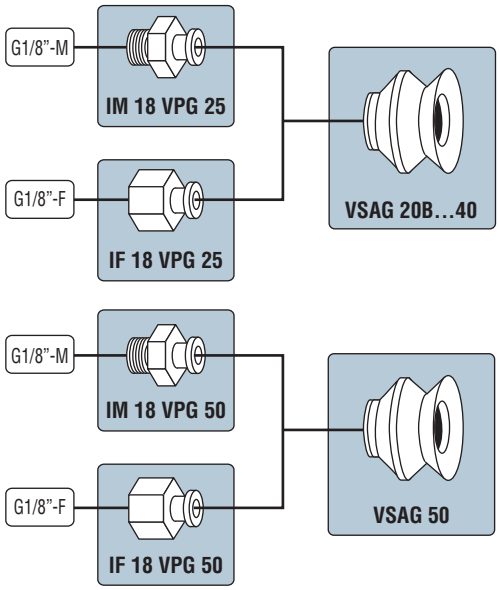
VSAG 10 - 15

Barbed fittings C



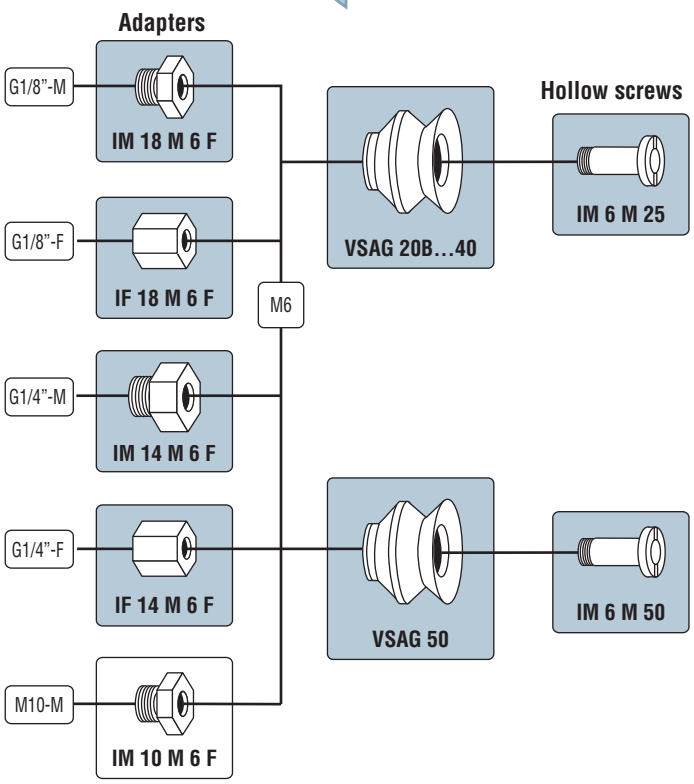
VSAG 20B - 50

Barbed fittings C



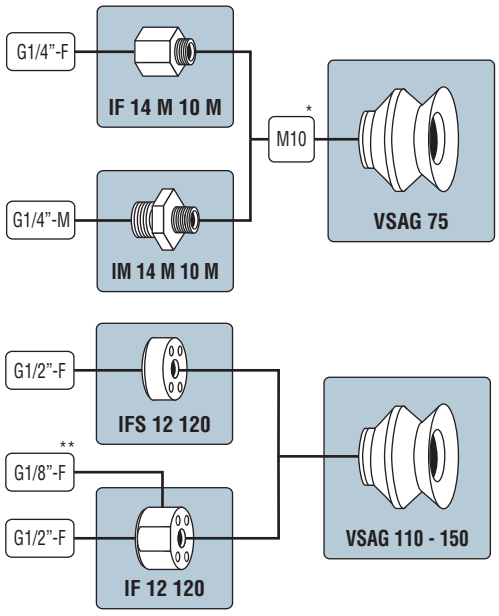
VSAG 20B - 50

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.

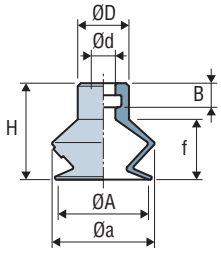
Fittings and suction cups dimensions: see pages 2/41 and 2/42.

VSAG

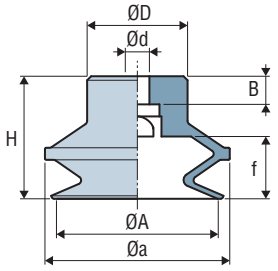
Suction Cups with 1.5 Bellows Ø 10 to 150 mm

Dimensions - Suction Cups

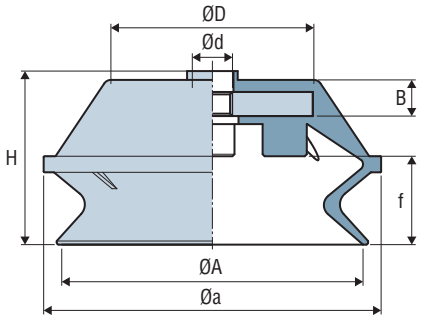
VSAG 10 - 15



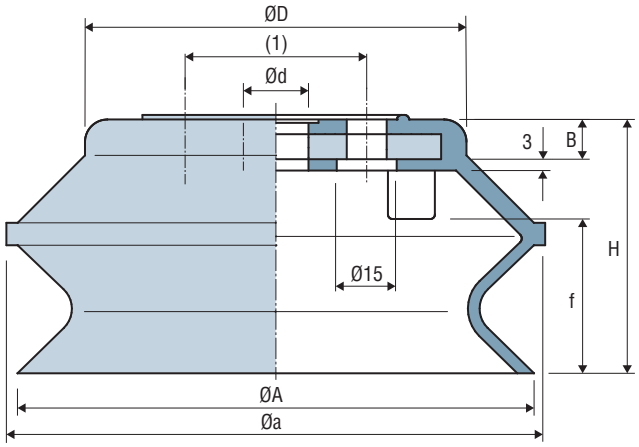
VSAG 20 - 50



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.

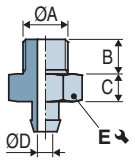
VSAG

Suction Cups with 1.5 Bellows Ø 10 to 150 mm

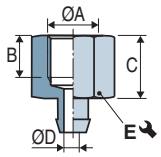
Dimensions - Fittings

Barbed fittings

Male - IM

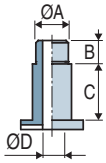


Female - IF



	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
IM 18 VPG25	G1/8"-M	8	5	4	14	Aluminum	4.1
IM 18 VPG50	G1/8"-M	8	5	4	14	Aluminum	4.9
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
IF 18 VPG25	G1/8"-F	9	15	4	14	Aluminum	5.5
IF 18 VPG50	G1/8"-F	9	15	4	14	Aluminum	6.3

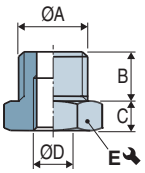
Hollow Screws



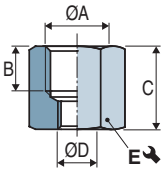
	ØA	B	C	ØD	Material	(g)
IM 6 M25	M6-M	6	6	3.5	Nickel-plated brass	2.7
IM 6 M50	M6-M	6	6	3.5	Nickel-plated brass	7.5

Adapters for Hollow Screws

Male - IM



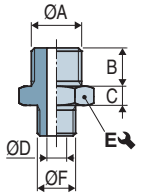
Female - IF



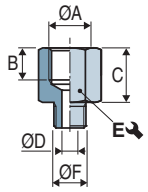
	ØA	B	C	ØD	E	Material	(g)
IM 10 M6F	M10-M	7	3.5	M6	13	Brass	5.9
IM 14 M6F	G1/4"-M	8	5	M6-F	17	Nickel-plated brass	15.9
IM 18 M6F	G1/8"-M	6	4.5	M6-F	13	Nickel-plated brass	6.6
IF 14 M6F	G1/4"-F	11	16	M6-F	17	Nickel-plated brass	20.5
IF 18 M6F	G1/8"-F	7.5	13	M6-F	13	Nickel-plated brass	9.9

Removable Fittings

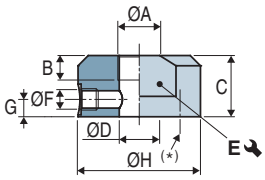
Male - IM



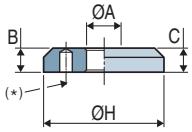
Female - IF



Female - IF 12120



Female - IFS 12120



(1) 4 holes Ø 9 on Ø 40

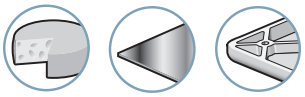
	ØA	B	C	ØD	E	ØF	G	H	Material	(g)
IM 14 M10M	G1/4"-M	10	5	5	17	M10x125-M	-	-	Aluminum	7
IF 14 M10M	G1/4"-F	10	17	5	17	M10x125-M	-	-	Aluminum	8.3
IF 12120	G1/2"-F	24	30	19	48	G1/8"-F	8.7	60	Aluminum	224.8
IFS 12120	G1/2"-F	13	13	-	-	-	-	65	Aluminum	143.5

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)	Rmin (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)

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

Reference and Dimensions - "Suction Cup + Fitting"

References - "Suction Cup + Fitting"

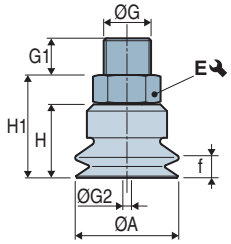
		C		V		
Ø 15 - 20 mm	THREAD	G1/8"-M	G1/8"-F	M5-M	G1/8"-M	G1/8"-F
	VSAJ15NBR	VSAJ15NBRIM18C	VSAJ15NBRIF18C	VSAJ15NBRIMM5V	VSAJ15NBRIM18V	VSAJ15NBRIF18V
	VSAJ15SI	VSAJ15SIIM18C	VSAJ15SIIF18C	VSAJ15SIIMM5V	VSAJ15SIIM18V	VSAJ15SIIF18V
	VSAJ20NBR	VSAJ20NBRIM18C	VSAJ20NBRIF18C	VSAJ20NBRIMM5V	VSAJ20NBRIM18V	VSAJ20NBRIF18V
	VSAJ20SI	VSAJ20SIIM18C	VSAJ20SIIF18C	VSAJ20SIIMM5V	VSAJ20SIIM18V	VSAJ20SIIF18V

		C		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	VSAJ30NBRIM18C	VSAJ30NBRIF18C	VSAJ30NBRIMM6V	VSAJ30NBRIM18V	VSAJ30NBRIF18V	VSAJ30NBRIM14V	VSAJ30NBRIF14V
	VSAJ30SI	VSAJ30SIIM18C	VSAJ30SIIF18C	VSAJ30SIIMM6V	VSAJ30SIIM18V	VSAJ30SIIF18V	VSAJ30SIIM14V	VSAJ30SIIF14V

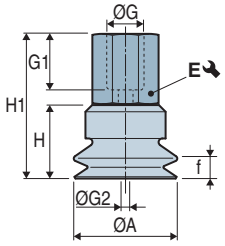
VSAJ 15 -20

VSAJ 30

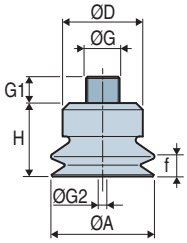
1



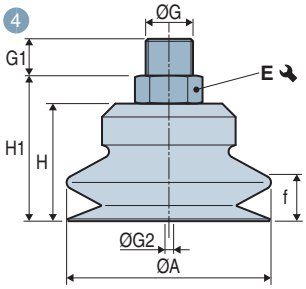
2



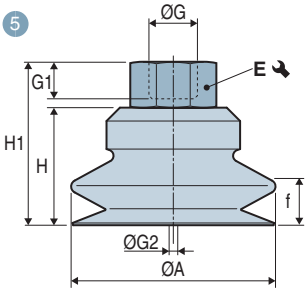
3



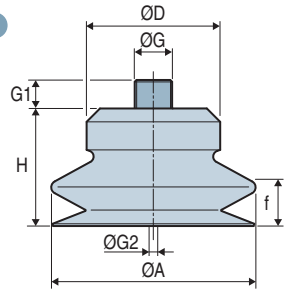
4



5



6



		Diagrams	ØA	ØD	f (1)	H	H1	ØG	G1	ØG2 (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---IM18C	1	20	-	5.5	13	18	G1/8"-M	8	3	14	5.7
	VSAJ20---IF18C	2	20	-	5.5	13	28	G1/8"-F	9	3	14	7
	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---IM18C	4	30	-	7	17	42	G1/8"-M	8	4	14	9
	VSAJ30---IF18C	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.

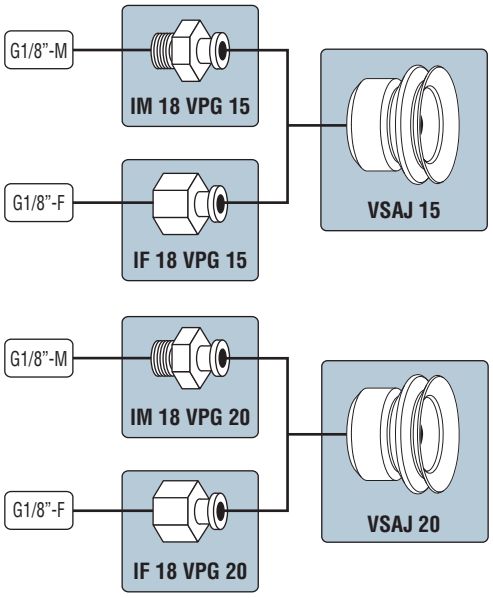
VSAJ

Suction Cups with 1.5 Bellows Ø 15 to 30 mm

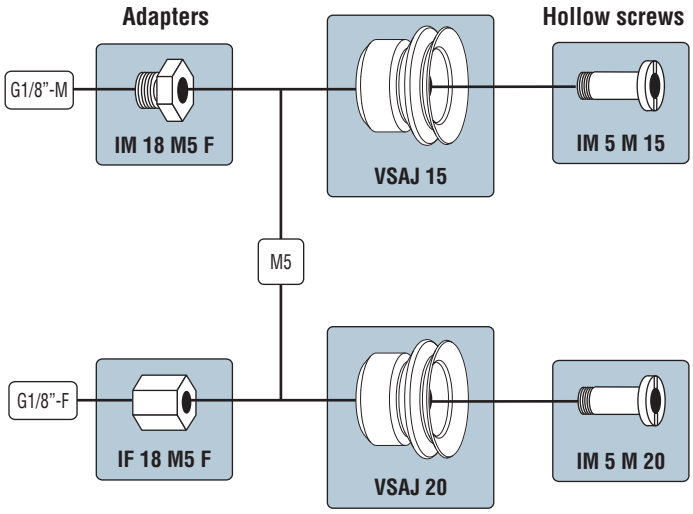
Assembly Diagrams

VSAJ 15 - 20

Barbed fittings C

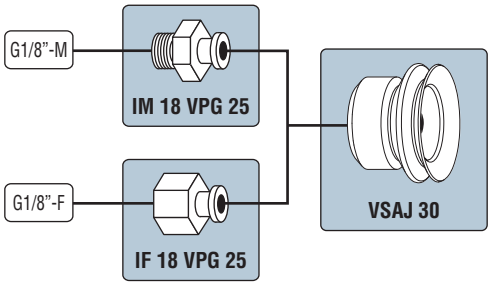


Removable fittings V

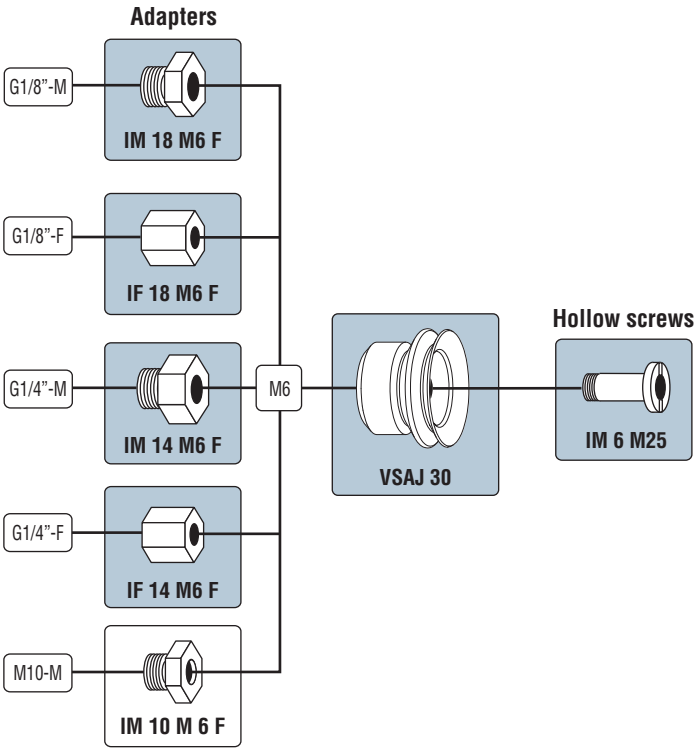


VSAJ 30

Barbed fittings C



Removable fittings V



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

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

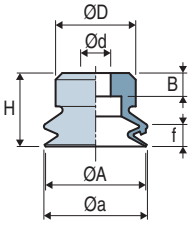
VSAJ

Suction Cups with 1.5 Bellows Ø 15 to 30 mm

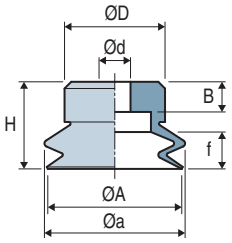
Dimensions

Suction Cups

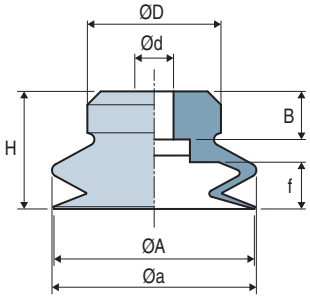
VSAJ 15



VSAJ 20



VSAJ 30

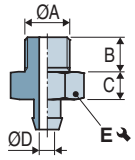


	Ø A	H	Ø a	Ø d	Ø D	f (1)	B	(g)
VSAJ 15	15	11	15.5	4.5	12	3.3	3.5	9
VSAJ 20	20	13	21	4.7	15	5.5	4.5	8.4
VSAJ 30	30	17	30.6	5.8	20	7	7.2	7.6

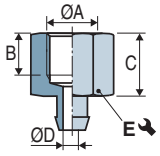
(1) f = Deflection of the suction cup.

Barbed Fittings

Male - IM

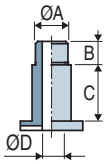


Female - IF



	ØA	B	C	ØD	E	Material	(g)
IM 18 VPG15	G1/8"-M	8	5	2.2	14	Aluminum	4
IM 18 VPG20	G1/8"-M	8	5	3	14	Aluminum	4.1
IM 18 VPG25	G1/8"-M	8	5	4	14	Aluminum	4.1
IF 18 VPG15	G1/8"-F	9	15	2.5	14	Aluminum	5.2
IF 18 VPG20	G1/8"-F	9	15	3	14	Aluminum	5.4
IF 18 VPG25	G1/8"-F	9	15	4	14	Aluminum	5.5

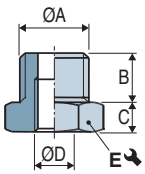
Hollow Screws



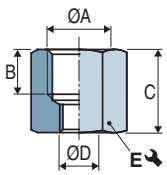
	ØA	B	C	ØD	Material	(g)
IM 5 M15	M5-M	5	2	2.5	Nickel-plated brass	1.3
IM 5 M20	M5-M	5	4	2.5	Nickel-plated brass	2.2
IM 6 M25	M6-M	6	6	3.5	Nickel-plated brass	2.7

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

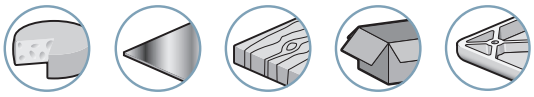
The values represent the average characteristics of our products.
Note: All dimensions are in mm.

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

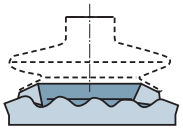
S **Version S**
Factory-crimped fitting

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

C

	THREAD	M3M	M5M	M6M	G1/8"-M	G1/8"-F
Ø 5 -25 mm	**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

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 - 62 mm	**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

V S

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

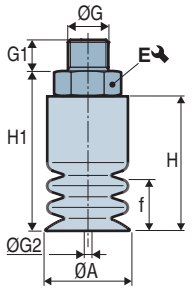
VS

Suction Cups with 2.5 Bellows Ø 5 to 88 mm

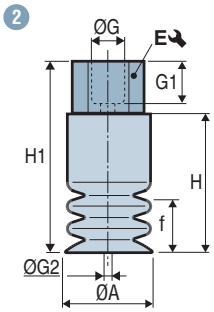
Dimensions - "Suction Cup + Fitting"

VS 5 - 9 | **Group 1**

1

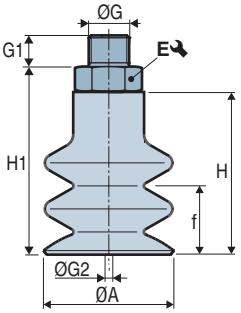


2

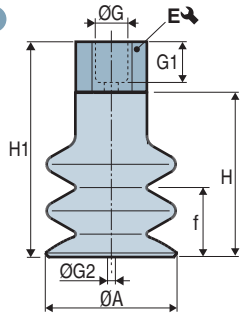


VS 12 - 25 | **Group 1**

3

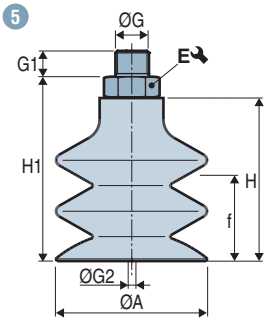


4

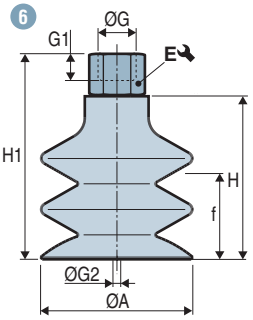


VS 26 - 62 | **Group 2**

5

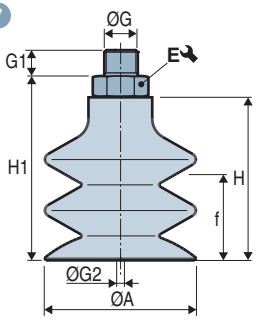


6

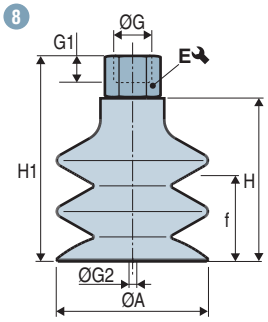


VS 88 | **Group 3**

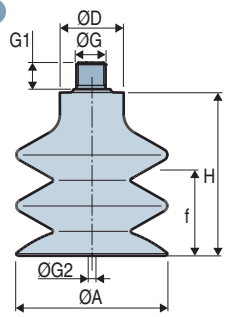
7



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.

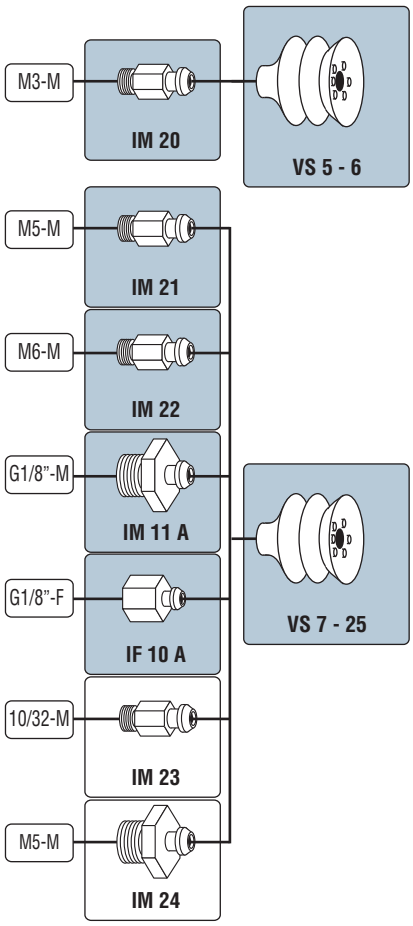
VS

Suction Cups with 2.5 Bellows Ø 5 to 88 mm

Assembly Diagrams

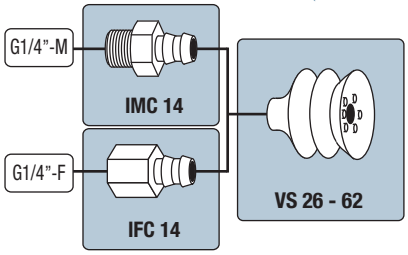
VS 5 - 25 | Group 1

Barbed fittings C

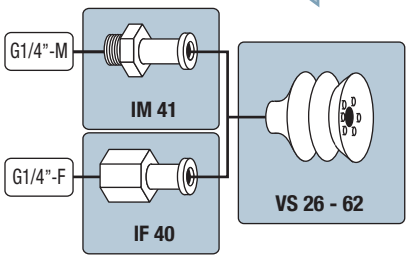


VS 26 - 62 | Group 2

Barbed fittings C

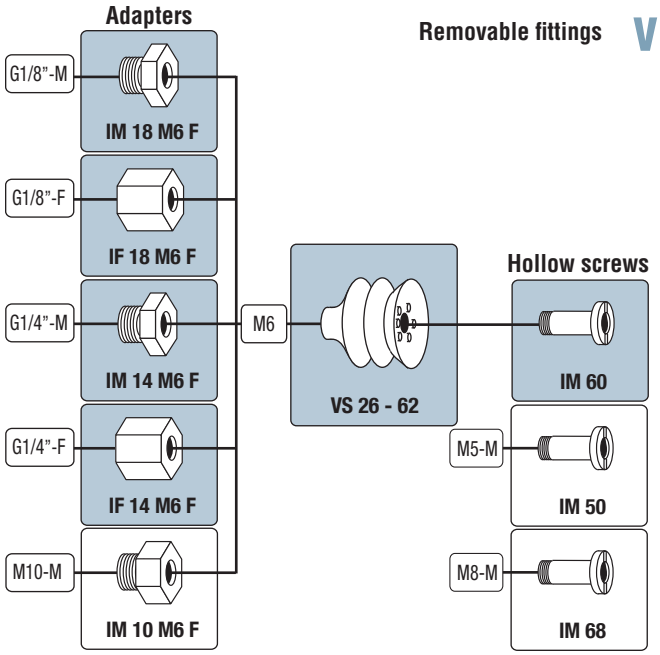


Pressed fittings E



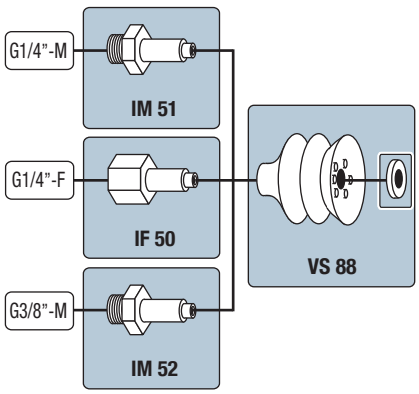
Adapters

Removable fittings V



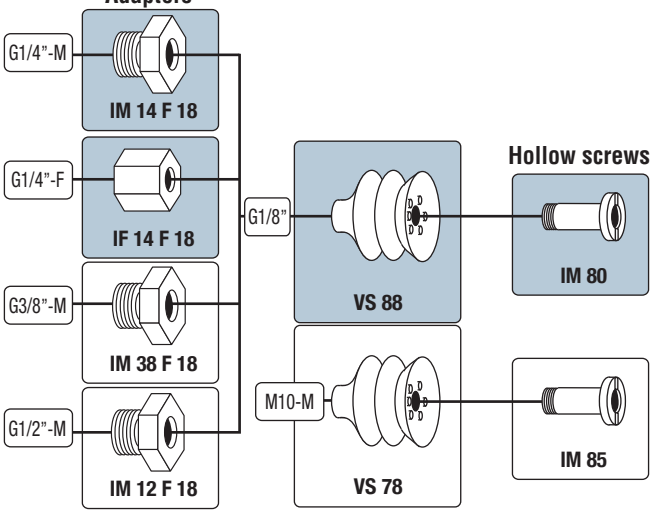
VS 88 | Group 3

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.

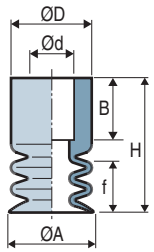
VS

Suction Cups with 2.5 Bellows Ø 5 to 88 mm

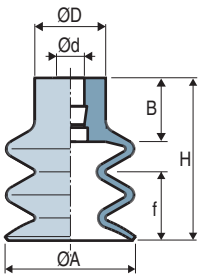
Dimensions

Suction Cups

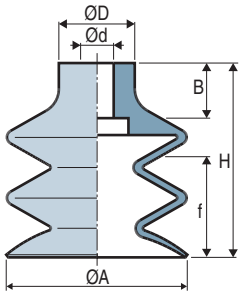
VS 5 - 25



VS 26 - 62



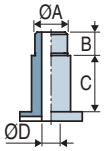
VS 88



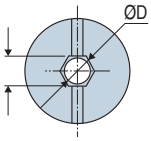
(1) f = Deflection of the suction cup.

	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



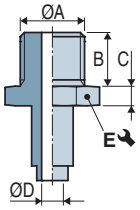
IM60: ⬢4
IM80: ⬢6



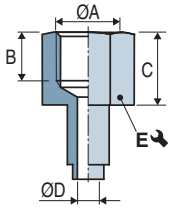
	ØA	B	C	ØD	Material	(g)
IM 50	M5-M	5	11	2.8	Brass	7.4
IM 60 (2) (3)	M6-M	7	11	3.5	Nickel-plated brass	7.3
IM 68	M8-M	8	11	5.2	Nickel-plated brass	6.5
IM 80	G1/8"-M	8	18	6	Nickel-plated brass	23.8
IM 85	M10x150-M	8	18	6	Nickel-plated brass	23.5

Factory-Crimped Fittings

Male - IM



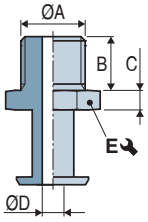
Female- IF



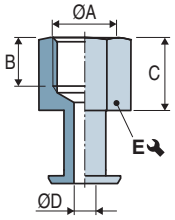
	ØA	B	C	ØD	E	Material	(g)
IM 51	G1/4"-M	11	6	8	21	Aluminum	11.8
IF 50	G1/4"-F	10	15	8	21	Aluminum	15.7
IM 52	G3/8"-M	11	6	8	21	Aluminum	14

Pressed Fittings

Male - IM



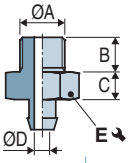
Female - IF



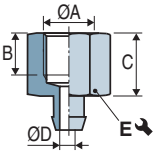
	ØA	B	C	ØD	E	Material	(g)
IM 41	G1/4"-M	11	4	4.4	17	Aluminum	7.8
IF 40	G1/4"-F	10	15	4.4	17	Aluminum	8.4

Barbed Fittings

Male - IM



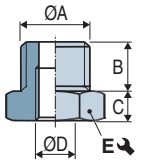
Female - IF



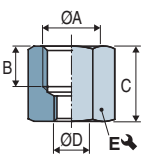
	ØA	B	C	ØD	E	Material	(g)
IM 11 A	G1/8"-M	7.5	6	3.5	14	Aluminum	4.1
IMC 14	G1/4"-M	10	8	7	17	Aluminum	8.7
IM 20	M3-M	3	2	1.4	5	Aluminum	0.4
IM 21 (2)	M5-M	4.5	5	2.5	7	Nickel-plated brass	3.1
IM 22 (2)	M6-M	5	5	3.5	7	Nickel-plated brass	2.7
IM 23	10/32-M	4.5	5	2.5	7	Brass	3
IM 24	M5-M	4.5	2.5	2.5	10	Nickel-plated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

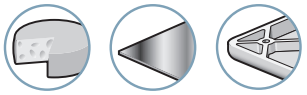
(3) Available in stainless steel

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®

Suction Cup Properties

	Ø (mm)	(cm³)	(lbf) (1)	Rmin (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

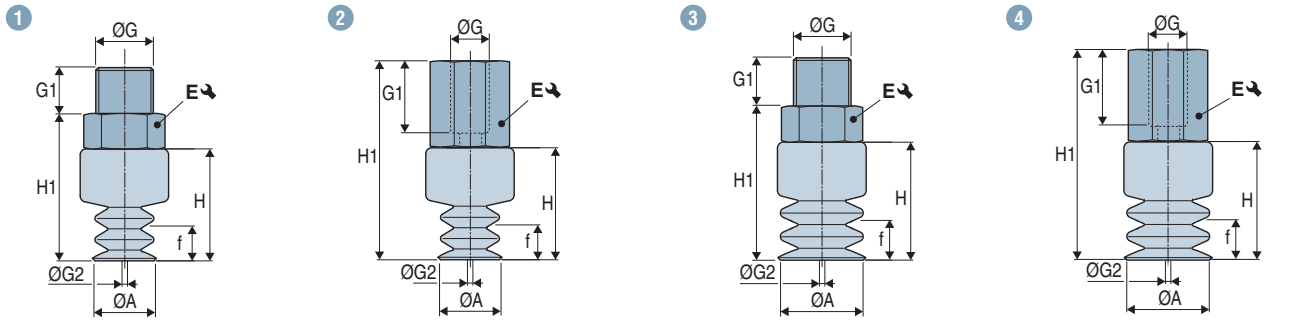
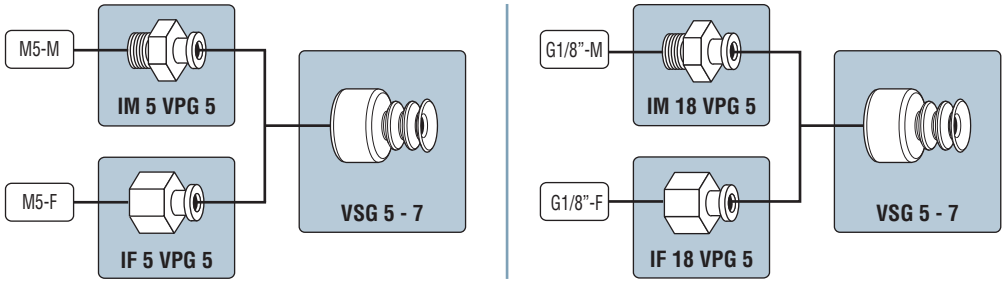


	Diagram	ØA	f (1)	H	H1	ØG	G1	ØG2 (2)	E	(g)
VSG5-IMM5C	1	5	3	9.5	13	M5-M	4.5	2.2	7	2.6
VSG5-IFM5C	2	5	3	9.5	18.5	M5-F	6	2.2	8	3.1
VSG5-IM18C	1	5	3	9.5	14.5	G1/8"-M	8	2.2	14	5.8
VSG5-IF18C	2	5	3	9.5	24.5	G1/8"-F	9	2.2	14	7
VSG7-IMM5C	3	7	3	10	13.5	M5-M	4.5	2.2	7	0.9
VSG7-IFM5C	4	7	3	10	19	M5-F	6	2.2	8	1.4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

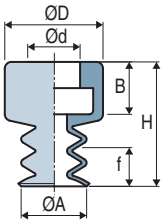
(1) f = Deflection of the suction cup. (2) Ø G2 = Ø internal orifice of the fitting.

Assembly Diagrams

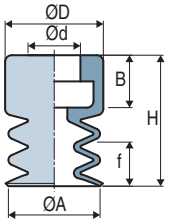


Suction Cups

VSG 5



VSG 7

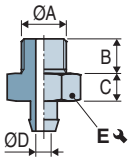


	ØA	H	Ød	ØD	f (1)	B	(g)
VSG 5	5	9.5	4	7.5	3	4	1.9
VSG 7	7	10	4	7.5	3	4	0.24

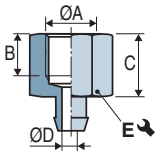
(1) f = Deflection of the suction cup

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

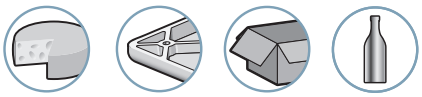
The values represent the average characteristics of our products.

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 — C

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

Group 2 — C / E / V

Ø 32-62	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
	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**.

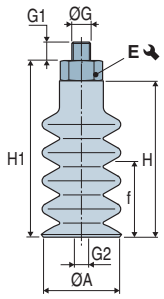
VSD

Long Stroke Suction Cups

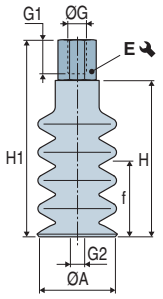
Dimensions - "Suction Cup + Fitting"

VSD 18 | Group 1

1

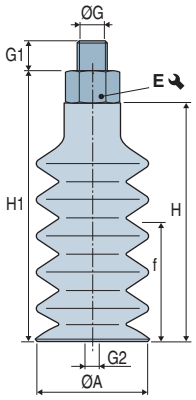


2

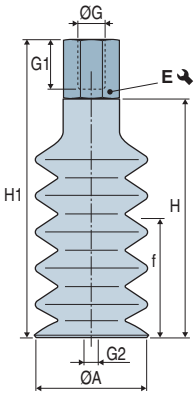


VSD 32 | Group 2

3

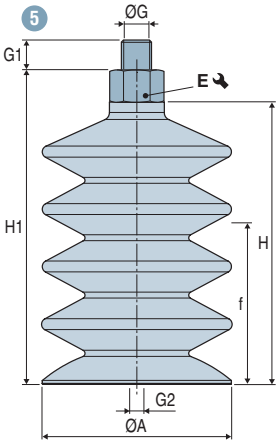


4

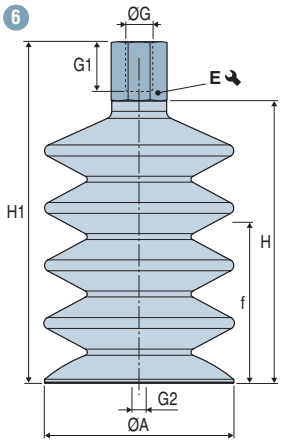


VSD 62 | Group 2

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.

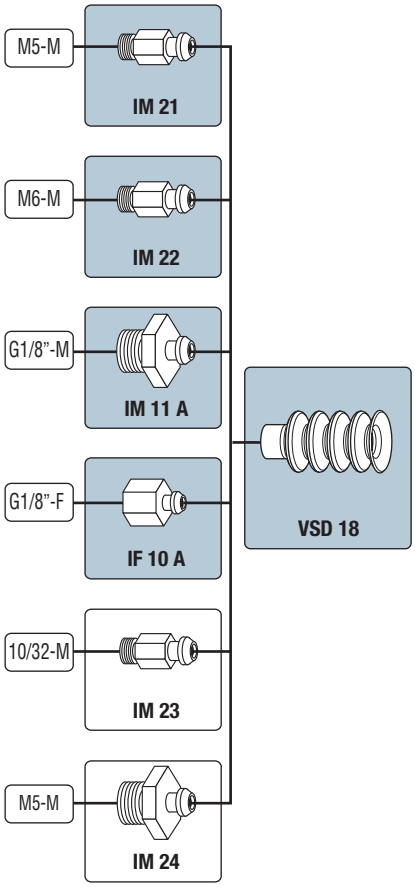
Note: All dimensions are in mm.

Assembly diagrams
See page 2/57.

VSD
Long Stroke Suction Cups
Assembly Diagrams

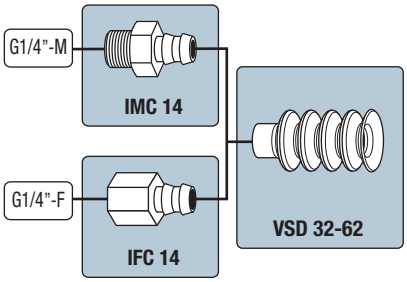
VSD 18 | Group 1

Barbed fittings C

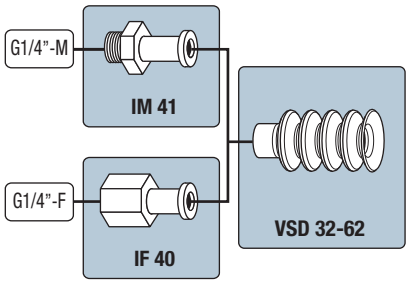


VSD 32-62 | Group 2

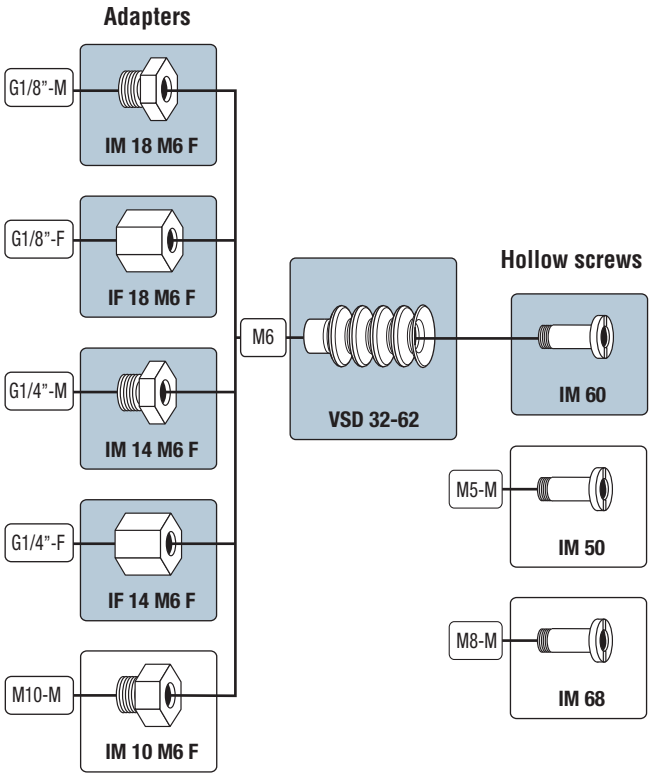
Barbed fittings C



Pressed fittings E



Removable fittings V



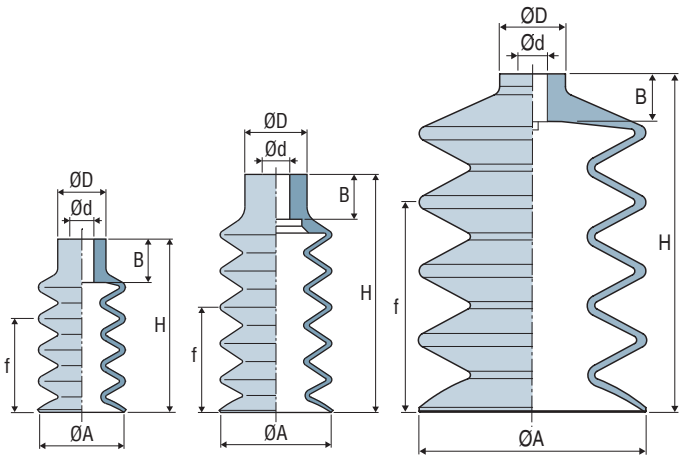
Configurations (suction cup + fitting) refer to page 2/55

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

VSD
Long Stroke Suction Cups
Dimensions

Suction Cups

VSD 18 VSD 32 VSD 62

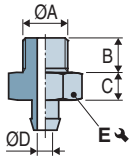


	ØA	f (1)	H	Ød	ØD	B	(g)
VSD 18	17.5	18	36	4	10	9	3.1
VSD 32	32	34	65	8	18	13	15.1
VSD 62	62	55	92.5	8	18	13	62.6

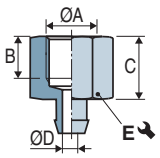
(1) f = Deflection of the suction cup.

Barbed Fittings

Male - IM

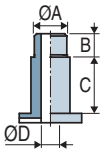


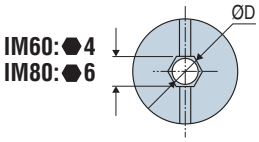
Female - IF



	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

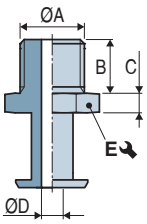




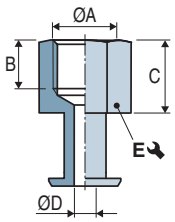
	ØA	B	C	ØD	Material	(g)
IM 50	M5-M	5	11	2.8	Brass	7.4
IM 60 (2) (3)	M6-M	7	11	3.5	Nickel-plated brass	7.5
IM 68	M8-M	8	11	5.2	Nickel-plated brass	6.4

Pressed Fittings

Male - IM



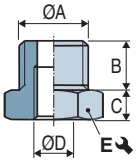
Female - IF



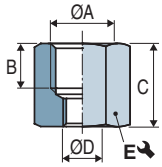
	ØA	B	C	ØD	E	Material	(g)
IM 41	G1/4"-M	11	4	4.4	17	Aluminum	7.8
IF 40	G1/4"-F	10	15	4.4	17	Aluminum	8.6

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

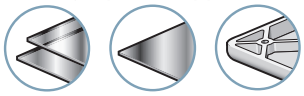
The values represent the average characteristics of our products.
Note: All dimensions are in mm.
(2) Flow restrictor version available: orifice calibrated to reduce leaks when used with a multi-cup gripper (see page 4/10).
(3) Available in stainless steel.

C
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

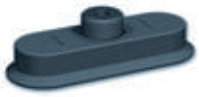
The COVAL **C Series** high performance vacuum cups are available in a complete range of shapes, sizes, materials, and connection types in order to meet all your needs in the most appropriate way.

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

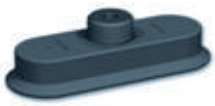
CFC Flat Suction Cup

	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 (1)	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

(1) CBC 30 M38G SP624

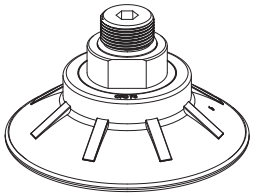
In order to meet the specific needs of end-of-arm tooling users in Stamping, COVAL has designed a Ø 30 mm suction cup, with an extra-large Ø 9.5 mm airflow, thus removing pressure drops in the vacuum network of the gripper's power supply.

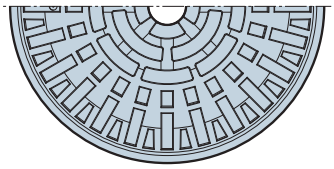
This special version can be recognized by its black O-ring.

High-performance Suction Cups

Suction Cup Properties

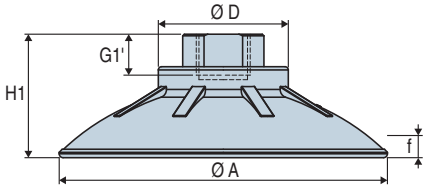
CFC Flat Suction Cup



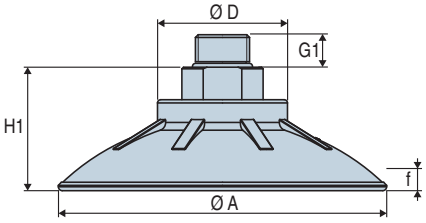


	ØA at rest	ØA gripping	(cm³)	(lbf)(1)	(lbf)(1)	Rmin	Rmin	Ø bore	tightening
CFC 35	37	38.5	2.46	13.49	12.59	58	50	6.3	w 22 + hk 6
CFC 50	51	54	8.37	24.05	24.73	66	52	6.3	w 22 + hk 6
CFC 75	76	80	25.03	47.21	50.58	100	58	6.3	w 22 + hk 6
CFC 100	101	105.7	57.61	78.68	105.66	120	90	6.3	w 22 + hk 6
CFC 125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

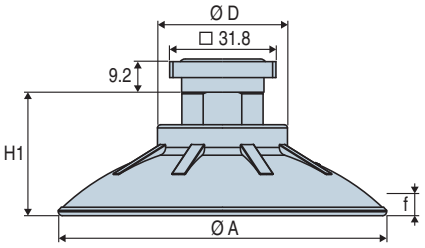
	H1	f(*)	G1	G1'	ØD	(g)				
						F38G	F38GA	M38G	M38GA	C32
CFC 35	25	3	10	12.6	37	14	25.7	18	33.7	36.2
CFC 50	30	5	10	12.6	38	25	34.9	29	42.9	47.2
CFC 75	33	8	10	12.6	41	40	48.9	45	56.9	62.2
CFC 100	38	10	10	12.6	41	67	75.3	72	83.3	89.2
CFC 125	44	14	10	12.6	55	119	146	124	154	141.2



F38G/F38GA Female fitting G3/8"

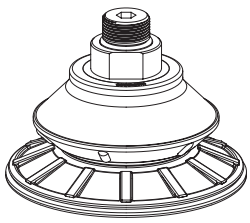


M38G/M38GA Male fitting G3/8"

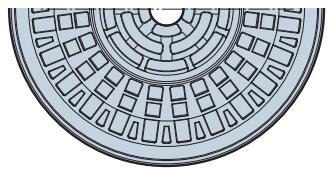


C32 Square coupling 32

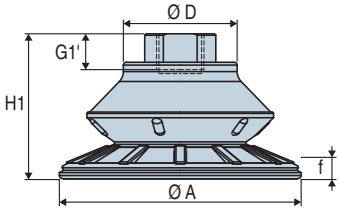
CBC Suction Cup with 1.5 Bellows



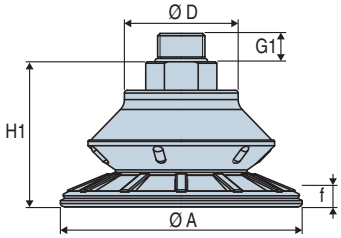
	ØA at rest	ØA gripping	(cm³)	(lbf)(1)(2)	(lbf)(1)(3)	(lbf)(1)	Rmin	Rmin	Ø bore	tightening
CBC 22	21.5	22	1.6	4.05	4.50	3.82	25	30	6.3	w 22 + hk 6
CBC 30(**)	32	34	5	7.87	8.99	7.42	30	32	6.3	w 22 + hk 6
CBC 45	47	48.7	11.47	8.77	17.31	19.11	36	45	6.3	w 22 + hk 6
CBC 60	62	64.5	25.31	13.49	30.35	34.85	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



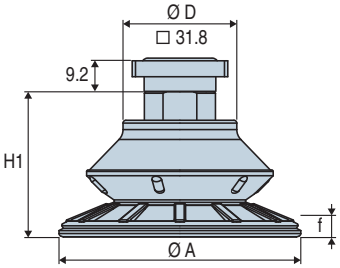
	H1	f(*)	G1	G1'	ØD	(g)				
						F38G	F38GA	M38G	M38GA	C32
CBC 22	32	6	10	12.6	37	10	23	14	31	32.2
CBC 30(**)	31	8	10	12.6	37	14	26.3	19	34.3	36.2
CBC 45	36	11	10	12.6	37	22	31.5	26	39.5	44.2
CBC 60	41	14	10	12.6	39	32	42	37	50	54.2
CBC 85	51	21	10	12.6	41	64	71.2	69	79.2	86.2
CBC 115	53	23	10	12.6	55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



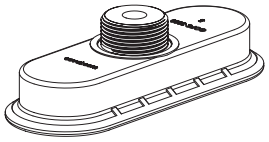
C32 Square coupling 32

(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. (**) A specific model of the CBC 30 is available with M G3/8" fitting and 9.5mm diameter bore: **CBC30 M38G SP624**. Note: All dimensions are in mm.

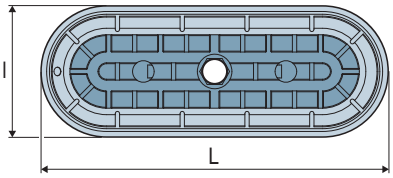
High-performance Suction Cups

Suction Cup Properties

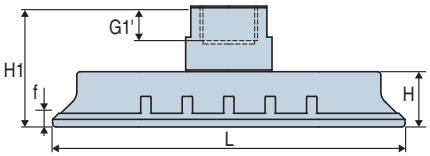
COFC Flat Oblong Suction Cup



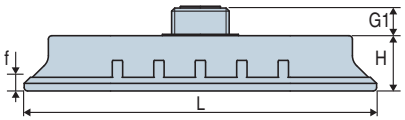
	l x L at rest	l x L gripping	(cm³)	(lbf)(1)	(lbf)(1)	Rmin	Rmin	Ø bore	tightening
COFC 2565	25x65	26.8x67	3.78	18.43	12.81	25	25	6	hk 6
COFC 3080	30x80	31.5x82	6.08	28.10	20.46	40	32	6	hk 6
COFC 4080	40x80	42x82	11.03	32.60	29.90	60	40	6	hk 6
COFC 50100	50x100	52.5x102.5	22.25	53.95	49.01	70	50	6	hk 6



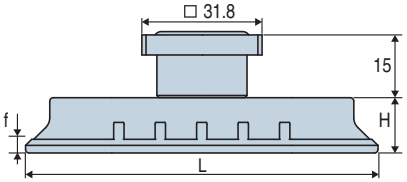
	H1	H	G1	G1'	f(*)	(g) F38G	F38GA	M38G	M38GA	C32
COFC 2565	31.5	12.5	8	10	3	24	37.8	17	26.3	35
COFC 3080	32	13	8	10	3	29	42.7	22	31.2	40
COFC 4080	34	15	8	10	4.5	30	45.5	23	34	41
COFC 50100	35	16	8	10	6	43	72.3	36	60.8	54



F38G/F38GA Female fitting G3/8"

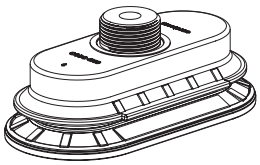


M38G/M38GA Male fitting G3/8"

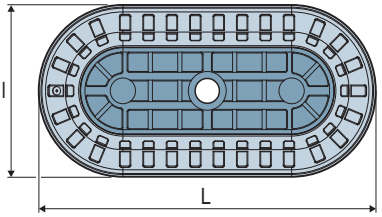


C32 Square coupling 32

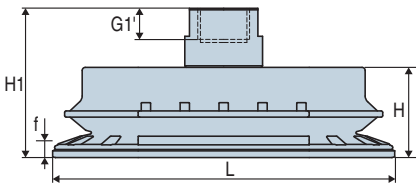
COBC Oblong Suction Cup with 1.5 Bellows



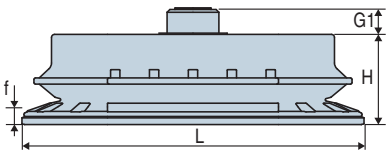
	l x L at rest	l x L gripping	(cm³)	(lbf)(1)(2)	(lbf)(1)(3)	(lbf)(1)	Rmin	Rmin	Ø bore	tightening
COBC 3065	31x65	32.3x67	9.98	11.24	16.86	19.56	25	30	6	hk 6
COBC 4080	40x80	41.5x82	19.44	26.08	29.23	34.85	38	37	6	hk 6
COBC 55110	55x110	57x112.5	49.25	38.22	47.21	59.57	58	57	6	hk 6
COBC 70140	70x140	72x143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



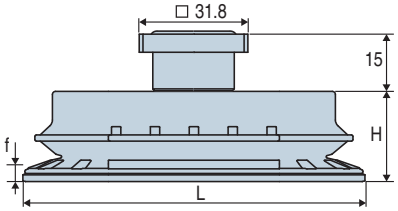
	H1	H	G1	G1'	f(*)	(g) F38G	F38GA	M38G	M38GA	C32
COBC 3065	39	20	8	10	7	31	45.5	25	34	43
COBC 4080	41	22	8	10	9.5	37	52.1	31	40.6	49
COBC 55110	48	29	8	10	11.5	68	94.3	62	82.8	80
COBC 70140	49	30	8	10	14.5	103	120.9	97	109.4	115



F38G/F38GA Female fitting G3/8"



M38G/M38GA Male fitting G3/8"



C32 Square coupling 32

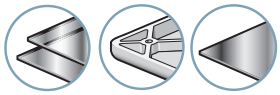
The values represent the average characteristics of our products.

(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.

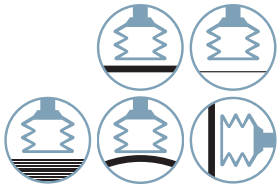
CTC
High-Performance Bell-type Suction Cups

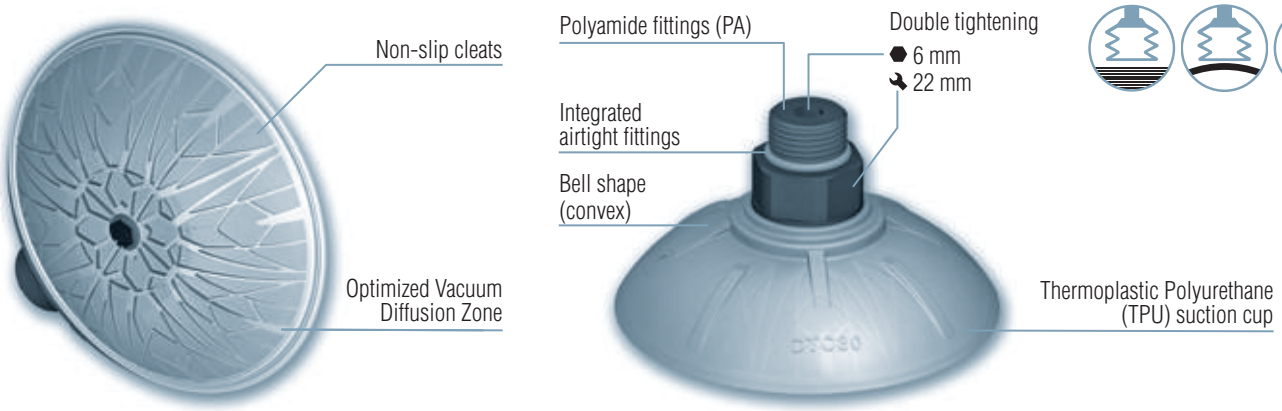
The **CTC Series** high-performance bell-type suction cups have been specifically developed to meet the production requirements of applications in the automotive sector.
The bell shape of the **CTC Series** suction cups gives them significant deflection compared to traditional flat suction cups and guarantees 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



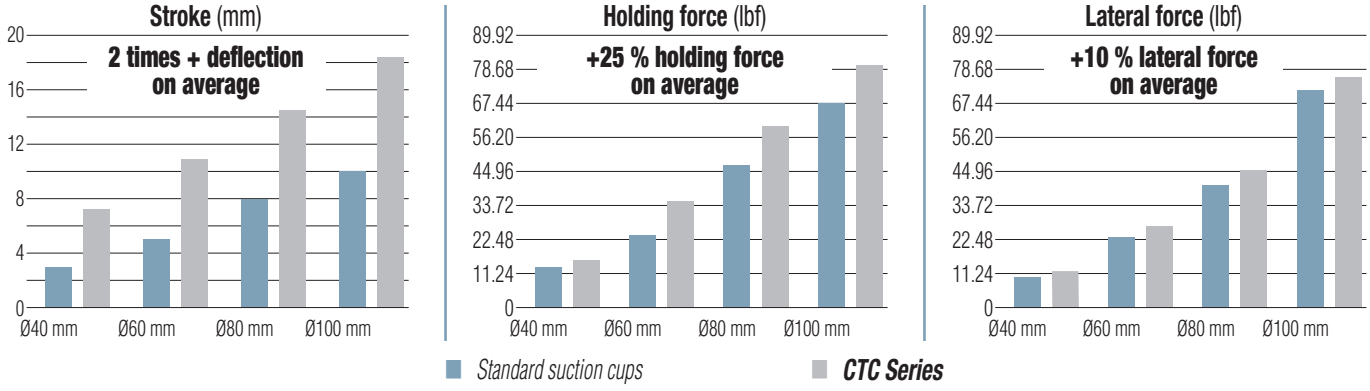
Types of use





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)

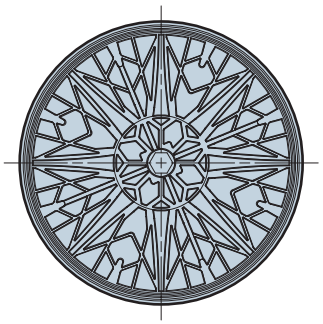
F38G
Female fitting G3/8"
(polyamide insert)

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

Other fittings available upon request

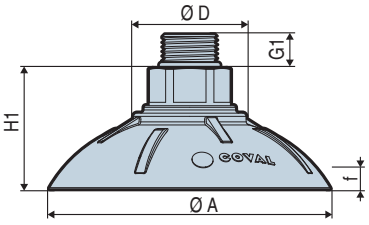
Characteristics

(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.

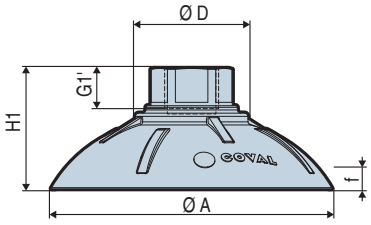


	ØA At rest	ØA gripping	(cm³)	(lbf)(1)	(lbf)(1)	Rmin	Ø bore	tightening
CTC 40	43.5	47.6	8.1	15.74	11.91	18	6.3	w 22 + hk 6
CTC 60	64.7	71.7	26.1	35.07	26.98	24	6.3	w 22 + hk 6
CTC 80	84.1	92.7	72.1	59.80	45.41	36	6.3	w 22 + hk 6
CTC 100	106	115.6	103.4	80.03	75.98	40	6.3	w 22 + hk 6

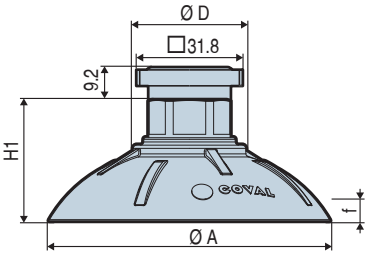
	H1	f (2)	G1	G1'	ØD	(g)		
						F38G	M38G	C32
CTC 40	30	7.2	10.5	10.7	32.8	12.9	17.9	35.1
CTC 60	33.9	10.9	10.5	10.7	32.7	18.3	23.3	40.5
CTC 80	36.5	14.5	10.5	10.7	33.3	26.9	31.9	49.1
CTC 100	39.1	18.4	10.5	10.7	40.3	36.1	41.1	58.3



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

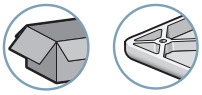
Example:
CTC80TPUM38G

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.

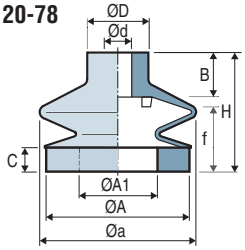
VSA-VS BM

Suction Cups with Foam Ring Seals

Dimensions

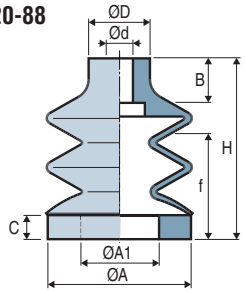
Dimensions

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.

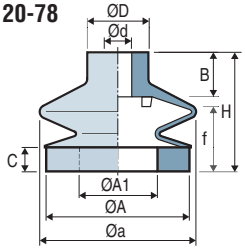
Suction Cup Properties

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.

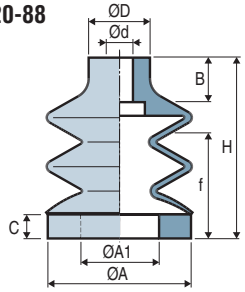
Dimensions

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



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

(2) f = Deflection of the suction cup.

Note: All dimensions are in mm.

The values represent the average characteristics of our products.

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

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

VSBM
Foam Rings

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

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

Industry-specific applications

Types of use

Materials
NBR Nitrile **SI** Non Food-grade silicone **SIF** Food-grade silicone FDA Standard

Operating Characteristics of the Materials

- Nitrile (NBR - Black)
  5 or 10mm thick, depending on the diameters of the suction cups.
  Good resistance to oil.
  The nitrile foam strip can only be bonded to nitrile suction cups.
- Silicone (SI - White non Food-grade silicone, SIF - White Food-grade silicone FDA Standard)
  2 or 5 mm thick, depending on the diameters of the suction cups.
  Heat-resistant up to 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

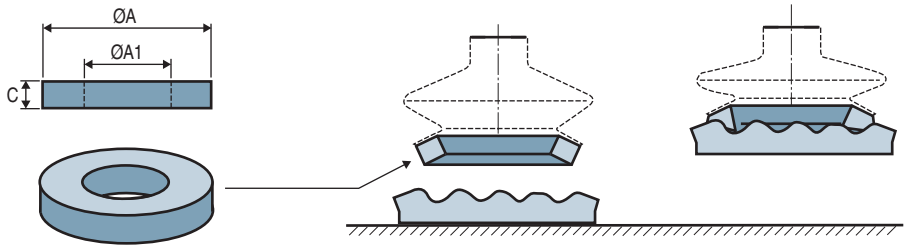
NBR

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

FlowPack Suction Cups

- Flexible suction cups
- 4 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

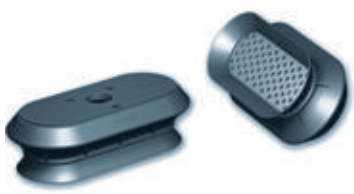
VSAF

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

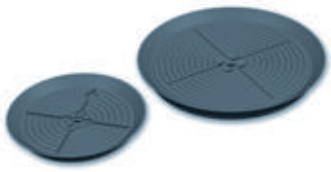
VPYR

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

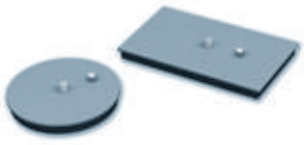


Heavy Load Suction Cups

- "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
FlowPack Suction Cups

Combining great flexibility and food compatibility, the new FPC 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 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 applications

Types of use

Applications

The FPC 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.
- FlowPack ≤ 5 kg: elliptical suction cup 120x100 mm, FPC120100.

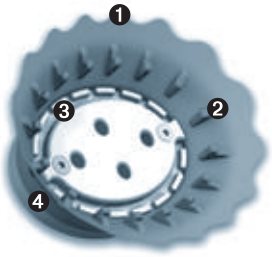
Materials

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 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 suction cups are also equipped with cleats that stiffen the lip and reinforce the clamping effect.



❶ Thin and wavy flower-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 efficiency when the product is held.
❹ Materials: Food-grade silicone and plastic insert meets FDA and CE standards.

Suction Cup characteristics

	Dim. (mm)	(cm³)	(lbf) (1)	SIBL3 Part number suction sup + fitting	SIBL5 Part number suction sup + fitting
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**
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

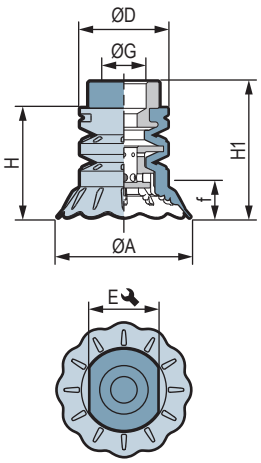
FPC120100...IF38P1V
Elliptical 120 x 100 mm

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

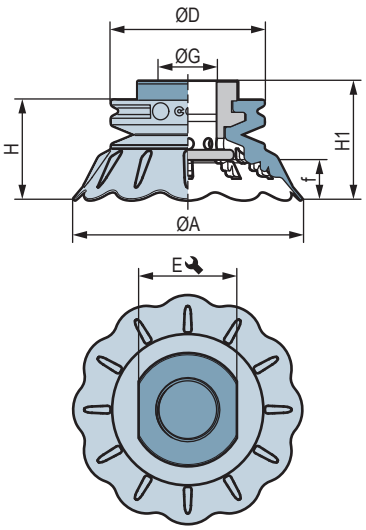
FPC
FlowPack Suction Cups
Dimensions

Suction Cup + fitting

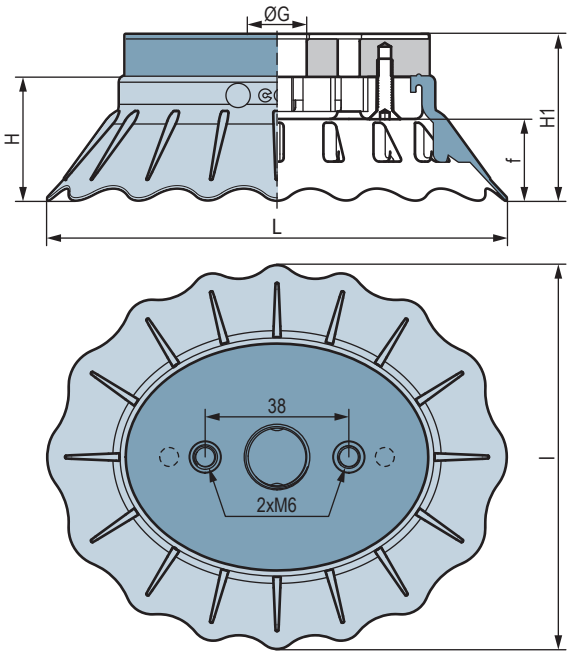
FPC351.5...IF14PC
Round, Ø 35 mm, 1.5 bellows



FPC45...IF38PC
FPC60...IF38PC
Round, Ø 45 and 60 mm



FPC120100...IF38P1V
Elliptical, 120 x 100 mm



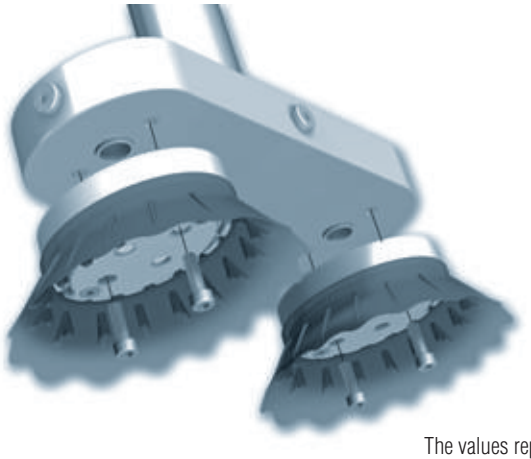
	Ø A	Ø D	L	l	f (1)	H	H1	Ø G	E	(g)
FPC351.5...IF14PC	35	23	-	-	10	29	36	G1/4"-F	19	9.9
FPC45...IF38PC	45	39	-	-	7	23	30	G3/8"-F	26	20
FPC60...IF38PC	60	40	-	-	10	26	33	G3/8"-F	26	21.5
FPC120100...IF38P1V	-	-	120	100	15	32.5	42.5	G3/8"-F	-	92.1

(1) f = Deflection of the suction cup

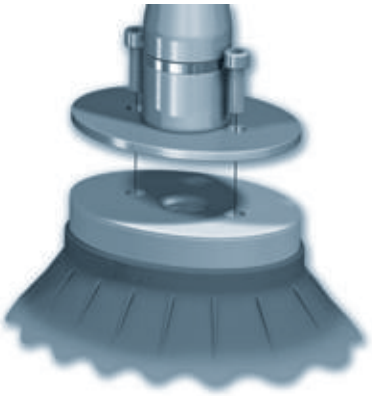
Mounting Configurations

FPC351.5 / FPC45 / FPC60
Via connection:
- FPC351.5 : G1/4"-F
- FPC45 / FPC60 : 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
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

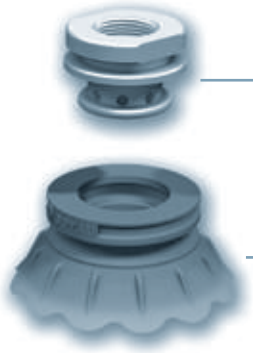
LOWER PLATE ONLY
IL1PFPC35

FPC45/FPC60

Round Ø 40 and 60 mm
COMPLETE PART CONFIGURATION

SUCTION CUP
+
G3/8»-F FITTING:

FPC45	**FPC60**
Hardness 35 Shore	Hardness 35 Shore
FPC45SIBL3IF38PC	**FPC60SIBL3IF38PC**
Hardness 50 Shore	Hardness 50 Shore
FPC45SIBL5IF38PC	**FPC60SIBL5IF38PC**



INDIVIDUAL PART REFERENCE

G3/8"-F FITTING ONLY:
IF38PFPC60

FPC45	**FPC60**
SUCTION CUP ONLY:	SUCTION CUP ONLY:
Hardness 35 Shore	Hardness 35 Shore
FPC45SIBL3	**FPC60SIBL3**
Hardness 50 Shore	Hardness 50 Shore
FPC45SIBL5	**FPC60SIBL5**

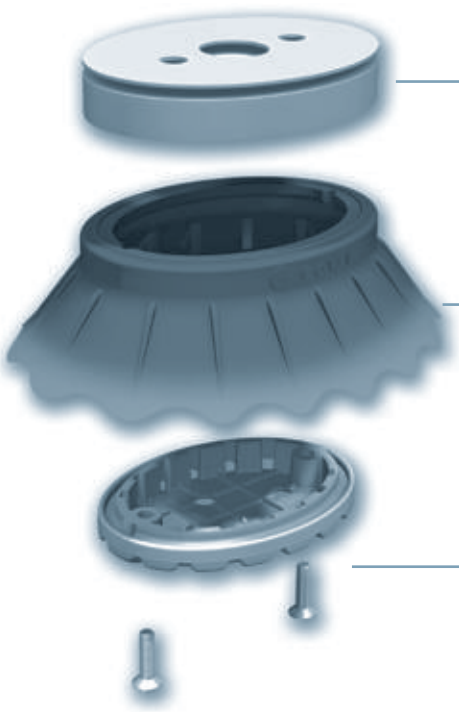
FPC120100

Elliptical 120 x 100 mm
COMPLETE PART CONFIGURATION

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

MVS

Soft Suction Cups for High Speed Applications

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.

Industry-specific applications

Types of use

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	Fittings		
				Reference	Reference	G1/8"-M	G1/4"-M	G1/4"-F
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
MVS301.5...C	30	7	2.27	**MVS301.5SIBC**	**MVS301.5SIT5C**	-	IM51SP143	IF50SP143
MVS302.5...G	30	11.2	1.71	**MVS302.5SIBG**	**MVS302.5SIT5G**	-	IM51SP143	IF50SP143
MVS302.5...C	30	11.2	1.91	**MVS302.5SIBC**	**MVS302.5SIT5C**	-	IM51SP143	IF50SP143
MVS303.5...C	30	11.6	1.89	**MVS303.5SIBC**	**-**	-	IM51SP143	IF50SP143
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**.

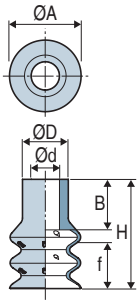
MVS

Soft Suction Cups for High Speed Applications

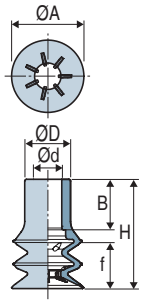
Dimensions

Suction Cups

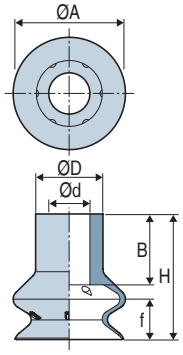
MVS202.5___G



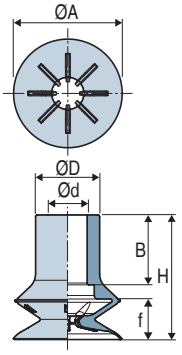
MVS202.5___C



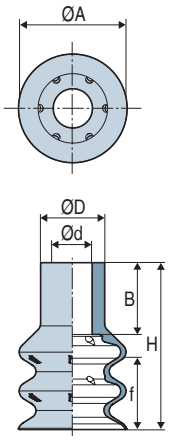
MVS301.5___G



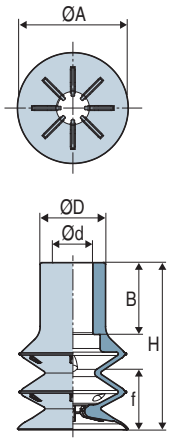
MVS301.5___C



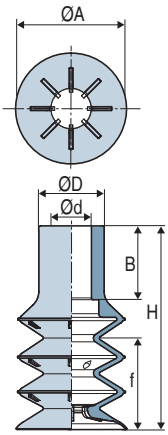
MVS302.5___G



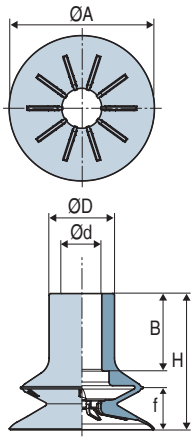
MVS302.5___C



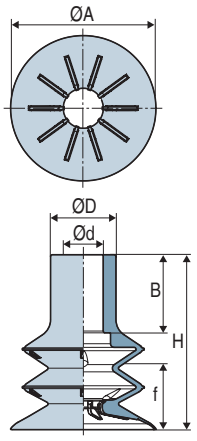
MVS303.5___C



MVS401.5___C



MVS402.5___C

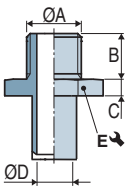


	Ø A	H	Ø d	Ø D	f (2)	B	(g)
MVS202.5___G	20	31	8	13	10	13	2.3
MVS202.5___C	20	31	8	13	10	13	3
MVS301.5___G	30	35	11	18	10	19.5	5.9
MVS301.5___C	30	35	11	18	9	19.5	6.5
MVS302.5___G	30	46	11	18	17.5	19.5	6.8
MVS302.5___C	30	46	11	18	15.5	19.5	8.2
MVS303.5___C	30	56	11	18	22.5	20.6	9.4
MVS401.5___C	40	37.5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

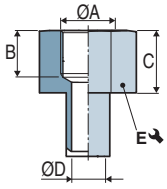
(2) f = Deflection of the suction cup.

Barbed Fittings

Male fittings



Female fittings



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

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

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

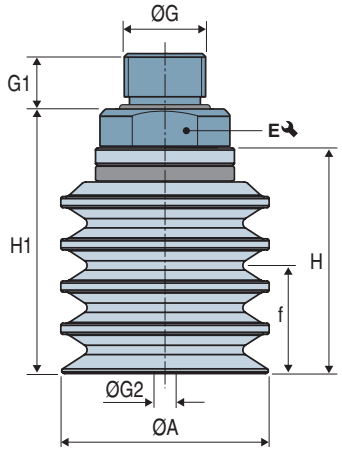
Ø 50 mm

	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

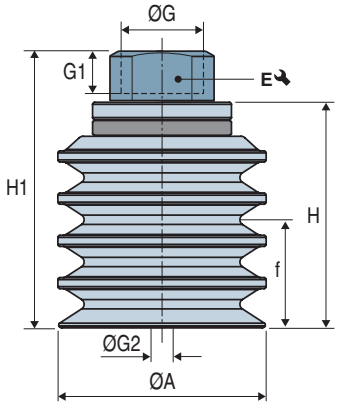


	Diagram	ØA	f (1)	H	H1	ØG	G1	ØG2 (2)	E	(g)
MVP204.5...IM18-	1	20	13.2	22.3	27.3	G1/8"-M	7	4	13	5.3
MVP304.5...IF18-	2	30	20.2	32.5	40.5	G1/8"-F	6.6	5	17	11.5
MVP304.5...IM14-	1	30	20.2	32.5	38.5	G1/4"-M	9	5	19	12.4
MVP304.5...IM38-	1	30	20.2	32.5	38.5	G3/8"-M	10	5	22	17
MVP404.5...IF18-	2	40	27	41.2	49.2	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

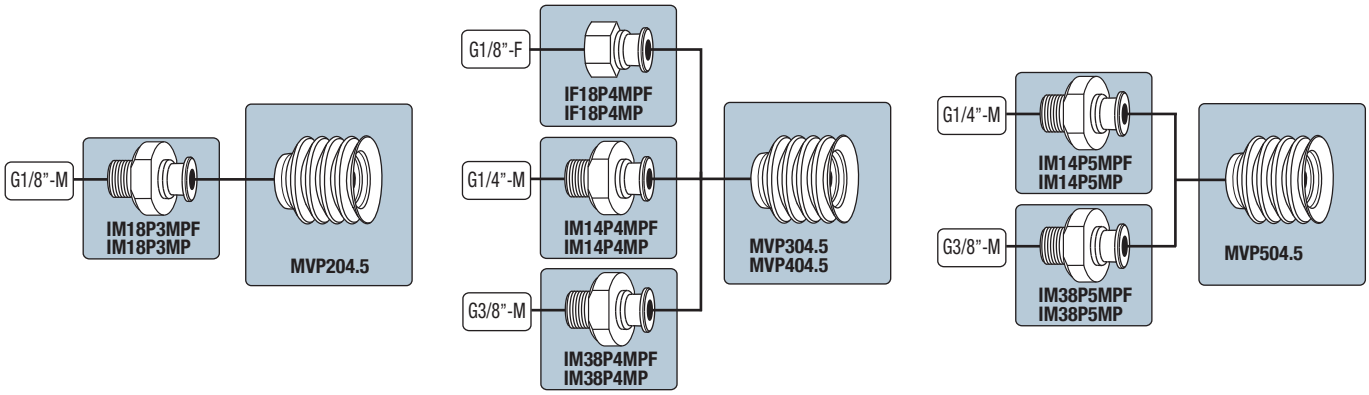
Note: All dimensions are in mm. (1) f = Deflection of the suction cup. (2) Ø G2 = Ø internal orifice of the fitting.

MVP

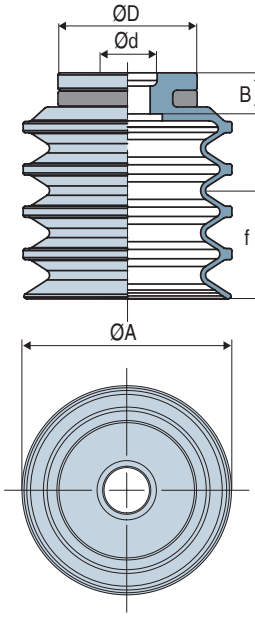
Suction Cups with 4.5 Bellows

Assembly Diagrams and dimensions

Assembly Diagrams



Dimensions Suction Cups

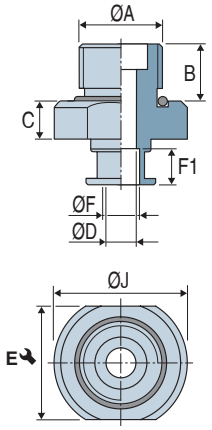


	ØA	H	Ød	ØD	f (2)	B	(g)
MVP204.5	20	22.3	6	14	13.2	4.8	2.1
MVP304.5	30	32.5	6.5	20	20.2	6.9	5.4
MVP404.5	40	41.2	6.5	19.5	27	6.9	12.7
MVP504.5	50	52.1	6.5	27	32.8	9.9	23.5

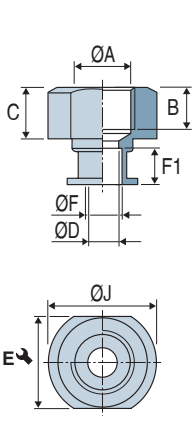
(2) f = Deflection of the suction cup.

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

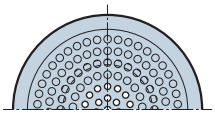
SIBL5 50 Shore A blue silicone

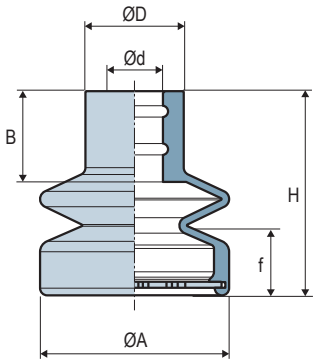
Suction Cup Characteristics

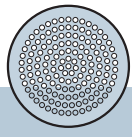
	Ø (mm)	(cm³)	(lbf) (1)
VSAF50SIBL5	50	24.1	4.27

(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

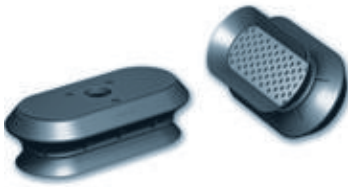
(2) f = Deflection of suction cup.

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

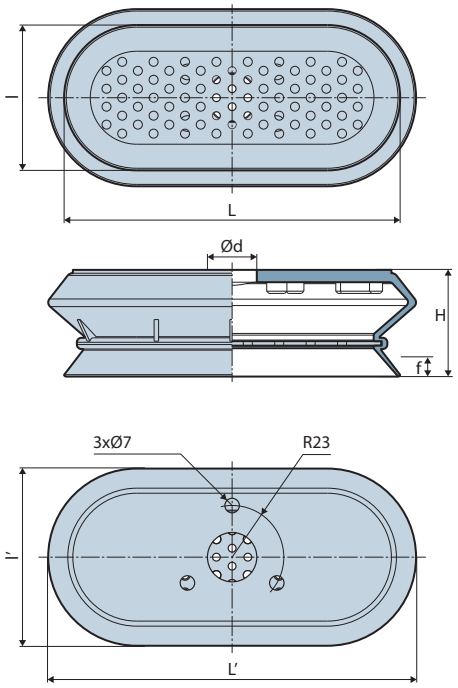
SIBL5 50 Shore A blue silicone

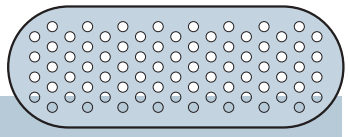
Suction Cup Characteristics

	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

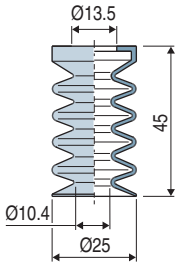
Suction Cup Characteristics

	dim. (mm)	f (1)	maximum vacuum (%)	shore hardness	(g)	Fittings M5-M	Fittings 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	-	-

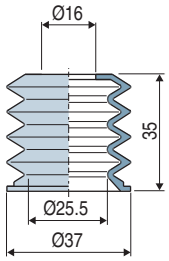
(1) f = Deflection of the suction cup. (2) Non-toxic red silicone

Suction Cup Dimensions

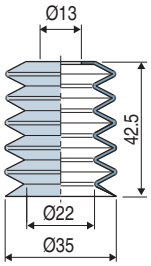
VSD 25



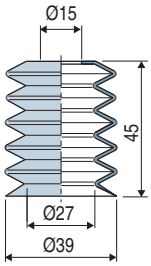
VSD 38



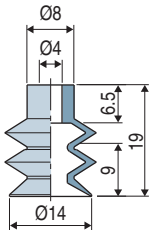
VSE 35



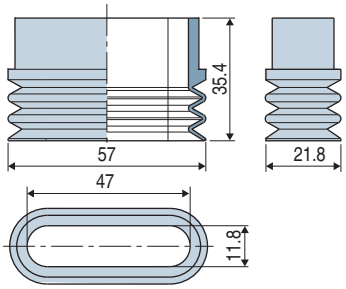
VSE 39



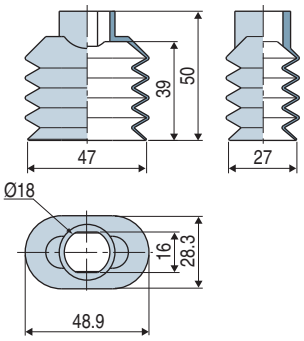
VSP 14



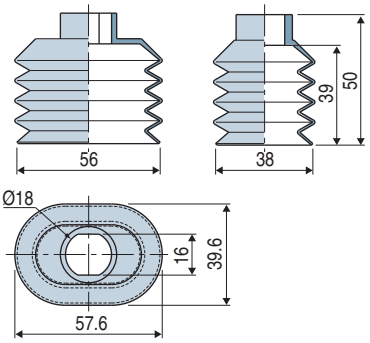
VSP 2258



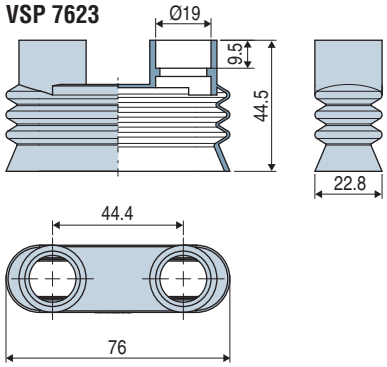
VSP 2747



VSP 3856



VSP 7623



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

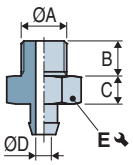
Specify the part number e.g.: VSP14SIT6
Please refer to the characteristics table above

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

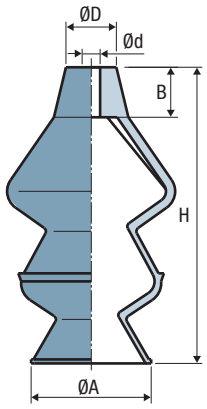
Suction Cup Characteristics

	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**	-

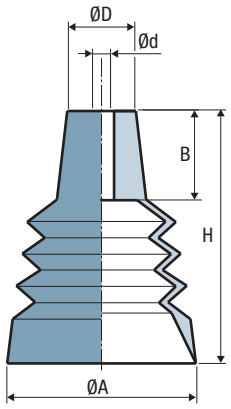
(1) at 30% vacuum with a safety factor of 2 included.

Suction Cup Dimensions

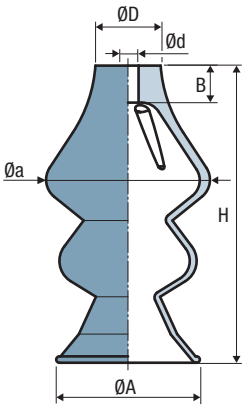
VSO 30 SI



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 ■ 4 reinforcements: stainless steel wire ■ 1 lower reinforcement: stainless steel
D6	■ 1 upper insert: stainless steel ■ 4 reinforcements: stainless steel plates ■ 1 lower reinforcement: stainless steel
D5P	■ 1 upper insert: stainless steel ■ 4 reinforcements: stainless steel wire ■ 1 lower reinforcement: polypropylene
D6P	■ 1 upper insert: stainless steel ■ 4 reinforcements: stainless steel plates ■ 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 ■ 3 reinforcements: stainless steel wire ■ 1 lower reinforcement: polypropylene
D6P	■ 1 upper insert ■ 3 reinforcements: stainless steel plates ■ 1 lower reinforcement: polypropylene

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

Note: Version CHV_, 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 ■ 4 reinforcements: stainless steel wire ■ 1 lower reinforcement: stainless steel	**D5**
■ 1 upper insert: stainless steel ■ 4 reinforcements: stainless steel plates ■ 1 lower reinforcement: stainless steel	**D6**

	INTERFACE
BM10N	POM support with 10 mm thick EPDM foam strip
LMNBR	Nitrile Magnum lip 50 x 105 mm

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.

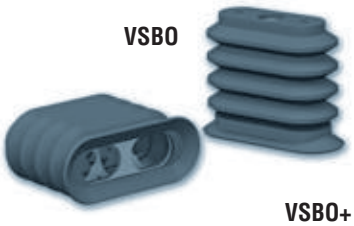
- Dual mounting option: To provide users with more options, the bottle suction cups feature M6 threads, so that they can be mounted from the inside using with two M5 screws or from the top using two M6 screws.

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

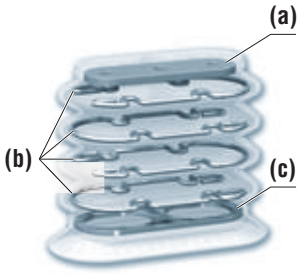
Suction Cup Characteristics

	(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

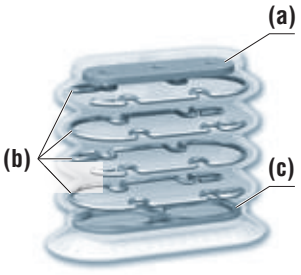
(1) Force measured at 65% on dry and smooth bottles without safety factor.
(2) f = Suction cup deflection.

Insert and Reinforcements

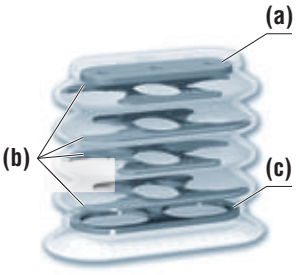
Version D5
(a) 1 upper insert: stainless steel
(b) 4 reinforcements: stainless steel wire
(c) 1 lower reinforcement: stainless steel



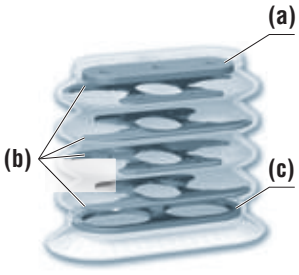
Version D5P
(a) 1 upper insert: stainless steel
(b) 4 reinforcements: stainless steel wire
(c) 1 lower reinforcement: polypropylene



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



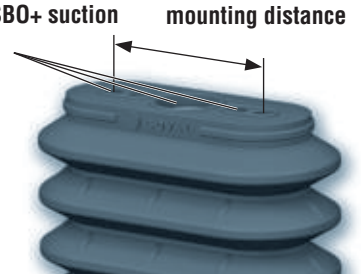
Mounting Hole Distance

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

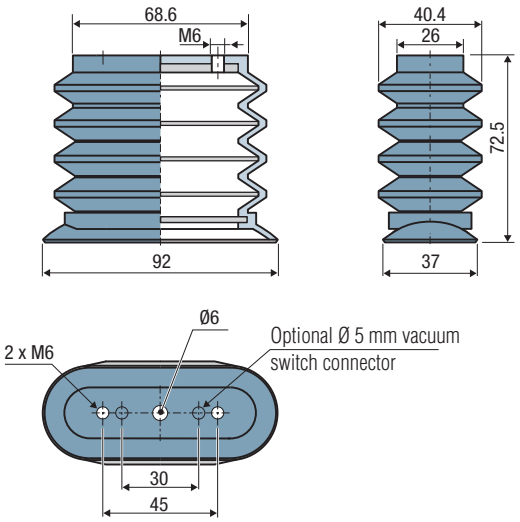
REINFORCEMENTS	
D5	■ 1 upper insert: stainless steel ■ 4 reinforcements: stainless steel wire ■ 1 lower reinforcement: stainless steel
D6	■ 1 upper insert: stainless steel ■ 4 reinforcements: stainless steel plates ■ 1 lower reinforcement: stainless steel
D5P	■ 1 upper insert: stainless steel ■ 4 reinforcements: stainless steel wire ■ 1 lower reinforcement: polypropylene
D6P	■ 1 upper insert: stainless steel ■ 4 reinforcements: stainless steel plates ■ 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)

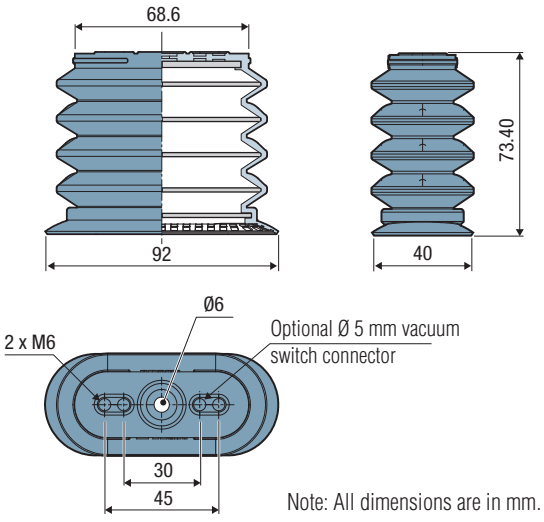
Note: 40 mm mounting hole distance available upon request

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

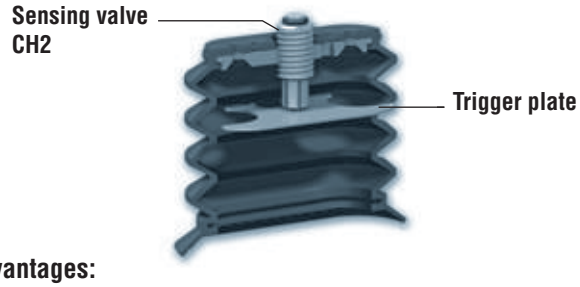
Suction Cup Characteristics

	(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

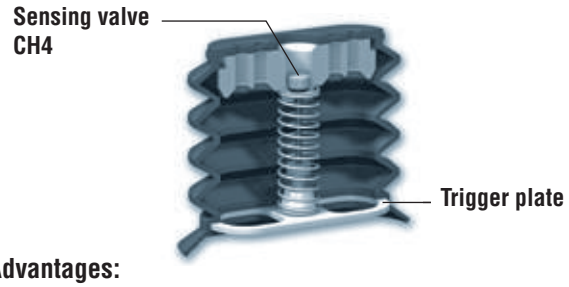
CH2 mechanical sensing valve
The **CH2 sensing valve** opens as pressure is exerted on the suction cup by an **internal** reinforcement, called a **"trigger plate"**.
The CH2 sensing valve is only compatible with stainless steel reinforcement plates (version D6P).



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+

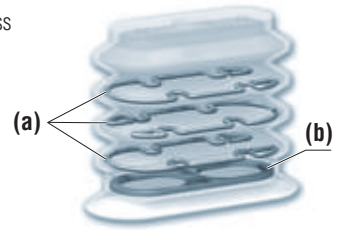
40 x 95 mm Bottle Suction Cups with Sensing Valve

Insert and Reinforcements

Version D5P

(a) 3 reinforcements: stainless steel wire

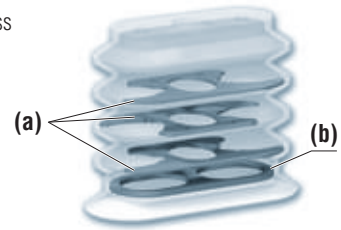
(b) 1 lower reinforcement: polypropylene



Version D6P

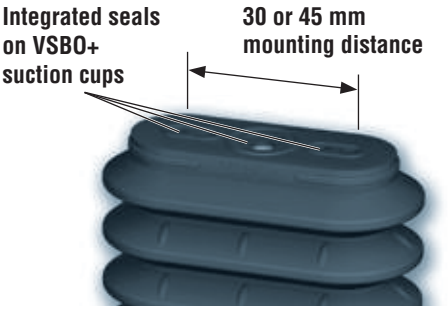
(a) 3 reinforcements: stainless steel plate

(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.



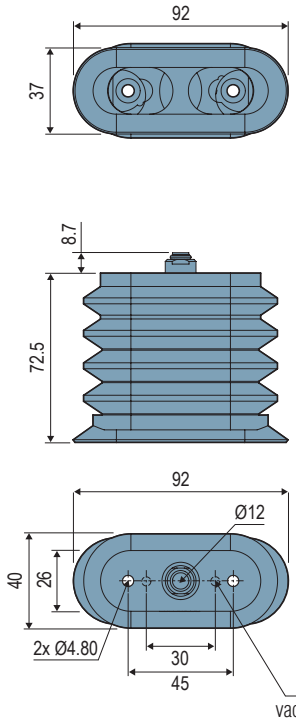
Available upon request: Vacuum switch connector

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.

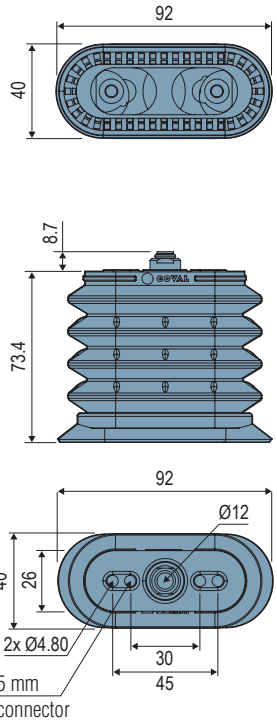
Suction Cup Dimensions

CH2 sensing valve

VSBO (VSBO4095_D6PCH2_)

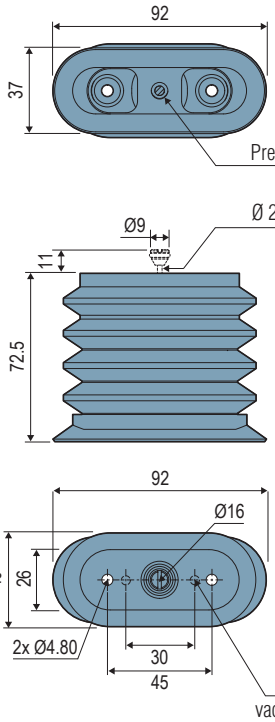


VSBO+ (VSBO4095C_D6PCH2_)

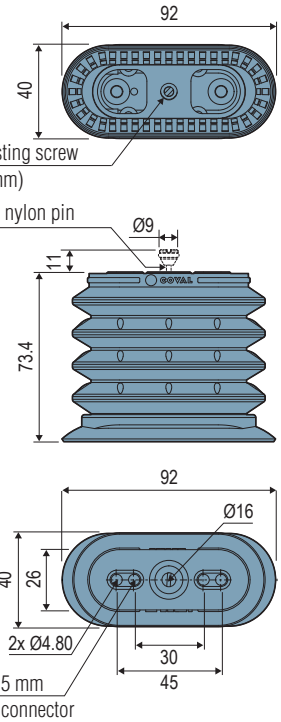


CH4 sensing valve

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 ■ 3 reinforcements: stainless steel wire ■ 1 lower reinforcement: polypropylene
D6P	■ 1 upper insert ■ 3 reinforcements: stainless steel plates ■ 1 lower reinforcement: polypropylene

VALVE TECHNOLOGY

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

Note: Version CHV_, 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

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

Industry-specific applications

Types of use

VSBO50105NBR_BM10N

VSBO50105NBR_LMNBR

Materials

Suction cups

NBR Nitrile

Suction Cup Characteristics

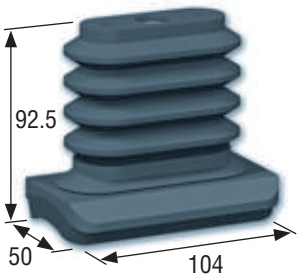
	(cm³)	(lbf) (1)	(lbf) (1)	f (2) (mm)	(g)
VSBO50105NBR_BM10N	150	35.5	18.6	7 + 34	205
VSBO50105NBR_LMNBR	142.5	55	18.6	2.5 + 34	205

(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**



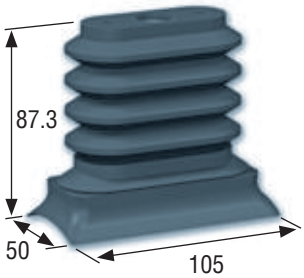
The **VSBO50105_BM10N** suction cup is designed for handling textured bottles. It features a curved gripping interface that fits the shape of the bottle and includes an EPDM foam seal that compensates for any irregular surfaces and guarantees an airtight seal.

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

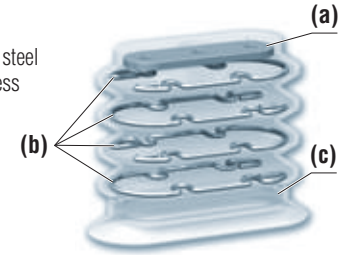
VSBO LM/BM

Bottle Suction Cups with Gripping Interface

Reinforcements

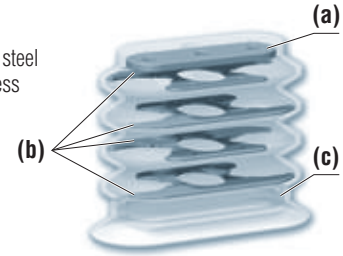
Version D5

(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



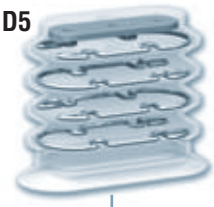
Bottle Suction Cups with Modular Gripping Interfaces

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

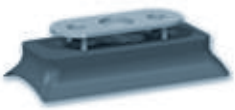
4 reinforcements: stainless steel wire
D5



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

How To Order

VSBO	50105	NBR	D5	X	45	BM10N

REINFORCEMENTS	
■ 1 upper insert: stainless steel ■ 4 reinforcements: stainless steel wire ■ 1 lower reinforcement: stainless steel	**D5**
■ 1 upper insert: stainless steel ■ 4 reinforcements: stainless steel plates ■ 1 lower reinforcement: stainless steel	**D6**

INTERFACE	
BM10N	POM support with 10 mm thick EPDM foam strip
LMNBR	Nitrile Magnum lip 50 x 105 mm

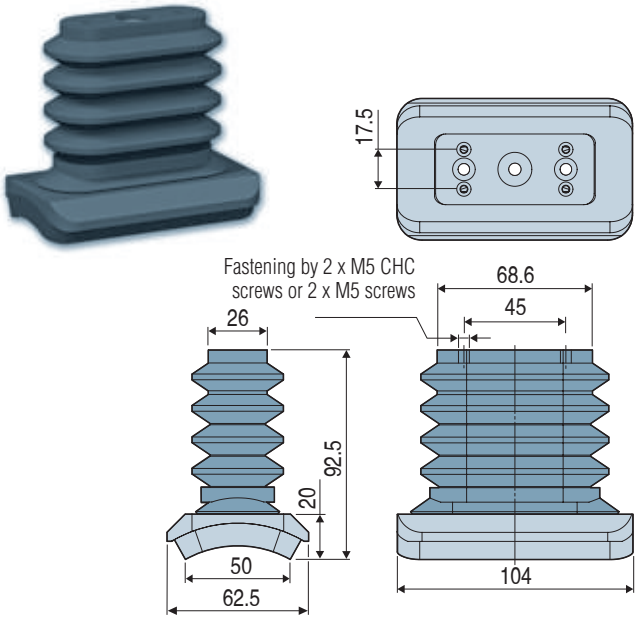
Available upon request: Vacuum switch connector
VSBO LM/BM suction cups feature an optional Ø 5 mm connector for a vacuum switch or blow-off valve.

VSBO LM/BM

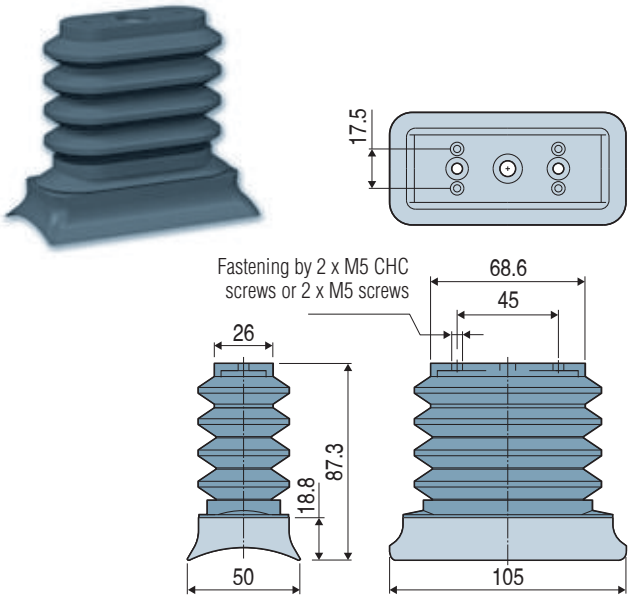
Bottle Suction Cups with Gripping Interface

Suction Cup Dimensions

VSBO50105NBR_X45BM10N



VSBO50105NBR_X45LMNBR

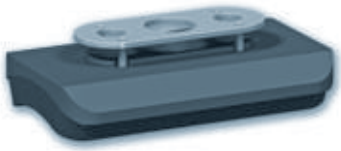


Gripping Interface Kits

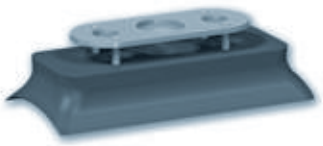
Gripping interface kits are used to turn 40 x 95 mm bottle suction cups (part no. VSBO4095NBR) into magnum bottle suction cups or suction cups with a foam gripping interface.

The kits include the reinforcement to fit the interface under the suction cup.

- Gripping interface kit with memory foam seal, 10 mm thick:
  Part no.: **VSBOKIT50105BM10N**



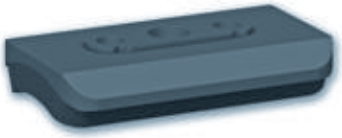
- Nitrile Magnum lip kit 50 x 105 mm:
  Part no.: **VSBOKIT50105LMNBR**



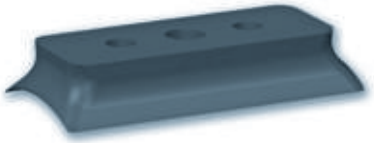
Part Numbers for Spare Parts

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

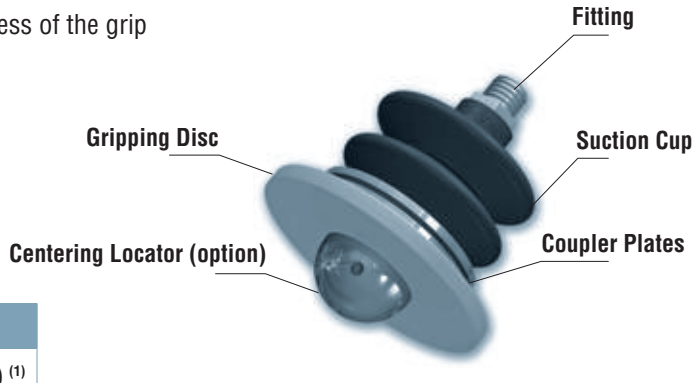
Types of use

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

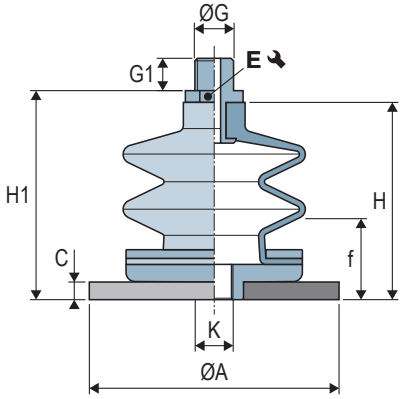
Suction Cup: NBR - Nitrile
Fitting and Couplers: Aluminum
Gripping Disc: SI - Silicone

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

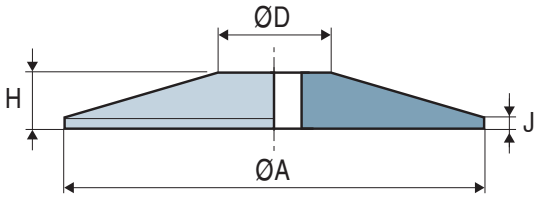
Materials

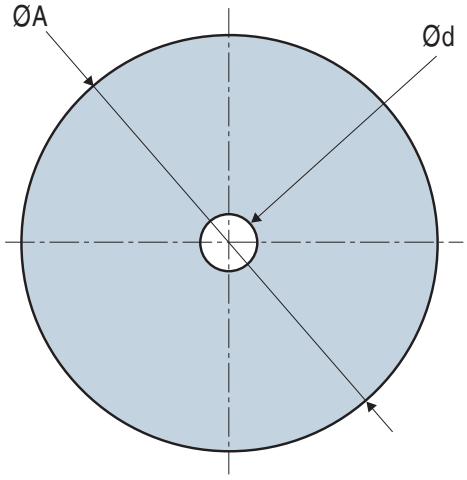
NR Natural rubber 45 Shore A

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

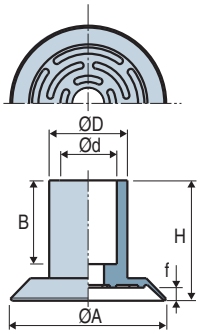
NBR	Nitrile	**NR**	Natural rubber
SIT5	Translucent silicone	**STN**	SITON®

Suction Cup Characteristics

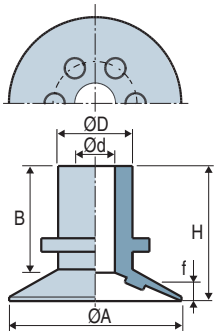
	Ø (mm)	(lbf) (1)	NBR	SIT5	NR	STN
VPA 15	15	0.65	-	**VPA15SIT5**	**VPA15NR**	-
VPA 20	20	0.97	-	**VPA20SIT5**	**VPA20NR**	-
VPA 25	25	1.46	-	**VPA25SIT5**	**VPA25NR**	-
VPA 26	26	1.46	-	-	**VPA26NR**	**VPA26STN**
VPA 30	30	2.11	**VPA30NBR**	**VPA30SIT5**	**VPA30NR**	**VPA30STN**
VPA 35 A	35	2.76	-	-	**VPA35ANR**	-
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.

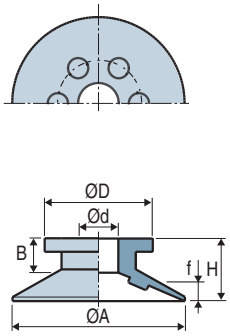
VPA 15…40



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

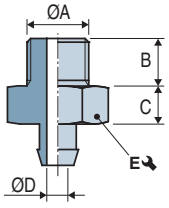
To optimize the use of your suction cups, Coval offers a comprehensive range of accessories (nozzle fittings, spring extensions, and feeder systems, etc.), see chapters **4** and **14**.

VPA
Suction Cups for Paper Applications

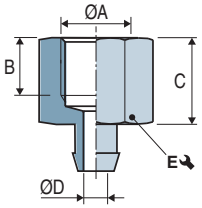
Choice of Fittings

	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	-

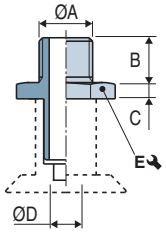
Male fittings
VPA 15...25



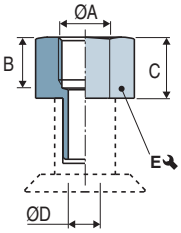
Female fittings
VPA 15...25



Male fittings
VPA 30...40



Female fittings
VPA 30...40

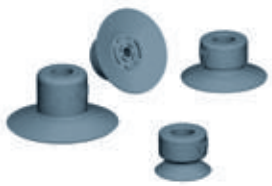


Barbed Fittings

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

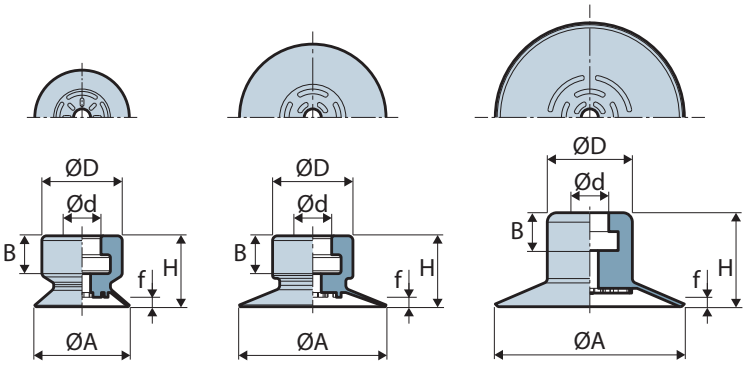
3 VPAL

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**

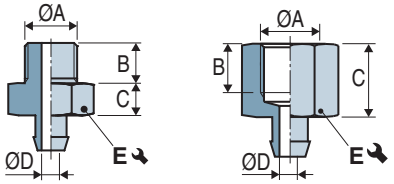


Suction Cup Dimensions

	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

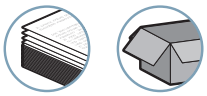
Accessories

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

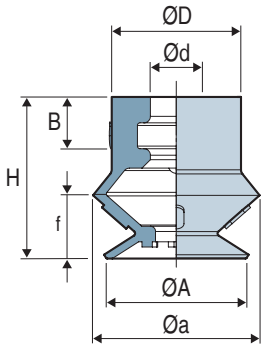
Materials

SIBL5 Blue Silicone 50 Shore A

Suction Cup Characteristics

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

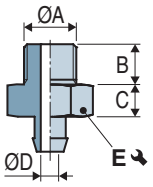
(1) Actual force of the suction cup with 65% vacuum and a safety factor of 2 included.



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

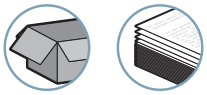
The values represent the average characteristics of our products.
Note: All dimensions are in mm

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

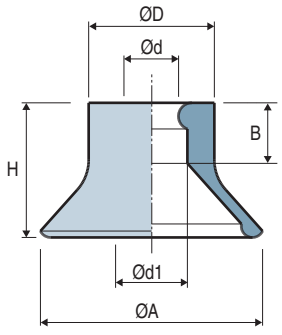
Advantages

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

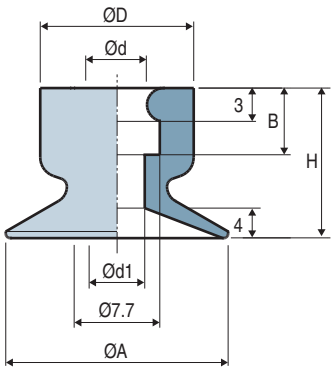
Suction Cup Characteristics

	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



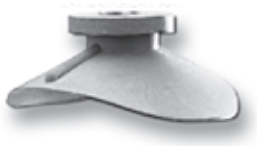
VPR 003 - 004



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

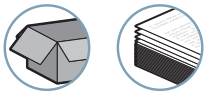
Specify the part number e.g.: VPR003NR
Please refer to the characteristics table above

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

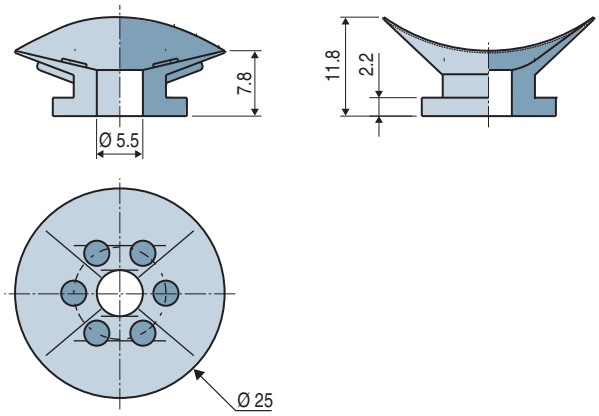
NR Natural rubber

Suction Cup Characteristics

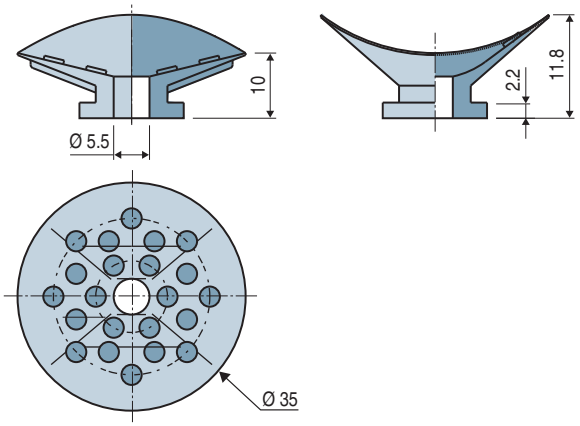
	NR	Fittings	
		G1/8"-M	G1/8"-F
VPAG 25	VPAG25NR	IM11ASP082	IF10ASP082
VPAG 3536	VPAG3536NR	-	-

Suction Cup Dimensions

VPAG 25

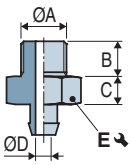


VPAG 3536

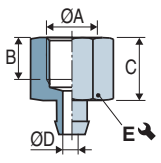


Barbed Fittings

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

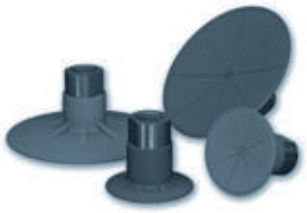
The values represent the average characteristics of our products.
Note: All dimensions are in mm

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**.

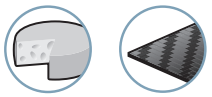
VPSC
Ultra-Flat, Non-Marking Suction Cups



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

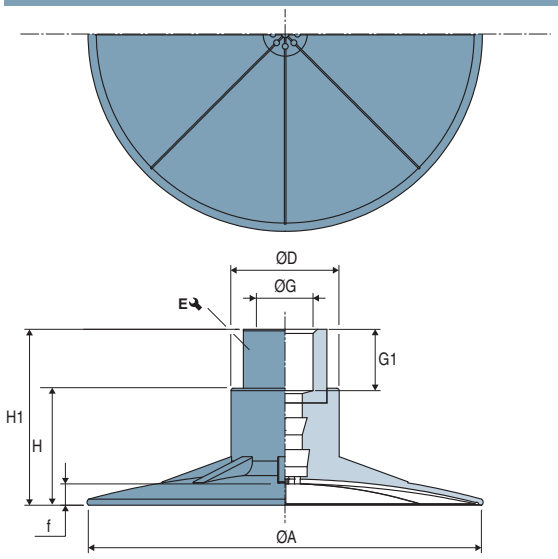
PU Polyurethane 60 Shore A
SIBL5 Blue Silicone 50 Shore A

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

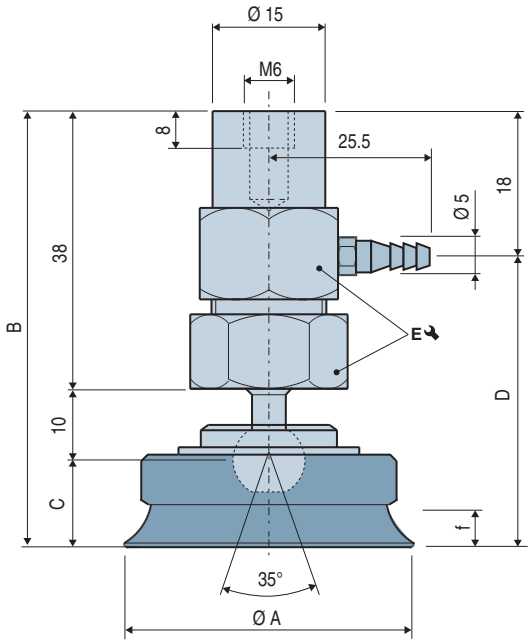
Ball-joint
Nickel-plated brass and zinc-plated steel

Suction Cup Characteristics

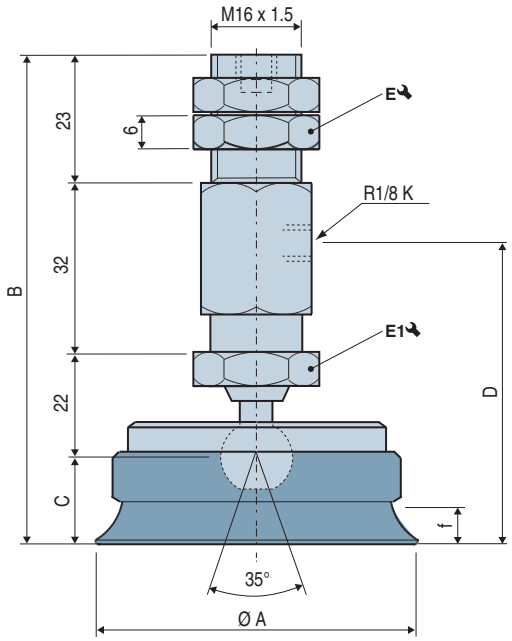
	(lbf) (1)	Rmin	Ø A	B	C	D	E	E1	f (2)	NBR	SI	(g)
VPYR 50	14.61	41	50	60	12	42	19	-	4	**VPYR50NBR**	**VPYR50SI**	117
VPYR 60	21.06	70	60	93	16	58	21	19	5	**VPYR60NBR**	**VPYR60SI**	352
VPYR 80	37.34	100	80	95	18	60	21	19	6	**VPYR80NBR**	**VPYR80SI**	444
VPYR 100	58.45	150	100	95	18	60	21	19	6	**VPYR100NBR**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

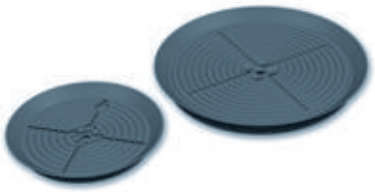
The values represent the average characteristics of our products.
Note: All dimensions are in mm

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

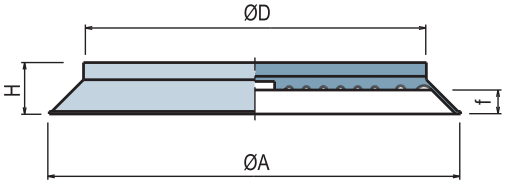
(1) Actual force of the suction cup in use with 65% vacuum and including a safety factor of 2 for horizontal handling and a factor of 4 for vertical handling.
(2) f = Deflection of the suction cup.
(3) Thickness of the steel fitting: 8 mm

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

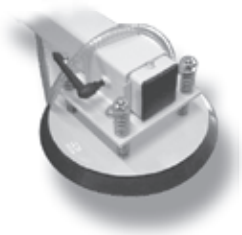
RSC2: specify **G38 RS2** in the order number

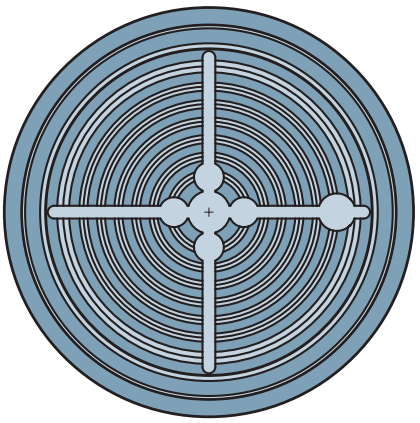


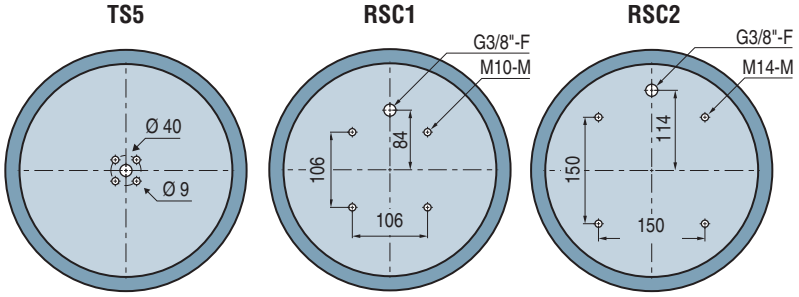
Internal Thread

	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.

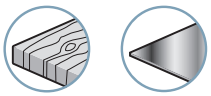
Steel Suction Cups with Bonded Seal

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 applications



Types of use

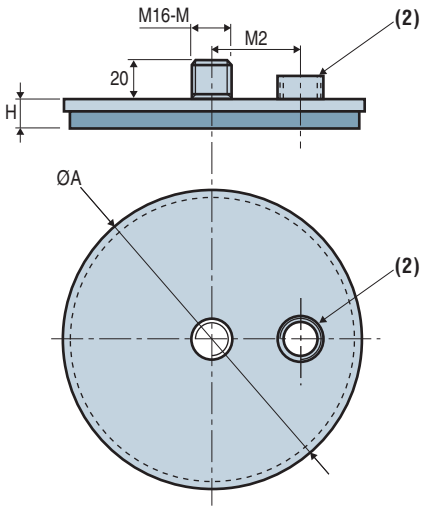
Materials

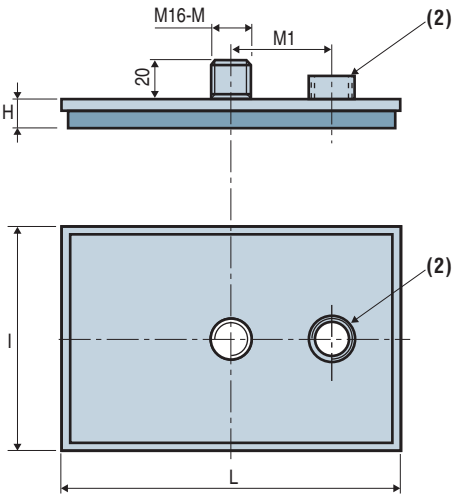
Body	Painted steel
Foam seal	Nitrile

Suction Cup Characteristics

Round suction cups				Rectangular suction cups							
	Ø A	H	(lbf) (1)		L	I	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

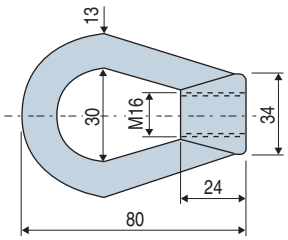
(1) Force measured at 65% vacuum including a factor of 2.



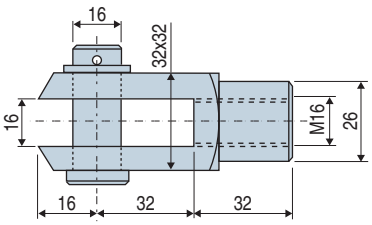


Fittings

■ **5000 An** ring fitting



■ **5000 Ch** cap fitting



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

For all orders, please specify:
Round suction cup: Model + Fitting model.
E.g.: 5050 5000 An

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

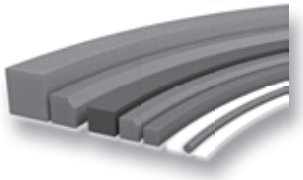
Piloted Safety Valves

- 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)

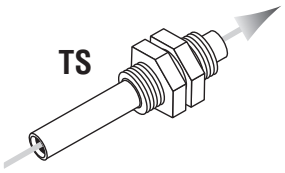
- The foam strip is designed for gripping products with an uneven or ridged surface: sawn wood, metal sheets, flat surfaces with bumps or hollows.
- All granular surfaces to which suction cups cannot adhere correctly and therefore cannot be airtight.

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

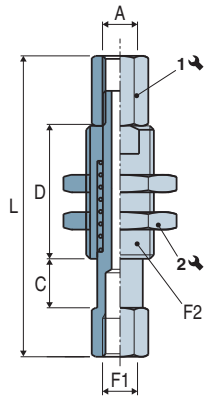
Spring Stainless steel
Tubing Zinc-plated steel
Slider Brass

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



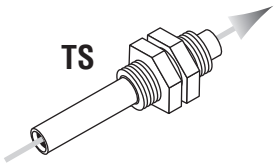
Please specify the part n° e.g.: TS1140
See part n° table above.

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

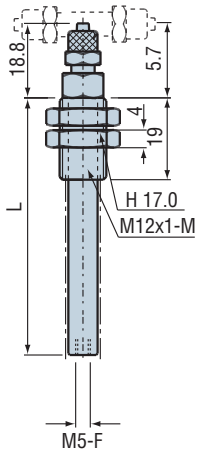
Spring Stainless steel
Tubing Zinc-plated steel
Slider Brass

Characteristics

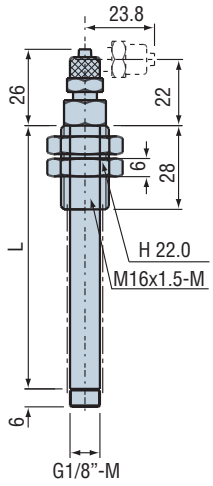
Models	TS1				TS2				TS3				TS1.20 LG
Stroke	05	10	20	30	10	30	50	70	10	30	50	70	20
L	29	39	59	79	48	88	128	168	48	88	128	168	59
k (lbf/in)	2.06	0.86	0.40	0.26	5.14	1.14	0.66	0.46	5.14	1.14	0.66	0.46	0.40
Frep (lbf)	0.22	0.38	0.33	0.45	1.82	0.94	1.01	1.01	1.15	0.94	1.01	1.01	0.33

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

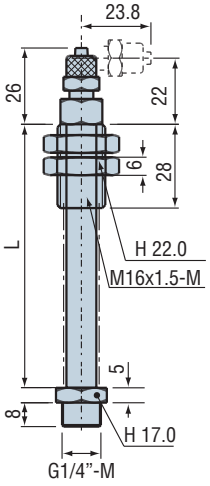
TS1



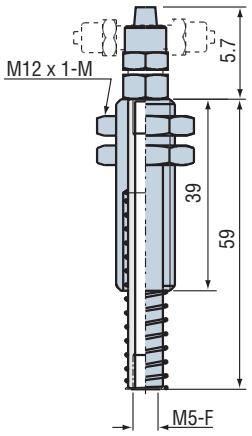
TS2



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 **TS2** **TS3**	**05 - 10 - 20 - 30** **10 - 30 - 50 - 70**	(TS1) (TS2, TS3)	**D46** **D68** **C46** **C68** **T46**[1] **N**[2]	(Straight 4 x 6 - TS1, TS2, TS3) (Straight 6 x 8 - TS2, TS3) (Elbow 4 x 6 - TS1, TS2, TS3) (Elbow 6 x 8 - TS2, TS3) (T-shape 4 x 6 - TS1) (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

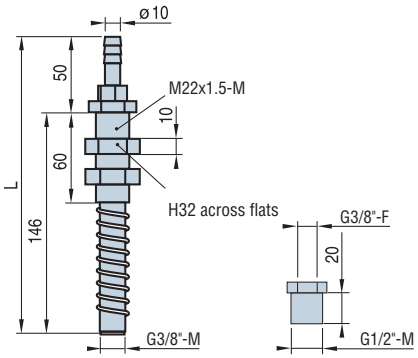
Models	TS4 50	TS5 60
Stroke	45	60
L	196	234
k (lbf/in)	2.68	7.02
Force at rest (lbf)	0.90	0

k = Spring stiffness

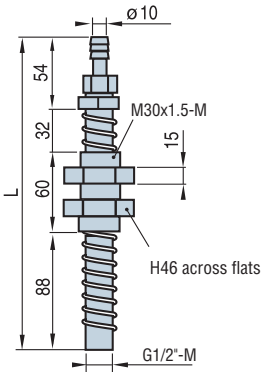
Materials

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

Note: All dimensions are in mm

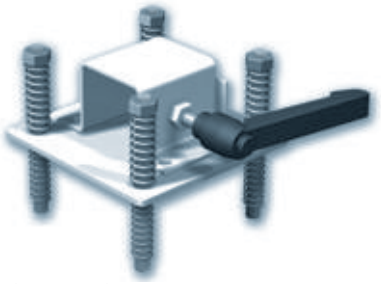


TS4 50 VPI **TS4 50 VPG**



TS5 60

RSC
Multi-Compensator Systems



Use

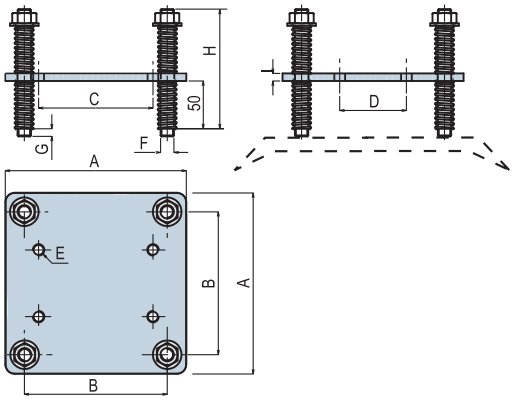
The system of 4 compensated springs is particularly recommended for horizontal handling requiring large diameter suction cups. The upper stainless steel springs act as dampers for all vertical movements. They compensate for different levels between the suction cups. The system of 4 compensated springs 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.

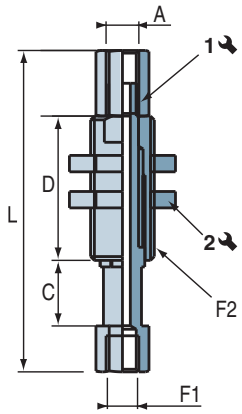
Characteristics - TSOP

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

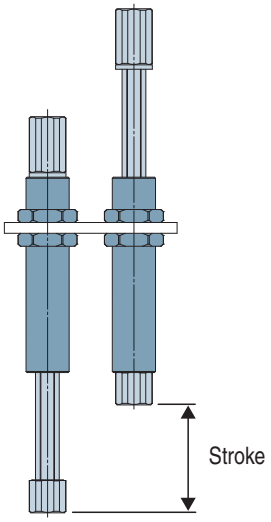


Please specify the part e.g.: TSOP140
See part n° table above.

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

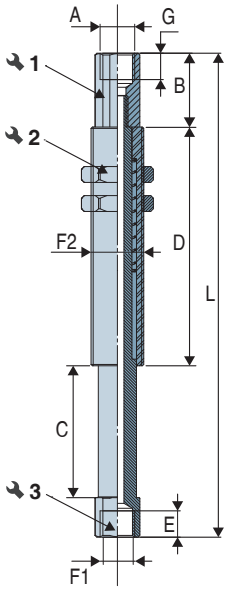
Characteristics - TSOG

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

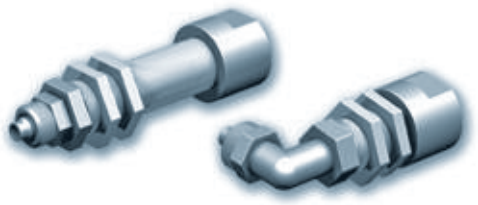
Materials

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



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

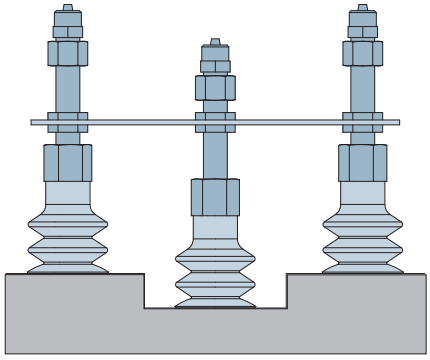
L
Mounting Extensions



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

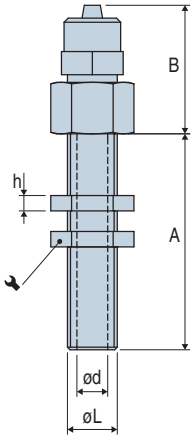
Characteristics

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	-	-

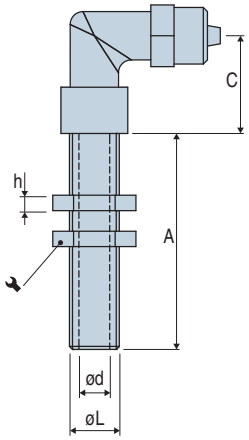
(1) Other lengths available on request for a minimum quantity of 10 pieces.

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

Straight

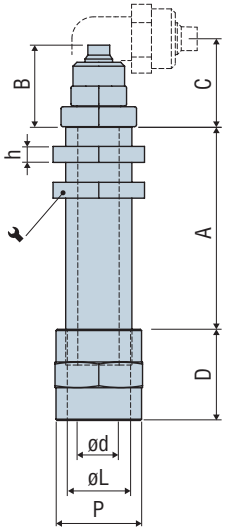


Elbow



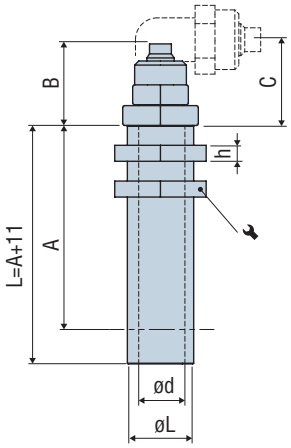
G3/8"-F

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).

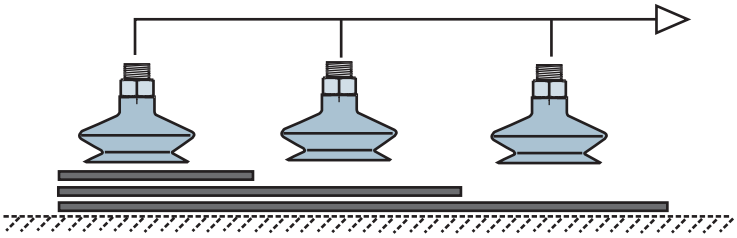
Miscellaneous Gripping

Principle

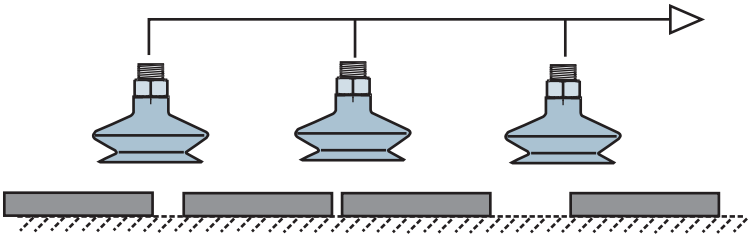
In many cases when using a multi-suction cup installation, some of the cups will not be covered by the product(s) to be handled. This leads to a high risk of reduced grip from the covered suction cups, or may even prevent them gripping at all.

Examples

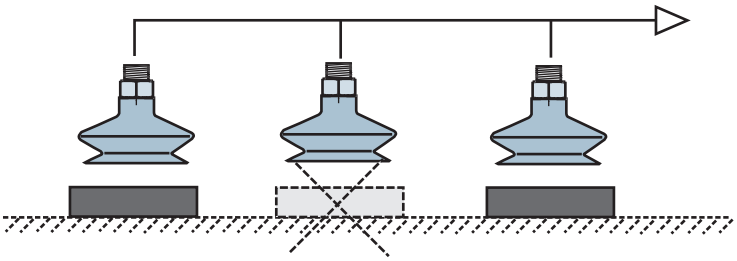
- Gripping of panels, sheet metal,etc. in a wide variety of sizes by a vacuum lifter equipped with suction cups.



- 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

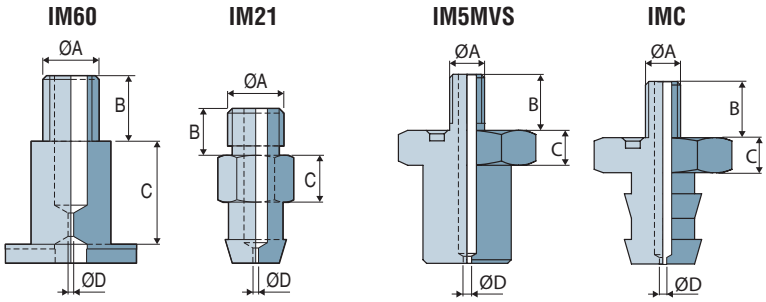
Groups 1 and 2

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.

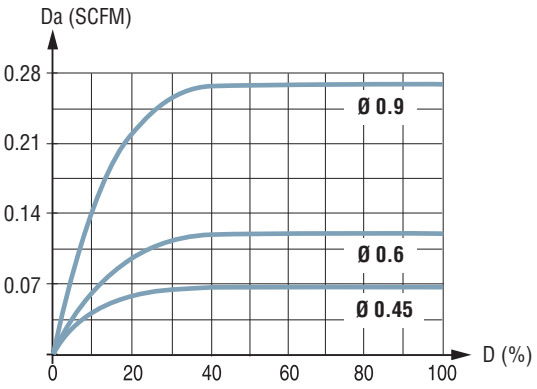
Caution, do not use this type of fitting for applications in a dusty environment.

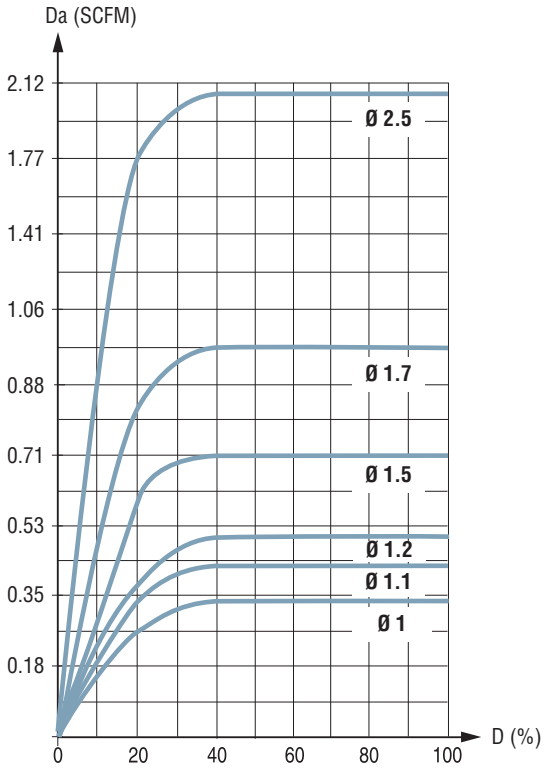
Characteristics

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.

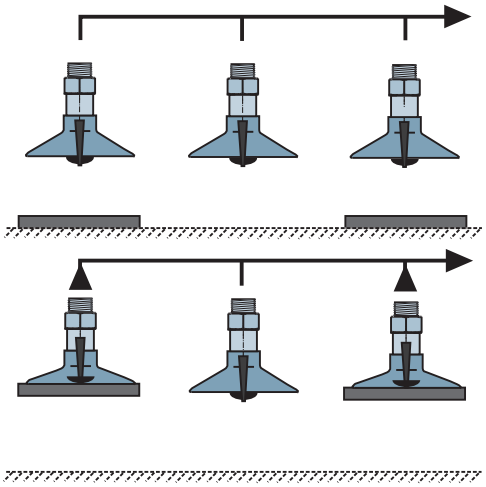
Note: All dimensions are in mm

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

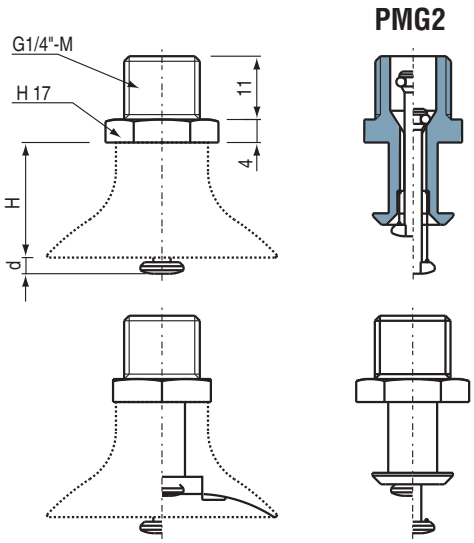
- Simple to install and operate.
- Very efficient air-tightness for non-covered suction cups.
- Little risk of marking delicate objects, as the feeler has a rounded surface.

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

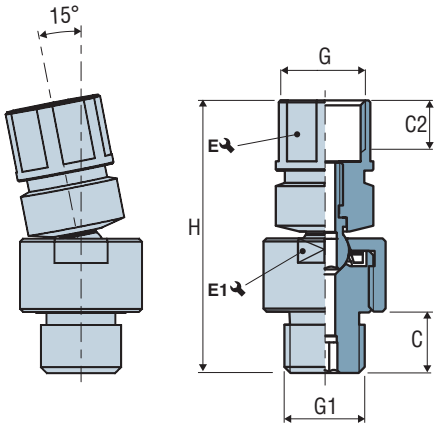
IMU series ball-joints are recommended for gripping rounded or rotating products.
When installed on a flat suction cup, they provide greater force than a bellows suction cup.
The vacuum connection is axial and sealing is ensured by a special seal always in contact with the spherical articulation.
The 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.

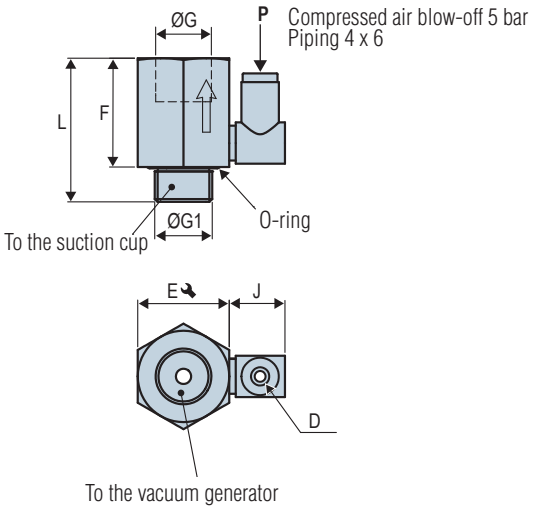
Note: The empty valve is not a positive safety feature. Regular maintenance is needed to ensure the proper functioning of the valve.

Materials

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

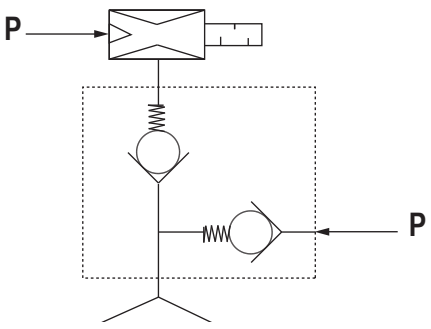
Characteristics

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

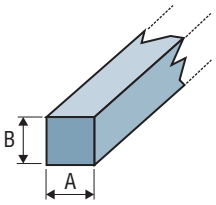
Mounting

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

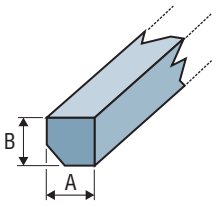
Support

- 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

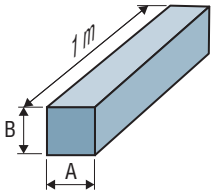
- The beveling facilitates gripping of products with uneven surfaces.
- Closed cells.
- Contact adhesive reference: BOSTIK 1400 (Neoprene adhesive).



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

4

Vacuum Pumps Overview

Chapter 5

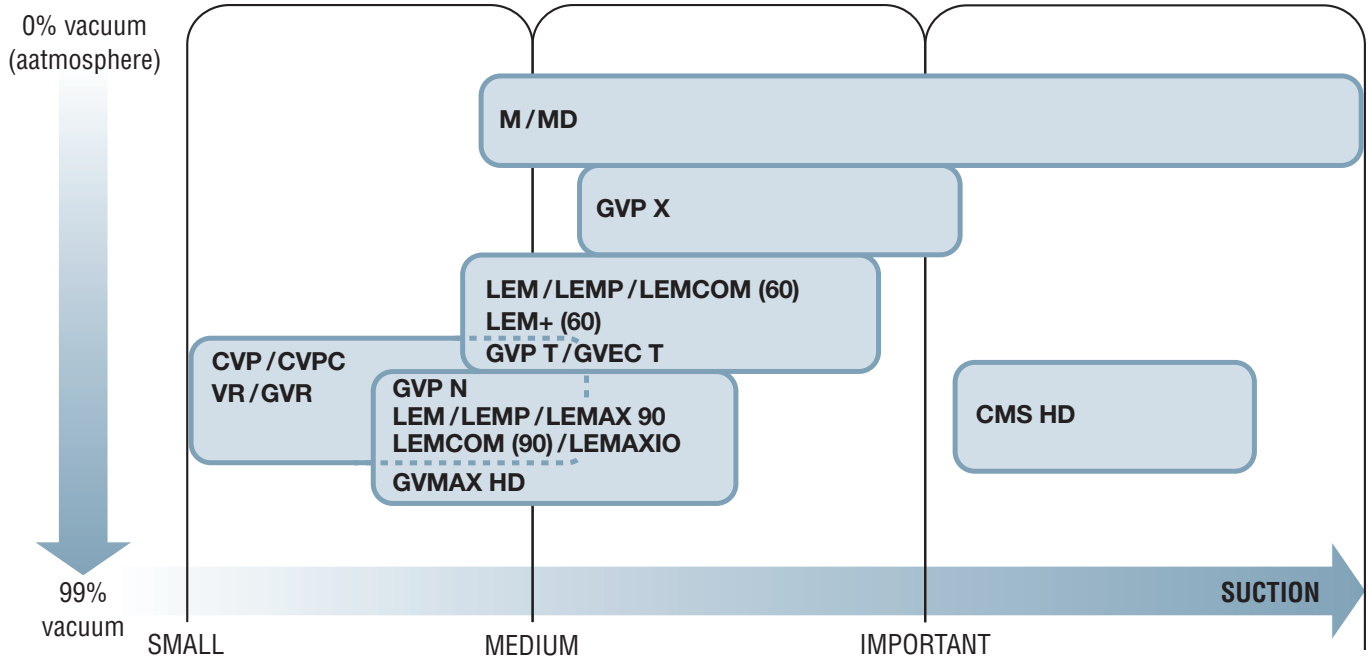
General Points	p. 5/2
Choosing a Vacuum Pump	p. 5/3
Comparison of Vacuum Pumps and Air Amplifiers	p. 5/4
COVAL's Family of Intelligent Vacuum Pumps	p. 5/6
Vacuum Pump Range	p. 5/8
Evacuation Time and Weight of Vacuum Pumps	p. 5/11

5

Vacuum Pumps Overview

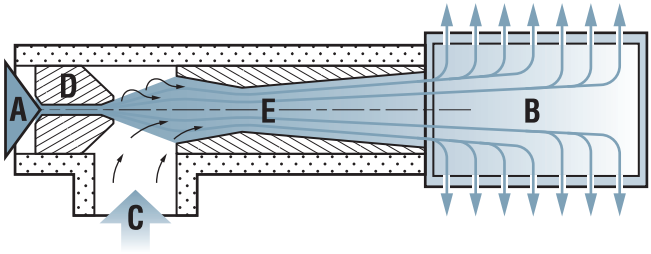
General Points

What is vacuum?



HOW A VENTURI WORKS

The COVAL vacuum pump works on the Venturi principle. The filtered, non-lubricated compressed air in **A** is blown through nozzle **D** and speeds up. It then goes into mixer **E** and finally escapes through silencer **B**. The vacuum is caused by the pressure drop in the chamber around nozzle **D**. The air sucked in **C** follows the same route to end up in silencer **B.**



PRESSURE UNIT CONVERSION

Units	Bar 10 N/cm² = 100 kPa	Atm kp/cm²	Torr 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

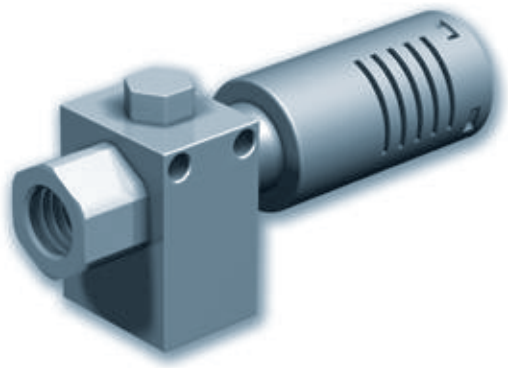
%	Bar (10 N/cm² = 100 kPa)	Atm (kp/cm²)	mm of water column
10%	-0.101	-0.103	1000
20%	-0.203	-0.207	2000
30%	-0.304	-0.310	3000
40%	-0.405	-0.413	4000
50%	-0.507	-0.517	5000
60%	-0.608	-0.620	6000
70%	-0.709	-0.723	7000
80%	-0.811	-0.827	8000
90%	-0.912	-0.930	9000

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.

5

TYPES OF VACUUM PUMPS

■ **Version 60% vacuum**

Optimal usage zone: 30 to 55% vacuum.

Use of vacuum pumps optimized at 60% maximum vacuum implies high suction flow to account for the drop in vacuum pressure.

■ **Version 85 % vacuum**

Optimal usage zone: 55 to 80% vacuum.

The importance of a vacuum pump which can create an 85% vacuum is to generate high vacuum and therefore a high force/surface ratio.

■ Applications:

HANDLING - SUCTION - EMPTYING - DOSING

Handling porous, semi-porous and airtight products.

High-speed pick and place.

Air and/or liquid dosing.

COMMENTS

The optimal use zones recommended as follows are the most adapted to the different types of technology. However they are in no way restrictive or limiting.

The notes are valid for both COVAL product groups: air amplifiers and vacuum pumps and also apply to all products using the same technology.

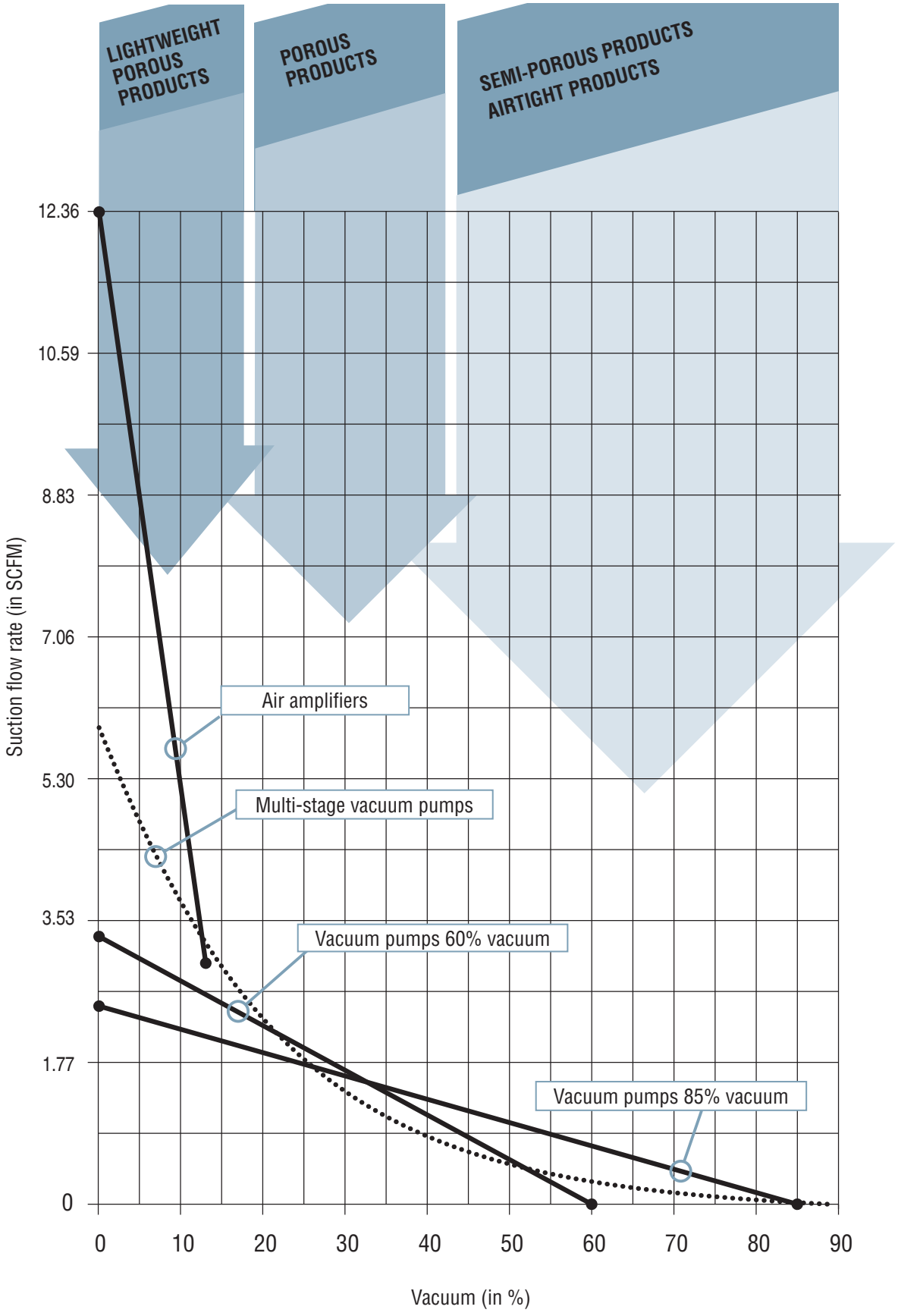
NOTE

The following curves have been established using COVAL equipment: M 10 C air amplifier, LEM60X14 and LEM90X14 vacuum pumps.

The values given are values for identical compressed air consumption and optimal characteristics of each of the vacuum generation procedures.

Vacuum Pumps Overview

Comparison of Vacuum Pumps and Air Amplifiers



COVAL's Family of Intelligent Vacuum Pumps

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

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

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

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

Key points of intelligent vacuum pumps

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.

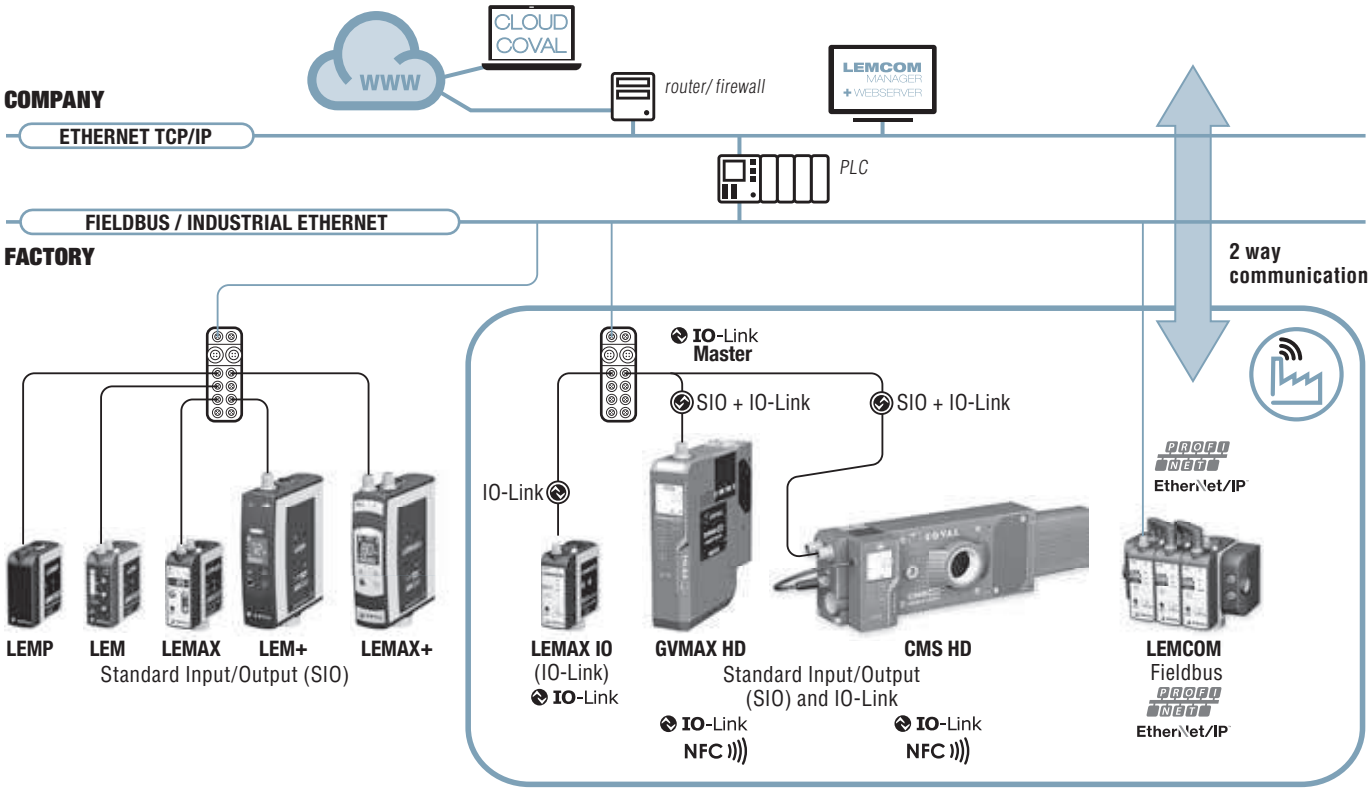
Ideal for gripping airtight products.

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...



5

Key points of communication technology

Communication interface with the machine

Industrial Ethernet

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

IO-Link

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

User communication interface

LEMCOM Manager

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

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

- 5 models
- Nozzle Ø: 0.5 ; 0.7 ; 0.9 ; 1 ; 1.2 ; 1.4mm
- 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
- Installed directly on the suction cups
- Excellent mechanical resistance
- Reduced gripping time
- Blow-off option
- Extended suction flow rate range
- Silent operation
- Adaptable to all industries

GVR

- 2 models
- Nozzle Ø: 0.9 ; 1 ; 1.2 ; 1.4 mm
- Suction flow rate: 0.74 to 2.26 SCFM
- Optimum supply pressure: 5 bar
- Weight 45 g
- Integrated silencer

- Very compact
- Installed directly on the suction cups
- Excellent mechanical resistance
- No clogging
- Reduced gripping time
- Blow-off option
- Extended suction flow rate range
- Silent operation
- Adaptable to all industries

CVP

- 2 sizes
- Nozzle Ø:
  1.2 ; 1.4 ; 1.6 ; 2.2 ; 2.7 mm
- Suction flow rate:
  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

CVPC

- 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

CBP

- 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.

Vacuum Pumps without control

GVP

- Simple 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

GEMP

- Simple energy-saving vacuum pumps
- Nozzle Ø: 1.2 ; 1.5 ; 2 ; 2.5 ; 3 mm
- 2 vacuum levels: 60% and 85%
- Suction flow rate: 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

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 needs frequent cleaning
- Use in washing or splashing zones
- No clogging

Vacuum Pumps Overview

Vacuum Pump Range

Intelligent Vacuum Pumps

LEMP AIR Saving Regulator	■ Mini Vacuum Pumps without control with ASR (Air Saving Regulator) ■ Nozzle Ø: 1; 1.2; 1.4 mm ■ 2 vacuum levels: 60% and 85% ■ Suction flow rate: 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
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
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
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
LEMCOM PROFINET AIR Saving Control 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
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

5

Vacuum Pumps Overview

Vacuum Pump Range

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

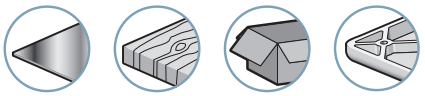
VR 05, 07, 09
Heavy-duty In-line Ejectors

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

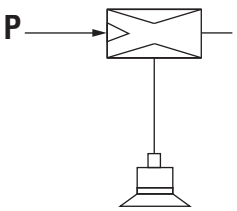
- Spring system, series TS3, available strokes: 10, 30, 50, 70mm, page 4/4.
- TSOP-TSOG series anti-rotation spring system, pages 4/6 and 4/7.
- Ball-joint systems, IMU series, page 4/12.

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.



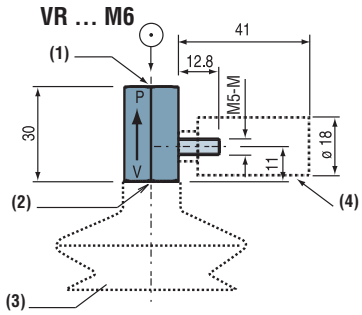
VR 05, 07, 09

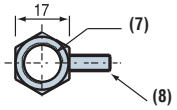
Heavy-duty In-line Ejectors

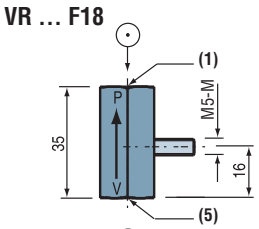
Dimensions and Data Curves

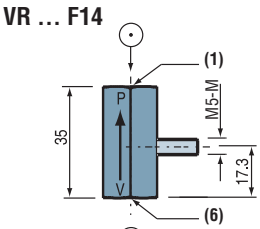
Dimensions

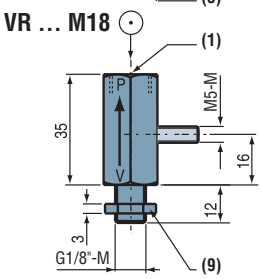
(**1**) G1/4"-F C.A. inlet, depth 10 mm
(**2**) M6-F vacuum outlet, depth 6 mm
(**3**) Example of suction cup
(**4**) Silencer
(**5**) G1/8"-F vacuum outlet, depth 7.5 mm
(**6**) G1/4"-F vacuum outlet, depth 10 mm
(**7**) Compressed air
(**8**) Exhaust
(**9**) Hexagonal nut, 14 across flats
(**10**)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

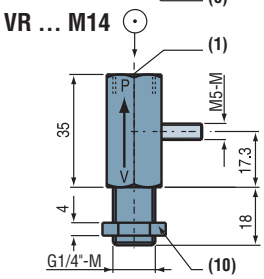






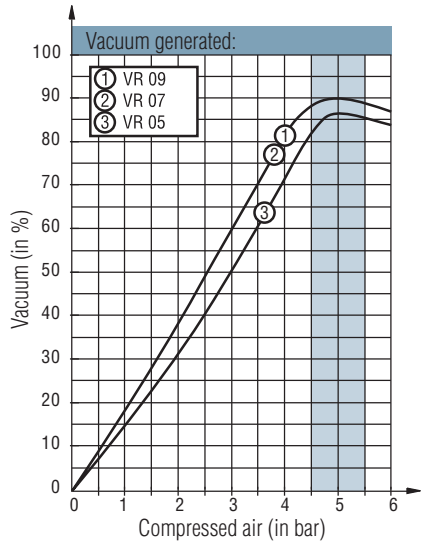


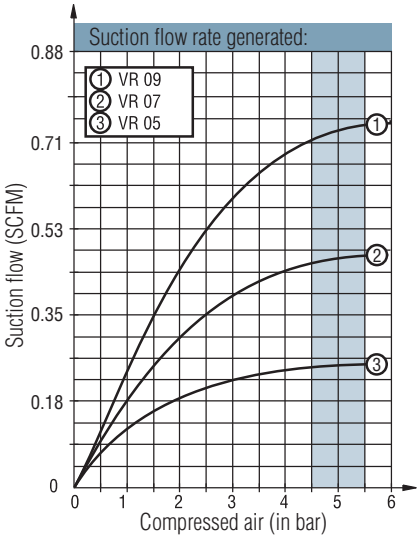


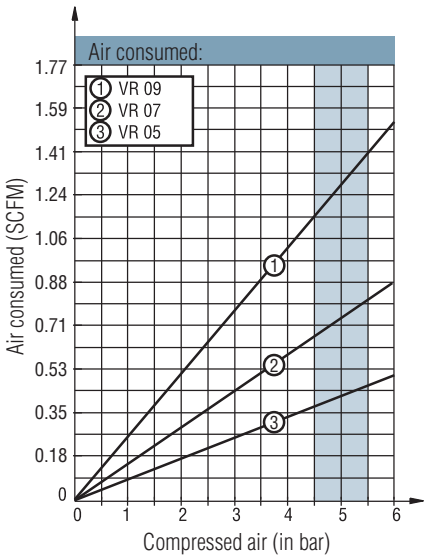


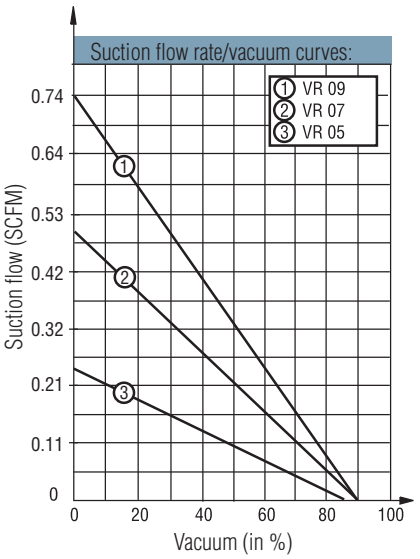
Note: All dimensions are in mm

Data Curves









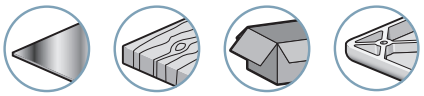
VR 10, 12, 14
Ejector Fittings

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

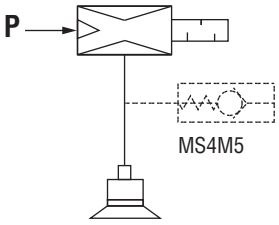
- New functions: vacuum switch or blow-off switch with or without silencer (SILGV 10).

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).

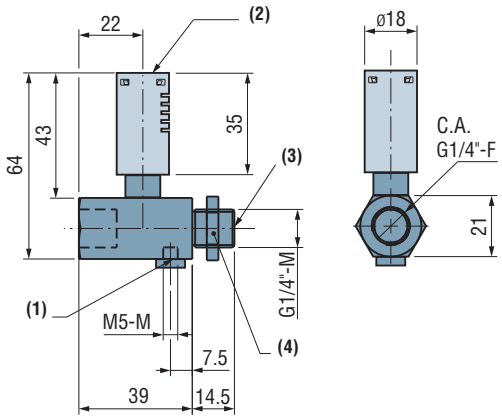


VR 10, 12, 14

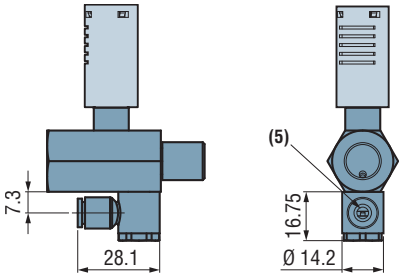
Ejector Fittings

Dimensions and Data Curves

Dimensions

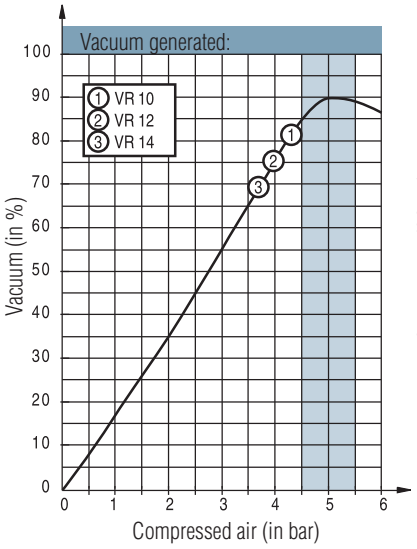


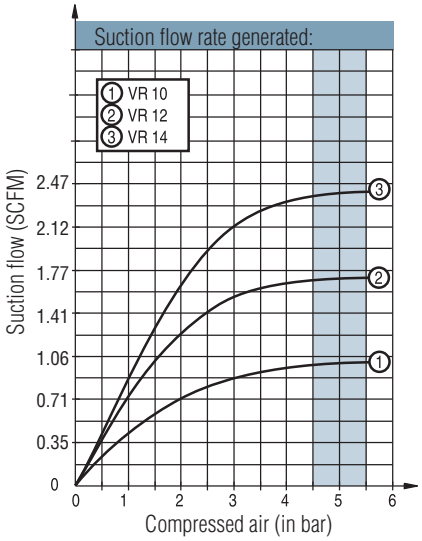
VR + MS4M5 version

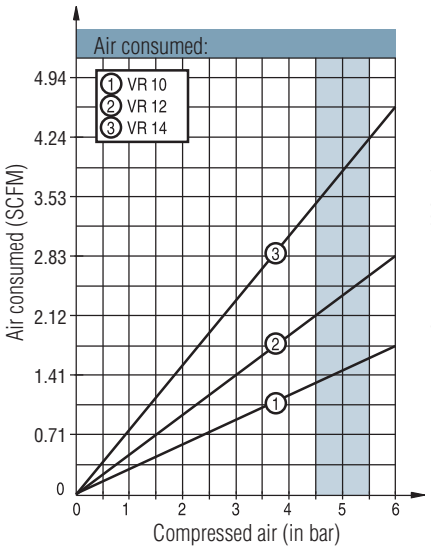


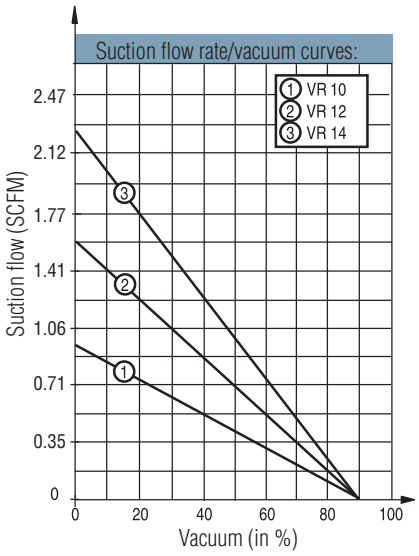
(**1**) Blow-off or vacuum switch
(**2**) Silencer
(**3**) Vacuum
(**4**) Hexagonal nut, 19 across flats
(**5**) Push fitting, external Ø 6

Data Curves







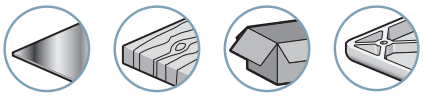


Note: All dimensions are in mm

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

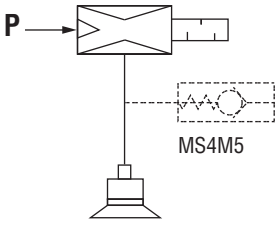
Additional Information
As standard
- Vacuum switch or blow-off switch with SILGV 10. SILK18C silencer (through-type) on request.

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.

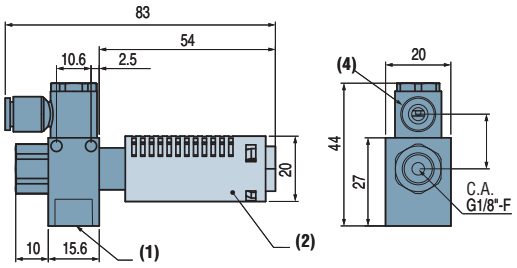
GVR 09, 10, 12, 14

Micro Ejectors

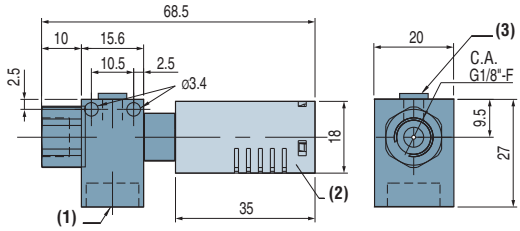
Dimensions and Data Curves

Dimensions

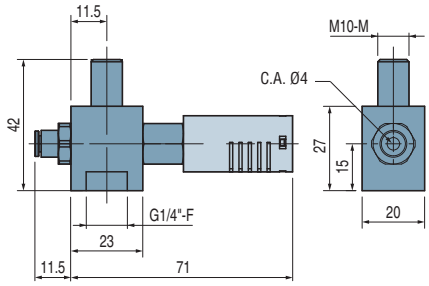
GVR 10, 12, 14 + MS4M5



GVR 10, 12, 14

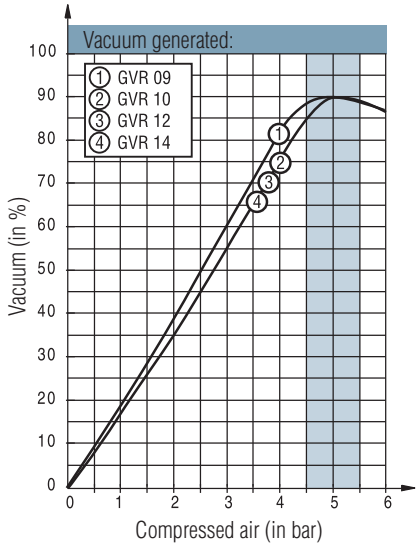


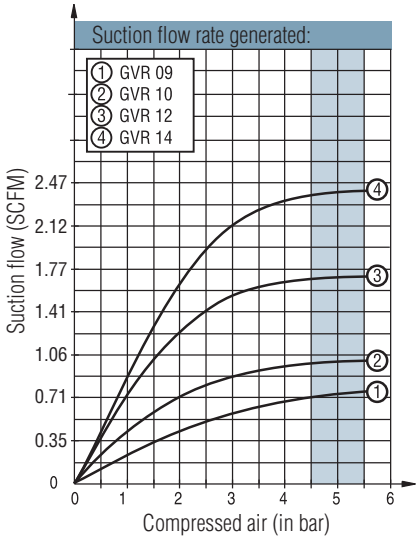
GVR 09

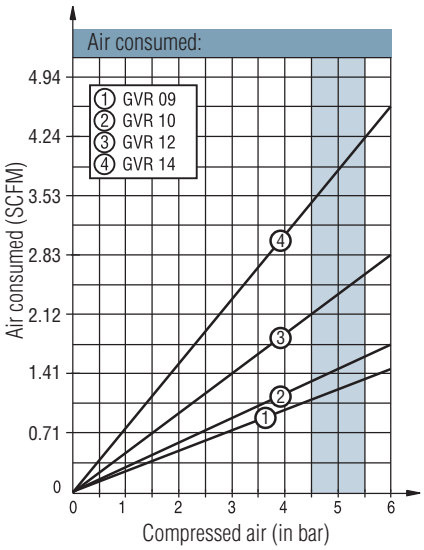


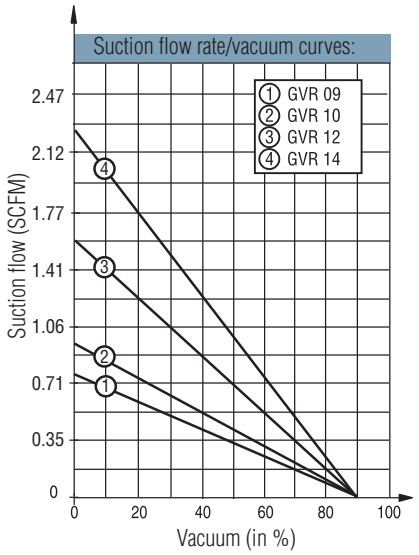
(**1**) Vacuum G1/4"-F
(**2**) Silencer
(**3**) M5-F plug for vacuum switch
(**4**) Push fitting, outside Ø 6

Data Curves









Note: All dimensions are in mm

CVP
Vacuum Cartridges
General Information

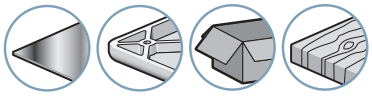
Owing to their compact size and light weight, the **CVP** Series vacuum cartridges can be used to easily install a simple and reliable vacuum generation system as close to the application as possible.

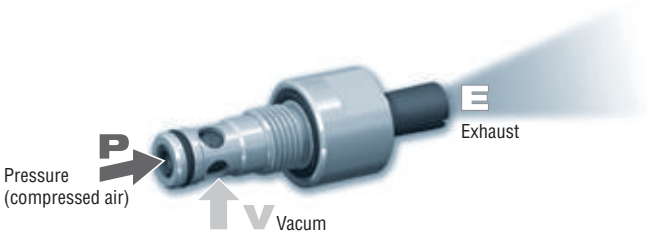
They meet the flexibility, customization and performance needs of machine manufacturers and integrators of robotic solutions, who wish to easily design flexible, modular and efficient gripping tools.

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

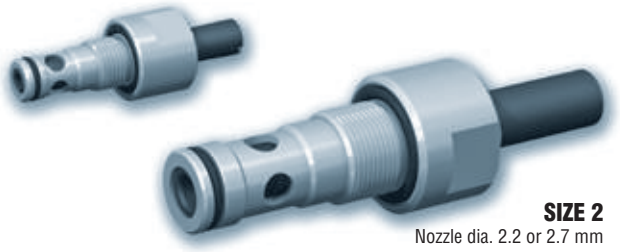
- Size 1: nozzle dia. 1.2, 1.4 and 1.6 mm generating a suction flow rate ranging from 1.45 to 3.18 SCFM. Max. vacuum 85%.
- Size 2: nozzle dia. 2.2 and 2.7 mm generating a suction flow rate ranging from 5.65 to 7.59 SCFM. Max. vacuum 85%.

Industry-specific applications





SIZE 1
Nozzle dia. 1.2, 1.4 or 1.6 mm

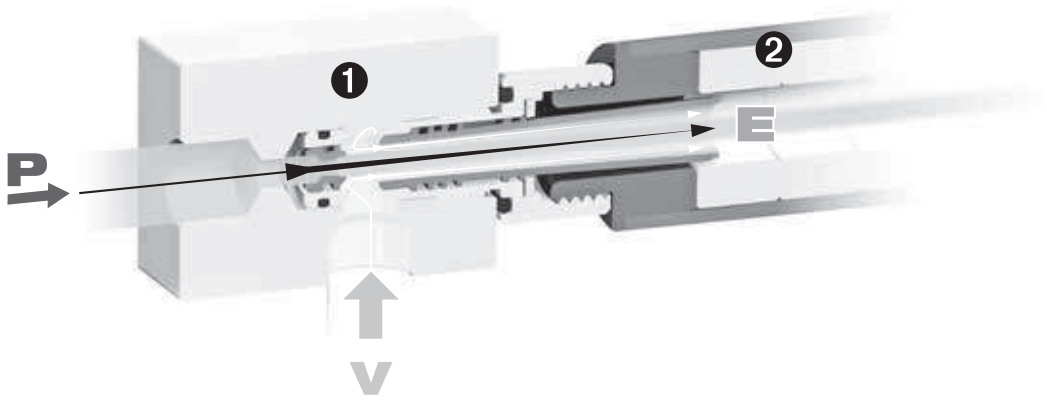


SIZE 2
Nozzle dia. 2.2 or 2.7 mm

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.

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

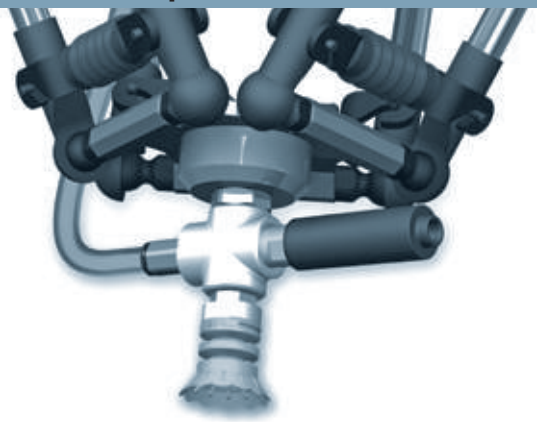
3. Peripheral equipment is assembled.

4

4. Pneumatic connections are established for use.

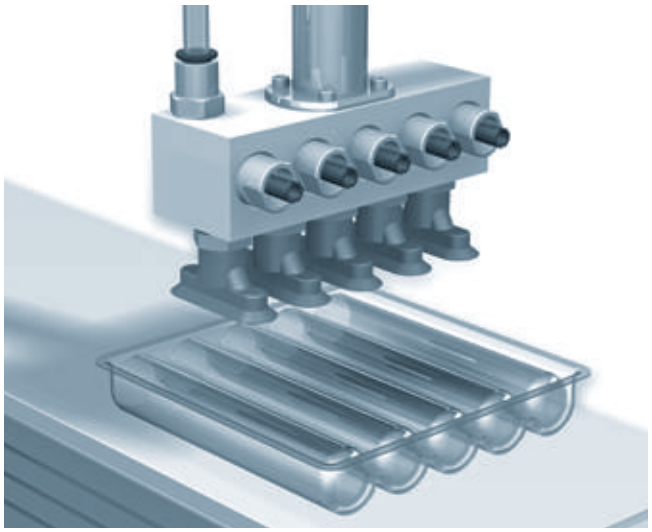
3D COVAL Data — You will find the 3D files of the cartridges as well as the specifications of the machining operations to be carried out on our website **www.coval.com**

Application examples

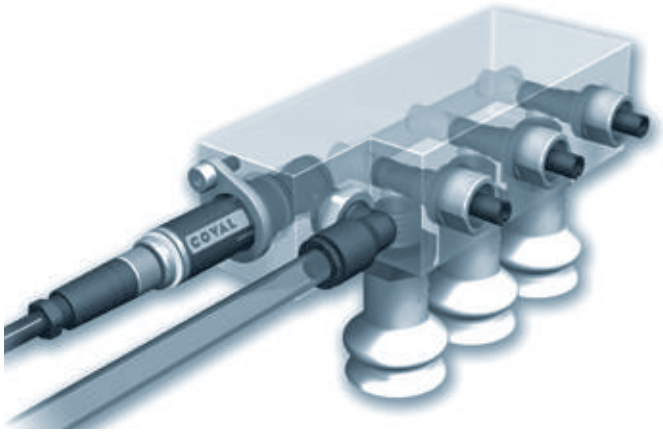


- 1 CVP series vacuum cartridge, with silencer
- 1 FPC series FlowPack suction cup

- 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

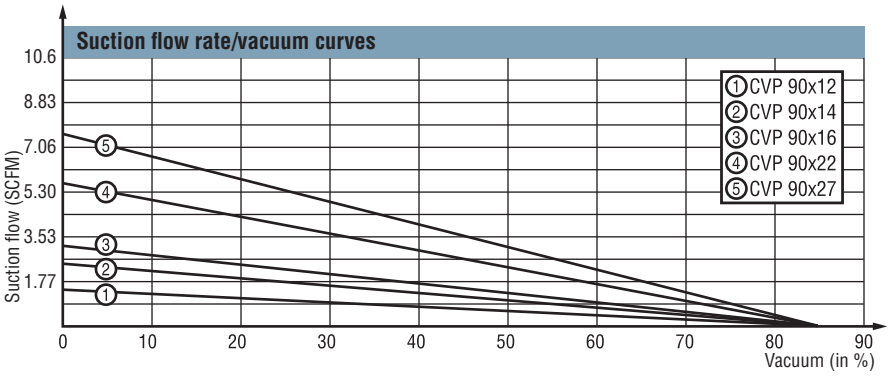
CVP
Vacuum Cartridges
Technical and Performance Data

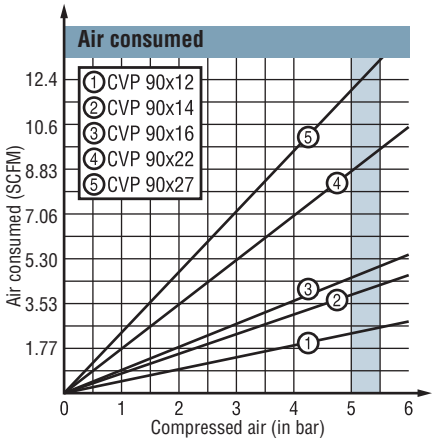
Characteristics

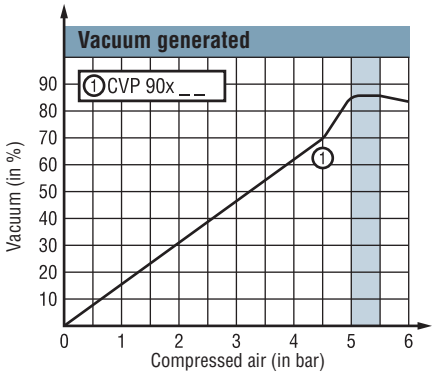
Model	Ø nozzle (mm)	Air consumed (SCFM)	Maximum vacuum (%)	Air drawn in (SCFM)	At optimal air pressure (bar)
CVP90x12	1.2	2.47	85	1.45	5 to 5.5
CVP90x14	1.4	4.06	85	2.47	5 to 5.5
CVP90x16	1.6	4.77	85	3.18	5 to 5.5
CVP90x22	2.2	9.18	85	5.65	5 to 5.5
CVP90x27	2.7	12.5	85	7.59	5 to 5.5

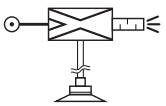
Evacuation time in seconds per liter

% 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

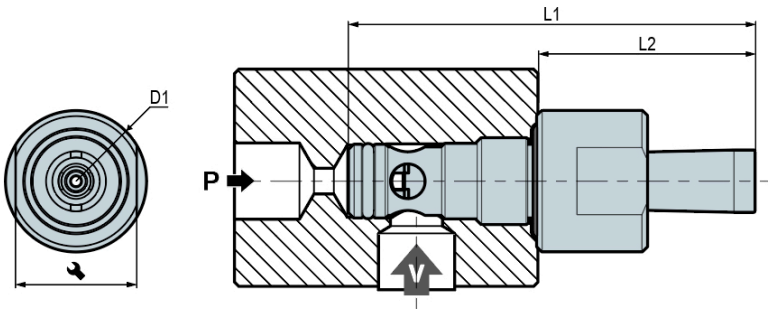








Dimensions



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

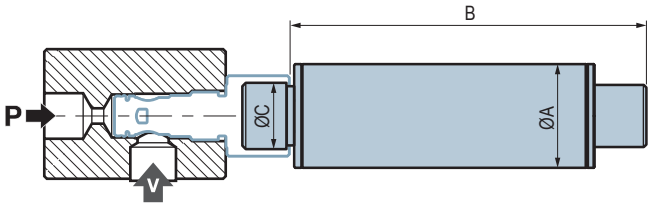
Through-type silencers - option K

- 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



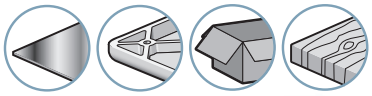
Controlled blow-off / multi-cartridge control valve

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

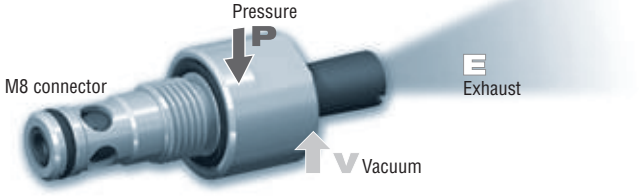
The ultra-compact and light **CVPC** Series controlled vacuum cartridges are used to effortlessly install a vacuum generation system equipped with an electric control, as close to the corresponding application as possible. They perfectly meet the flexibility, customization and performance needs of machine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

Industry-specific applications

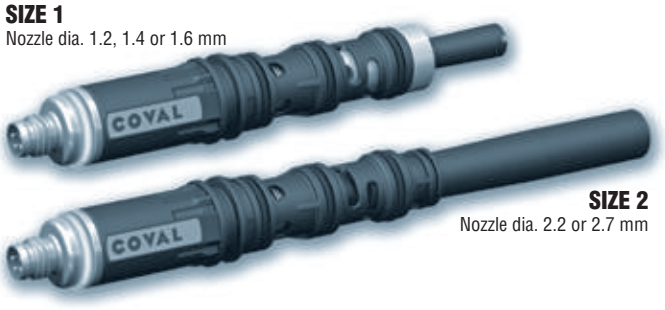


CVPC Series controlled vacuum cartridges are suitable for a broad variety of applications and are available in different sizes and suction capacities:

- 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

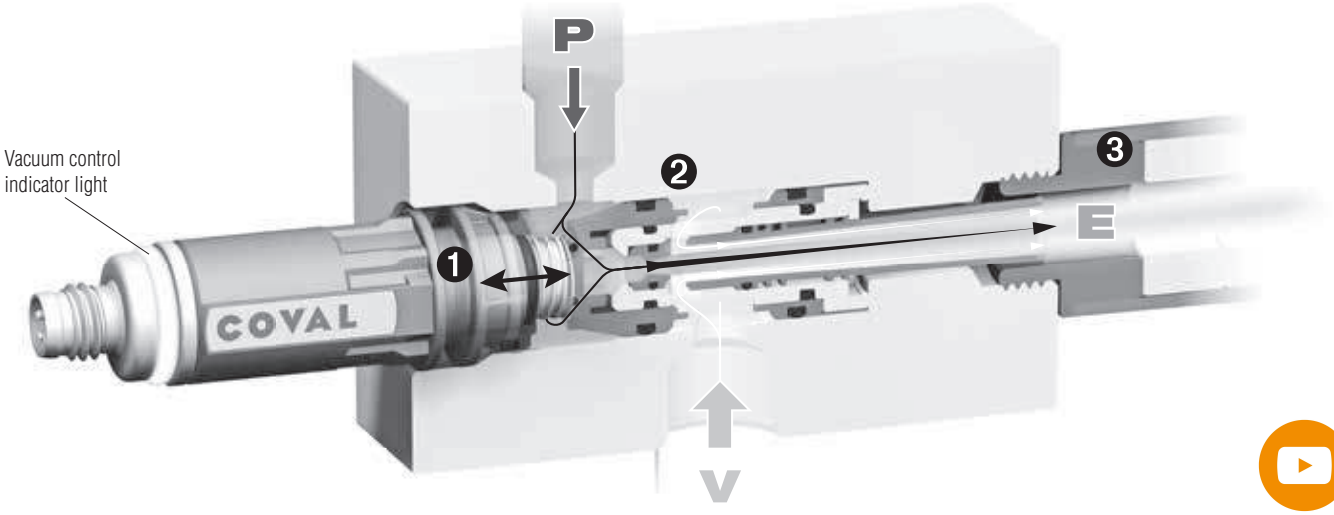


SIZE 2
Nozzle dia. 2.2 or 2.7 mm

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.

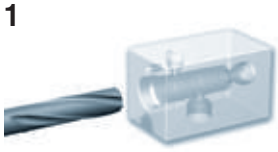
The innovative and patented design of the **CVPC** Series controlled vacuum cartridges combines two integrated functions:

- 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

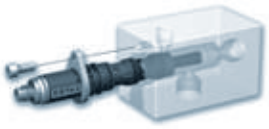
Implementation

1



1. Recess is machined to integrate the cartridge.

2

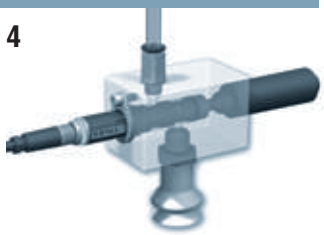


2. Vacuum cartridge is installed. Two mounting solutions are available: flange or threaded ring (see p. 6/15).

3

3. Peripheral equipment is assembled.

4

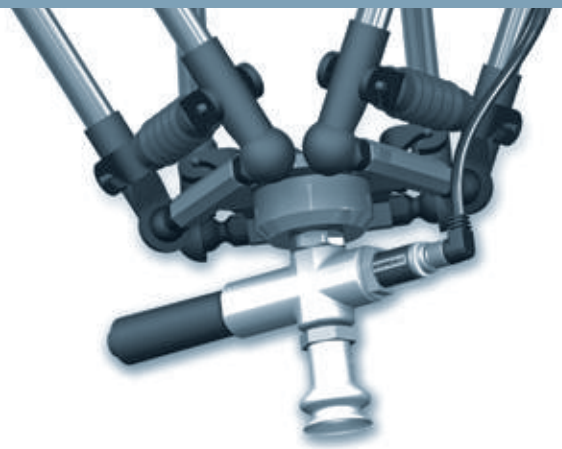


4. Pneumatic and electrical connections are established for use.

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**

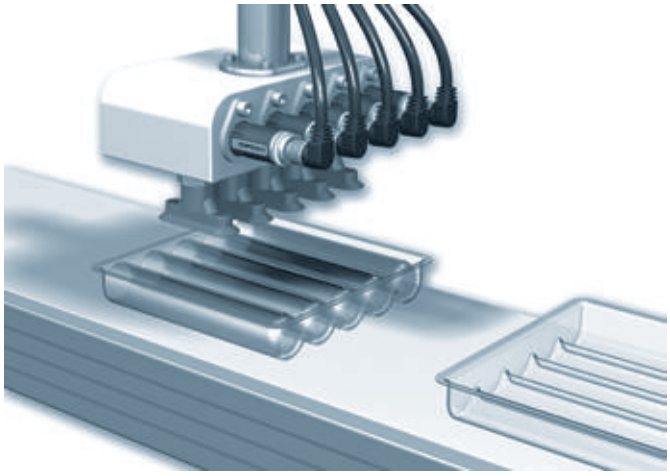
Application examples

- 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

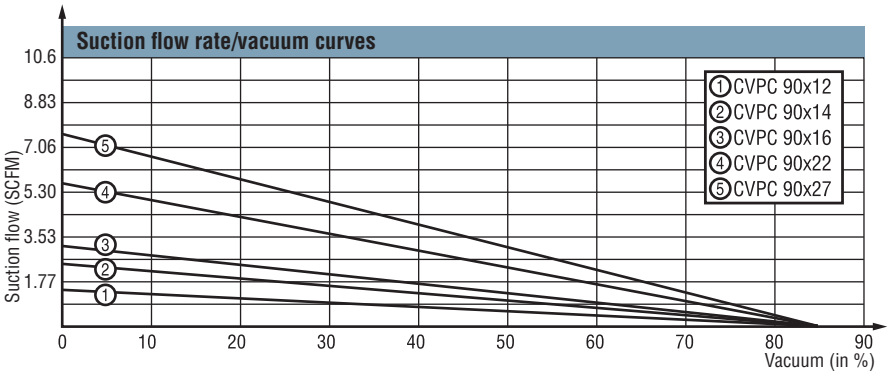
CVPC
Controlled Vacuum Cartridges
Technical and Performance Data

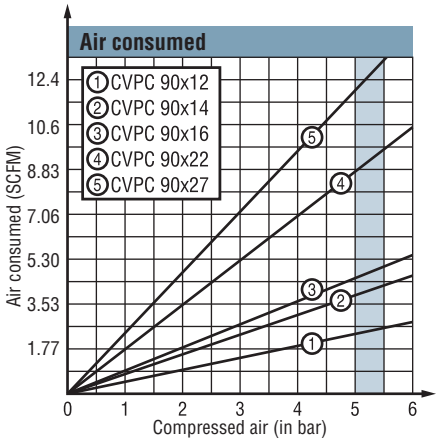
Characteristics

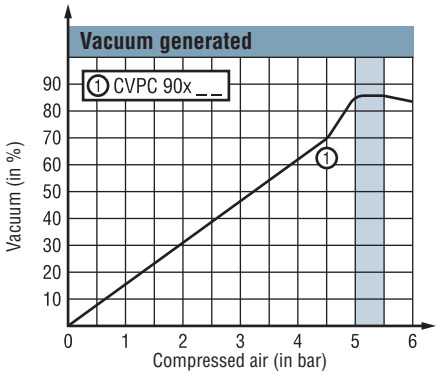
Model	Ø nozzle (mm)	Air consumed (SCFM)	Maximum vacuum (%)	Air drawn in (SCFM)	At optimal air pressure (bar)
CVPC90x12	1.2	2.47	85	1.45	5 to 5.5
CVPC90x14	1.4	4.06	85	2.47	5 to 5.5
CVPC90x16	1.6	4.77	85	3.18	5 to 5.5
CVPC90x22	2.2	9.18	85	5.65	5 to 5.5
CVPC90x27	2.7	12.5	85	7.59	5 to 5.5

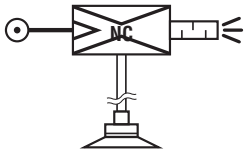
Evacuation time in seconds per liter

% 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

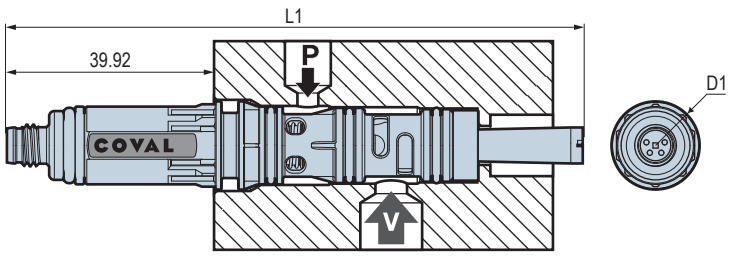






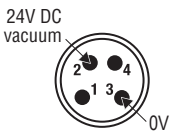


Dimensions and electrical connections



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

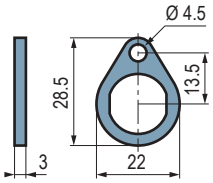
NOZZLE DIAMETER	
1.2 mm nozzle Ø	12
1.4 mm nozzle Ø	14
1.6 mm nozzle Ø	16
2.2 mm nozzle Ø	22
2.7 mm nozzle Ø	27

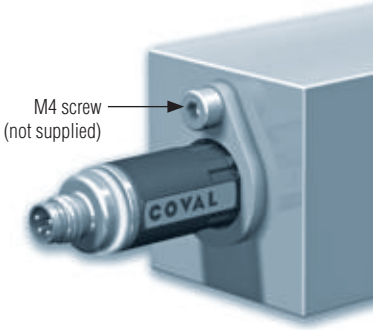
THROUGH-TYPE SILENCER	
–	Without
K	With silencer

Mounting accessories

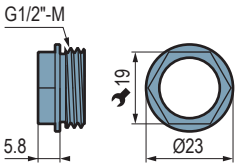
The CVPC controlled vacuum cartridges offer two mounting solutions:

Option CVPCFIX1
- Flange mounting





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



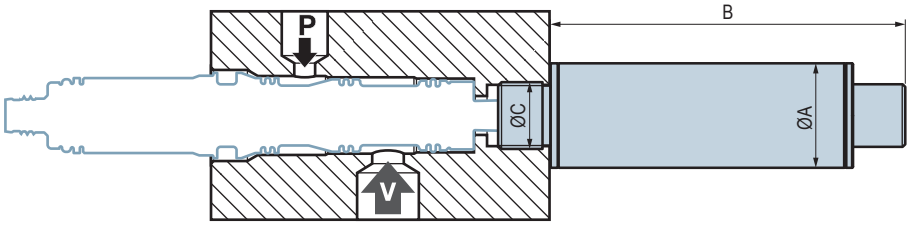
Through-type silencers - option K

- 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

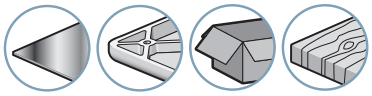
In some cases, a blow-off function must be added to the equipment to guarantee quick release and reduce cycle times. This is why COVAL developed an easy-to-integrate controlled blow-off cartridge.
➔ See **CBP** Series, page 6/16.

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



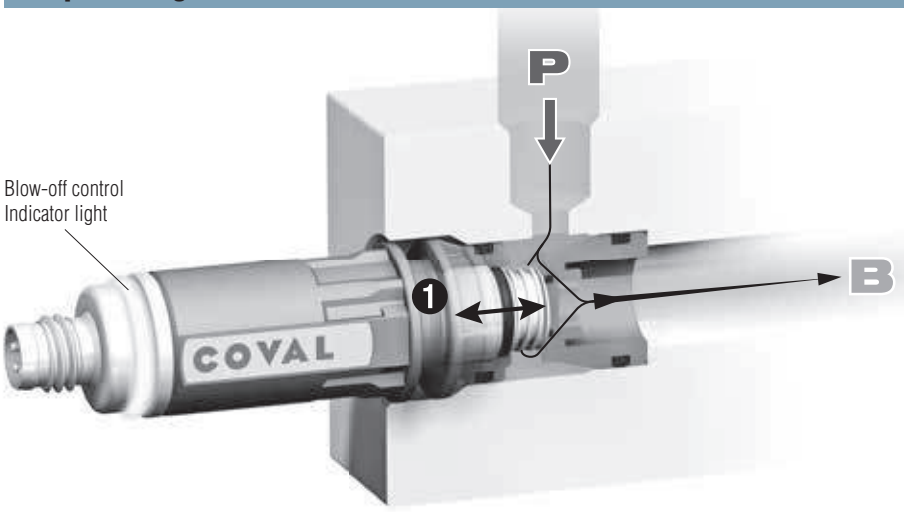
Advantages

- 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.
- …

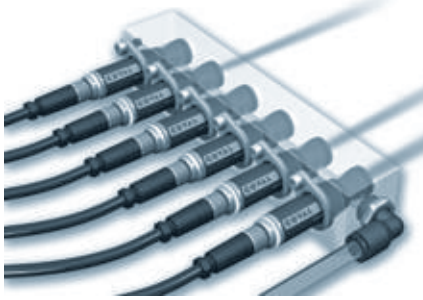
Compact integration



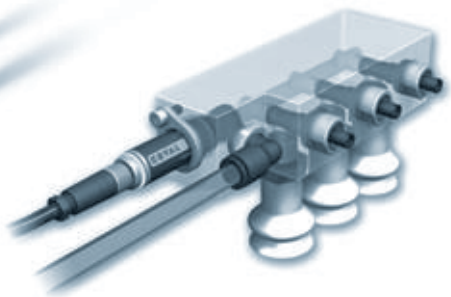
❶ Solenoid valve.

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.

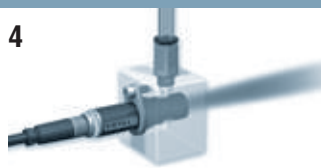
2

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

3

3. Peripheral equipment is assembled.

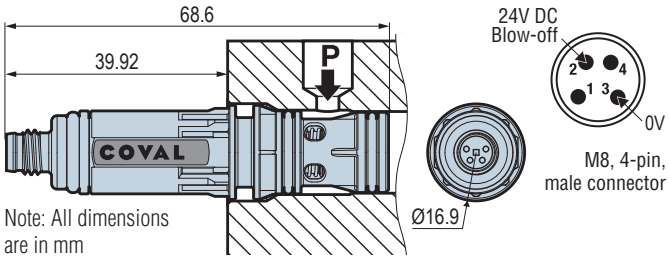
4



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**

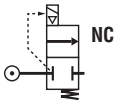
Dimensions and electrical connections



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:

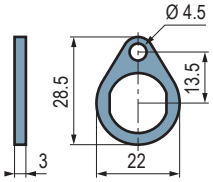
- CVP90X12 > 5 cartridges
- CVP90X14 > 3 cartridges
- CVP90X16 > 2 cartridges
- CVP90X22 > 1 cartridge
- CVP90X27 > 1 cartridge

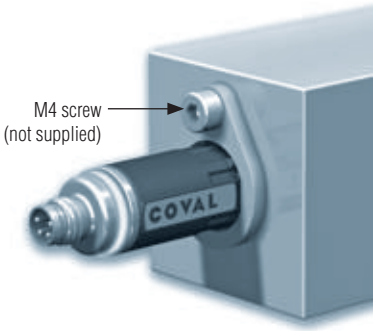
Mounting accessories

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

Option CVPCFIX1

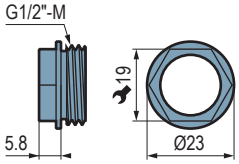
- Flange mounting.





Option CVPCFIX2

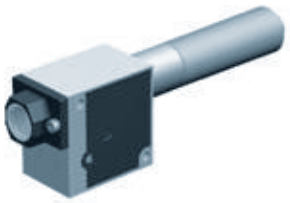
- Mounting with G1/2"-M threaded ring.



Vacuum Pumps without control

Chapter 7

GVP

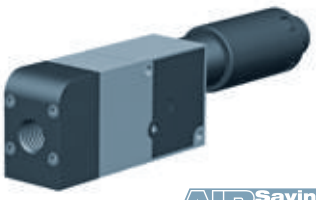


Vacuum Pumps

- 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

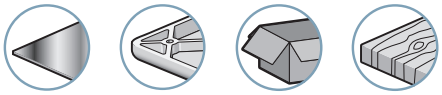
The GVP series vacuum pumps are the simplest in the range. They exist in 5 levels of power (suction rate) and 3 different levels of maximum vacuum:

- 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

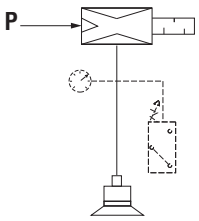
7 GVP

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



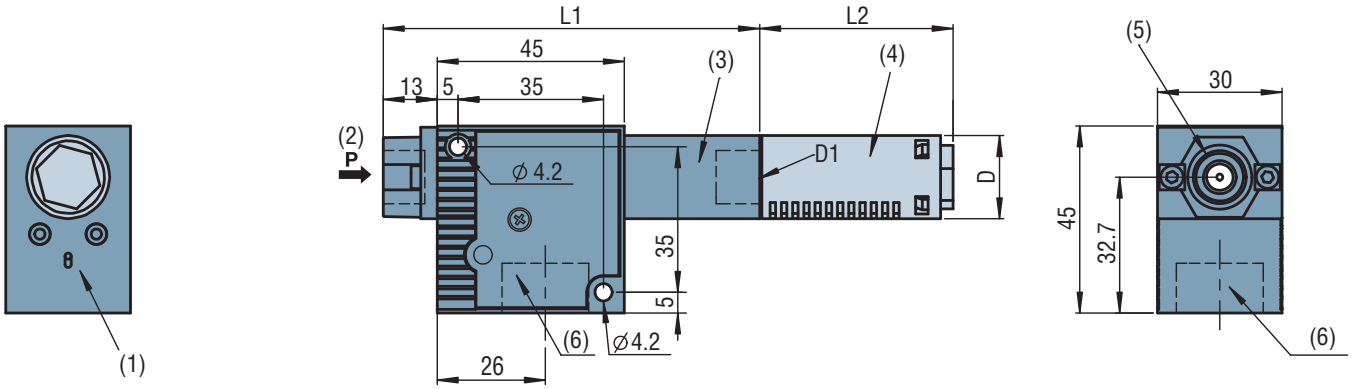
For all orders, please specify:
Model + Nozzle Ø + % vacuum + Silencer + C.A. fitting
e.g.: GVP30NK14

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

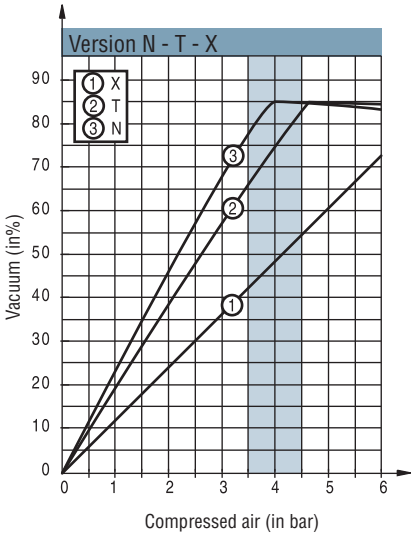
Options
- Vacuum switches see pages 7/5 and 7/6.
- Other options see pages 7/6 and 7/7.
- Silencer see page 11/11.

Curves
See page 7/4.

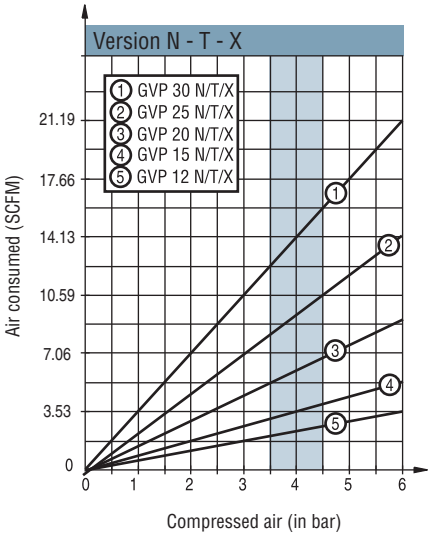
Note: all dimensions are in mm

GVP
Vacuum Pumps
Performance Curves

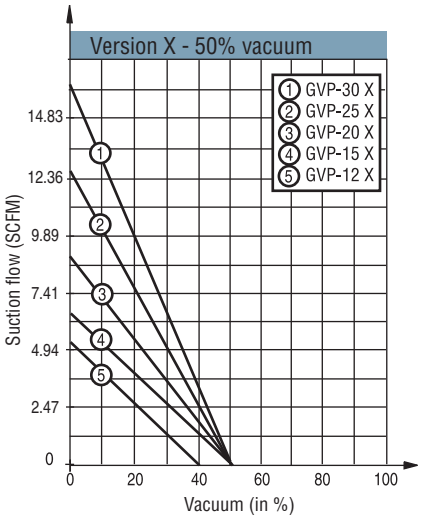
Vacuum Generated - Supply pressure 4 bar

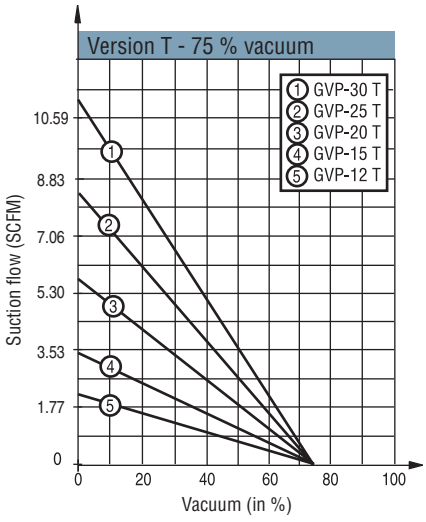


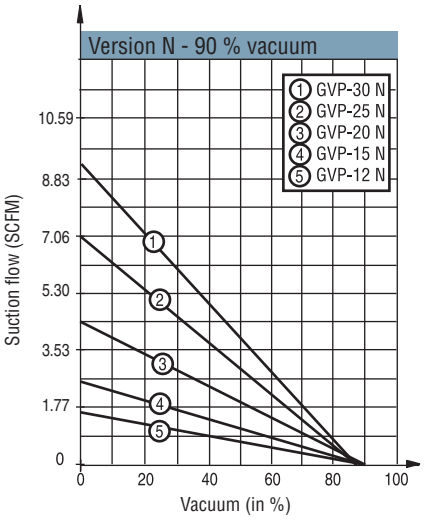
Air Consumed - Supply pressure 4 bar



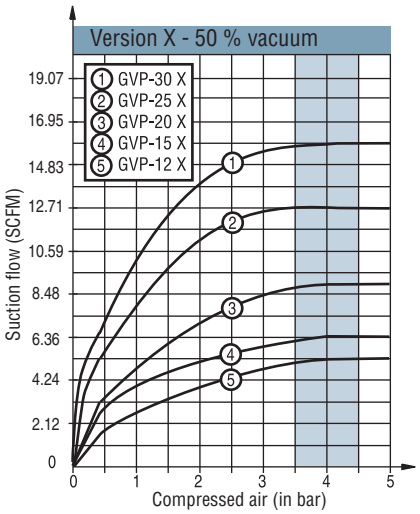
Suction Flow Rate/Vacuum Curves - Supply pressure 4 bar

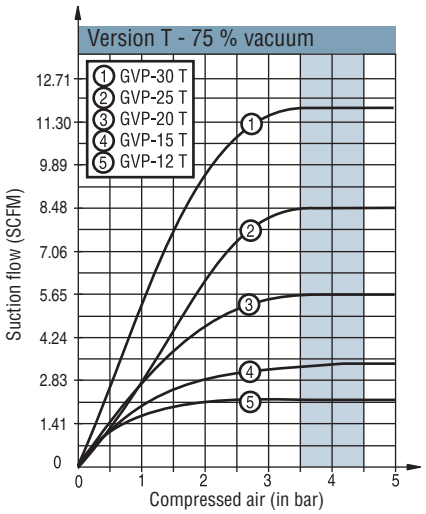


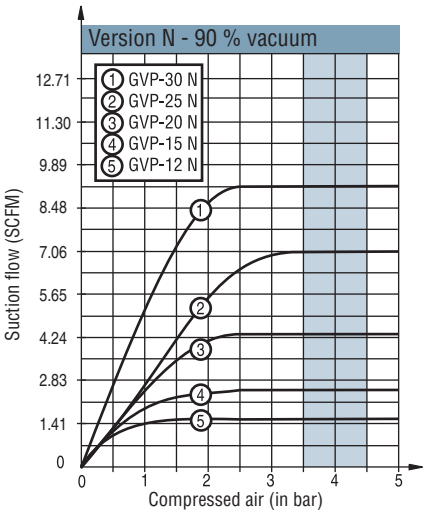




Suction Flow Rate Generated - Supply pressure 4 bar



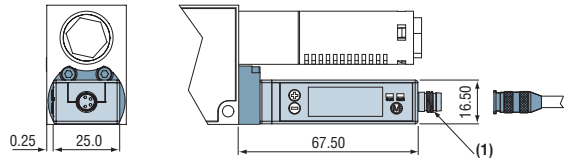




Electronic Vacuum Switch with Display

GVO PSA 100 C option

(See exact characteristics page 12/4)



Delivered with M8 cable (2 meters)
(1) M8 connector

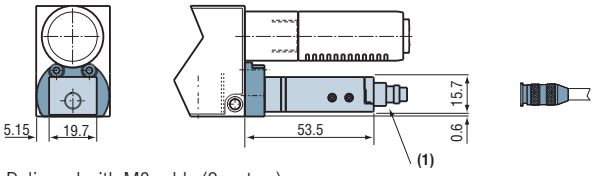
Our top-of-the-range electronic vacuum switch, the PSA 100C has an LED display showing the vacuum value in different units. It also has two separate outputs with independently regulated hysteresis, NO or NC

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

Electronic Vacuum Switch

GVO PSP 100 C (M5), PSP 100 L (M5) option

(See characteristics page 12/7)



Delivered with M8 cable (2 meters)
(1) M8 4 pole connector

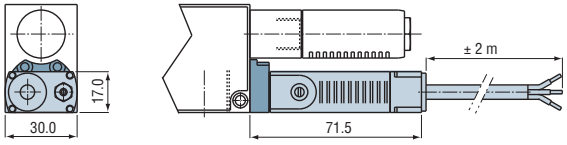
The vacuum data collected is always very reliable even with a large number of suction pads, thanks to the precision of the PSP 100. It has one output with hysteresis adjustment.

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

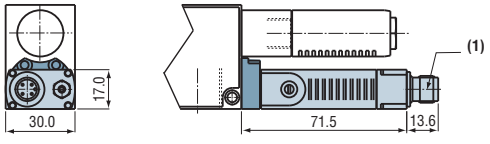
Vacuum Switch with Electrical Signal

GVO PSE 100 E or EC option

(See characteristics page 12/9)



GVO PSE 100 E with cable (length 2 metres)

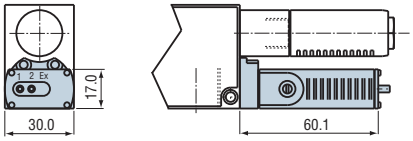


GVO PSE 100 EC with M12 connector (delivered without connection cable)
(1) M12 male connector

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

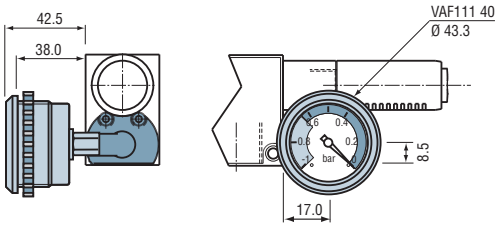
GVO PSE 100 P NO or NC option (see characteristics page 12/10)



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

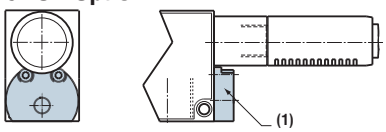
GVO VAF 111 40 option (See characteristics page 12/12)



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



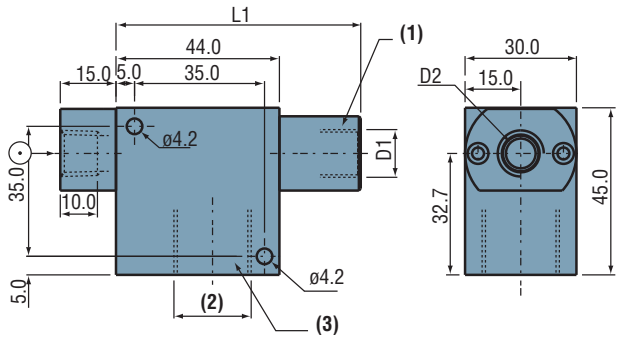
(1) Plug

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)

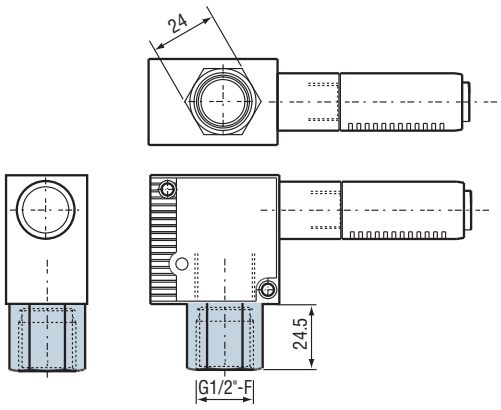
(**1**) Exhaust
(**2**) G1/2"-F
(**3**) Vacuum

GVO P Option

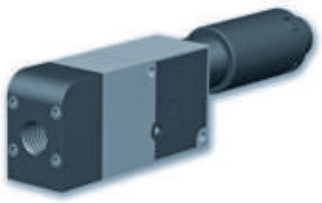
With G1/2"-F protective extension.

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.



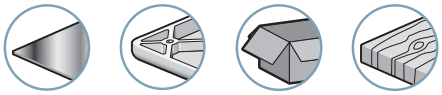
GEMP
Simple Vacuum Pump with ASR



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.

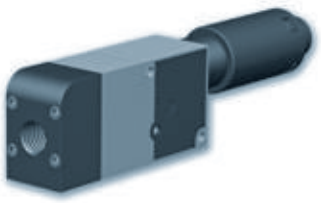
For all orders, please specify:
Model + % vacuum + X + Ø Nozzle + Vacuum switch.
e.g.: GEMP90X12VA

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		

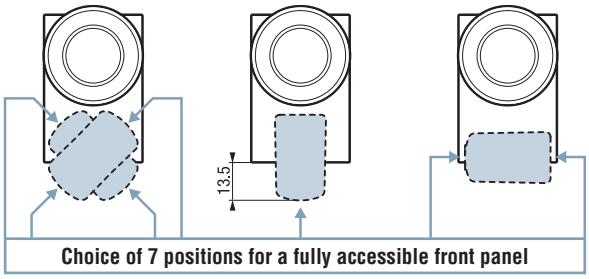
GEMP

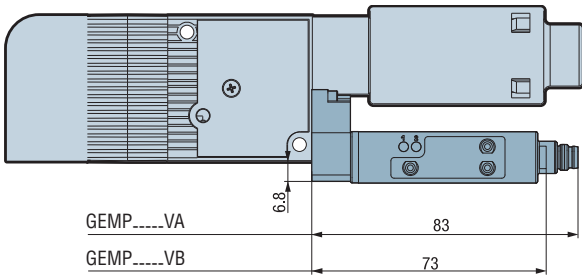
Simple Vacuum Pump with ASR

Vacuum Switch Functions and Connections



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



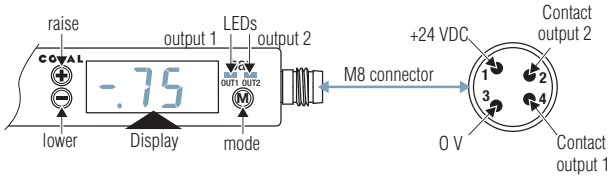


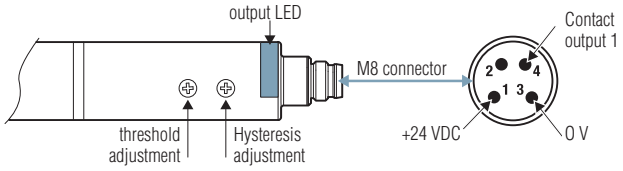
Vacuum switch with display, 2 outputs, GEMP-----VA

- compatible fluids: non-corrosive gas, dry, non-lubricated air.
- measuring range: -1 ... 0 bar
- hysteresis: configurable.
- maximum excess pressure: 3 bar.
- repetitivity: +/- 1% of the range.
- output thresholds: 2 x NO / NC.
- switching power: 125 mA transistor PNP
- threshold status display: 2 x LEDs.
- display unit: bar.
- Electrical connection: M8 (4 pins).
- supply voltage: 12 - 24 VDC ± 10%.
- current draw: < 60 mA.
- protection level: IP40.
- working temperature: 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 30%.
- 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

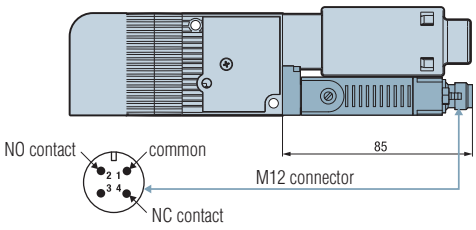




2 - Modules with Electrical Contact Vacuum Switch GEMP-----VC

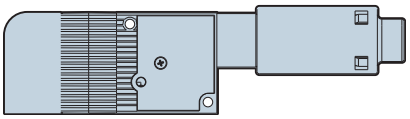
Contact vacuum switch, GEMP-----VC

- 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-----V0

This model without vacuum switch must be accompanied by an independent vacuum switch on the vacuum circuit or a vacuum gauge for manually-controlled vacuum capacity.

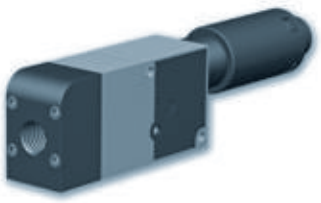


Note:
Screw-on electrical connectors, straight and angled M8 and M12 shown p. 11/12.

GEMP

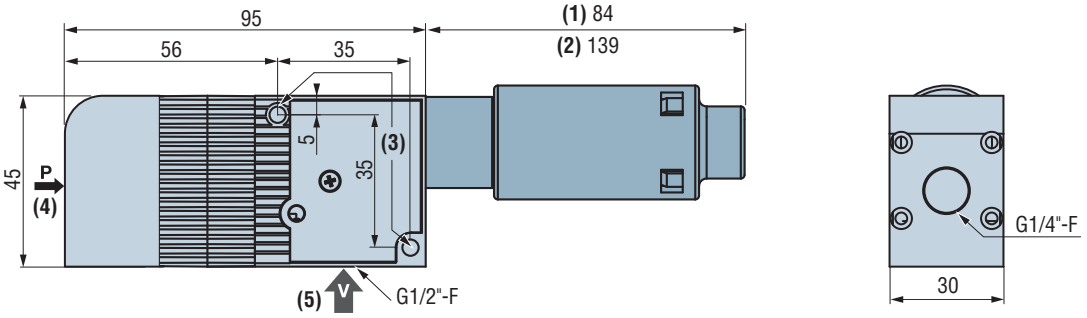
Simple Vacuum Pump with ASR

Dimensions and Performance Curves



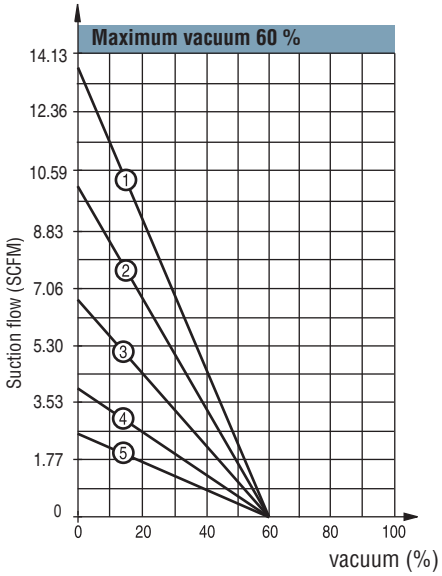
AIR Saving Regulator

Dimensions

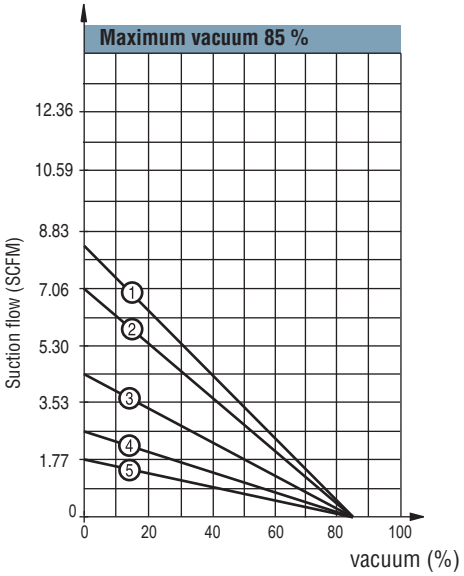


(**1**) silencer for nozzles Ø 1.2 or 1.5 mm (GEMP--X12--, GEMP--X15--)
(**2**) silencer for nozzles Ø 2 - 2.5 or 3 mm (GEMP--X20--, GEMP--X25--, GEMP--X30--)
(**3**) fittings Ø 4.2 mm
(**4**) G1/4"-F pressure fitting: pressure at 4 bar
(**5**) G1/2"-F vacuum fitting

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

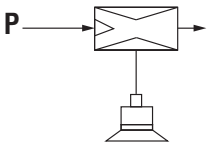
- Plastic and stainless steel materials: meet the requirements of splash zones, are resistant to cleaning agents and corrosion.
- Compact and light design: installation as close as possible to suction cups to improve the evacuation times and production rate.
- Easy disassembly: quick and precise cleaning.

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

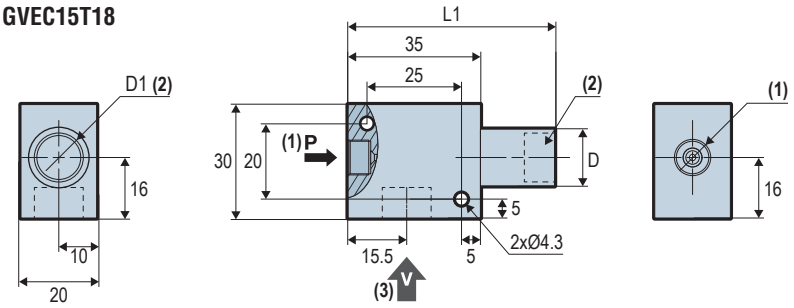
GVEC

"Easy Clean" Vacuum Pumps

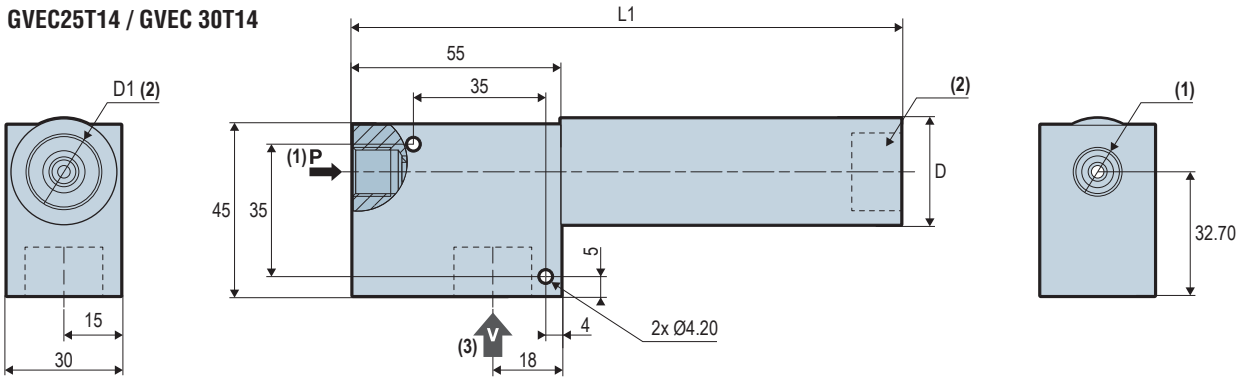
Dimensions

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

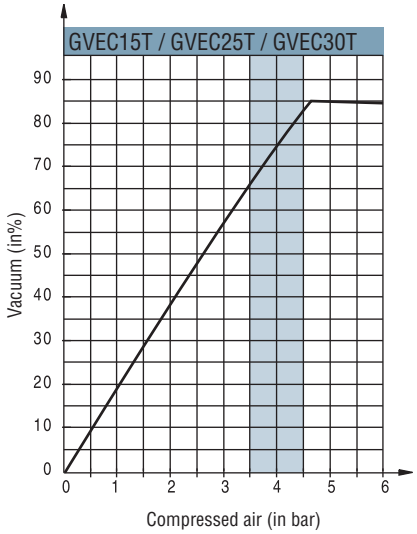
Note: all dimensions are in mm

GVEC

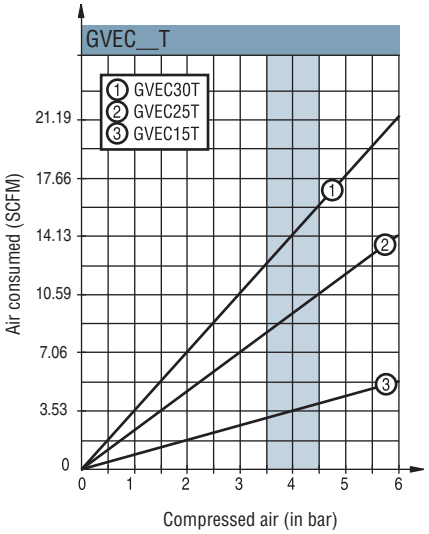
"Easy Clean" Vacuum Pumps

Performance Curves

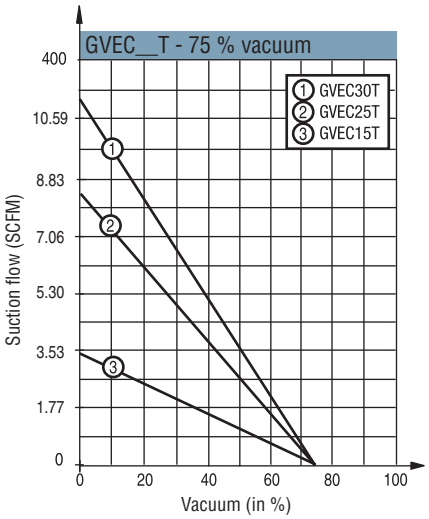
Vacuum Generated - Supply pressure 4 bar



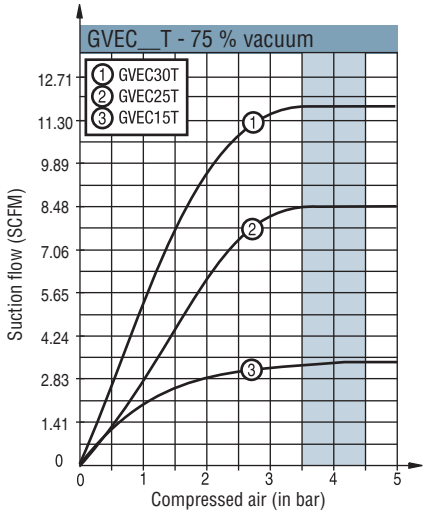
Air Consumed - Supply pressure 4 bar



Suction Flow Rate/Vacuum Curves - Supply pressure 4 bar



Suction Flow Rate Generated - Supply pressure 4 bar



LEMP

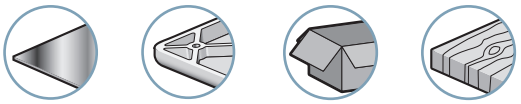
Mini Vacuum Pumps without control with ASR
(Air Saving Regulator)

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.

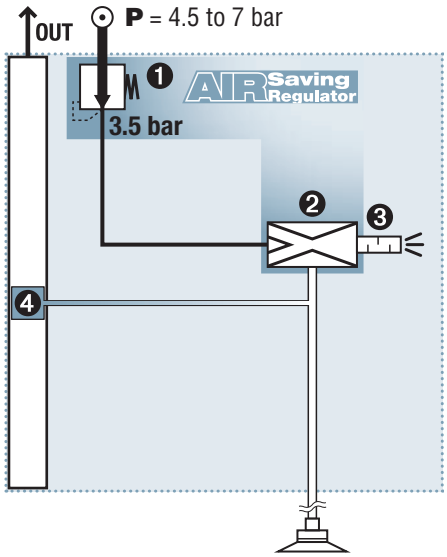
Industry-specific applications



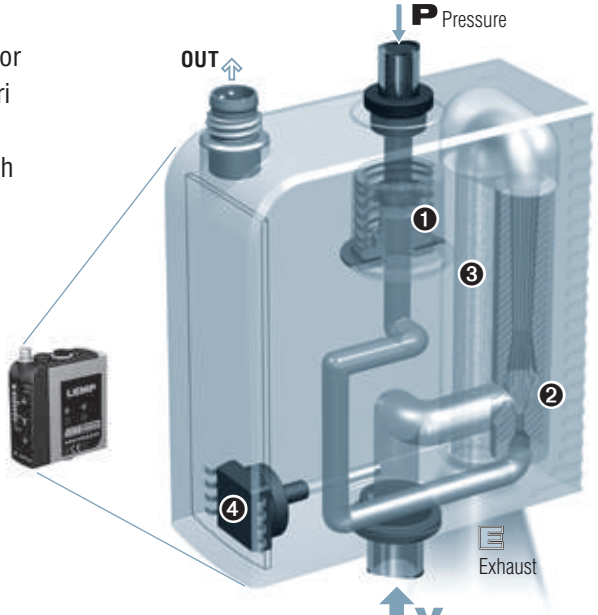
For all objects, porous or airtight

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

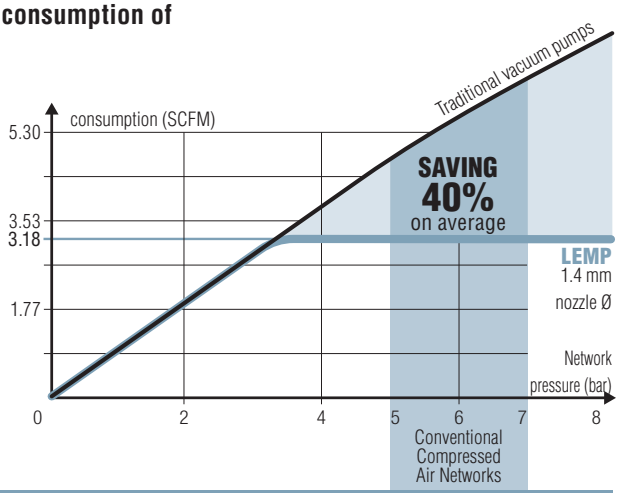
40% Energy savings

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

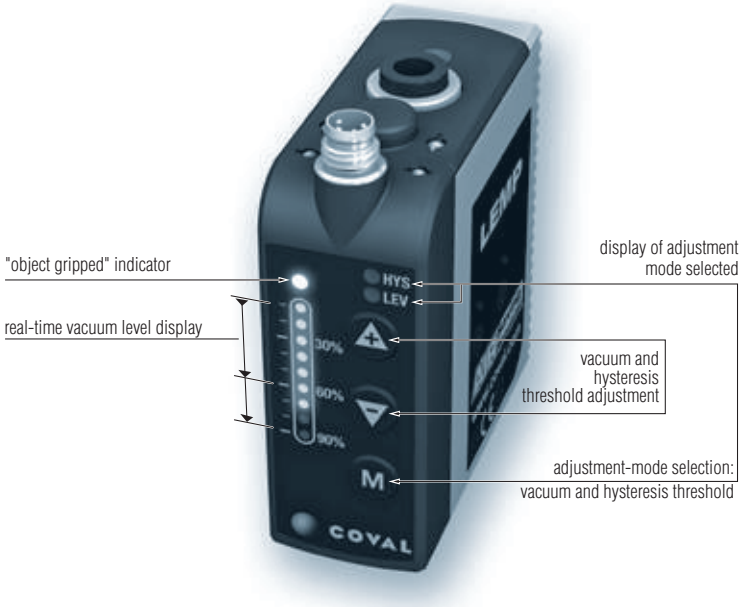
Mini Vacuum Pumps without control with ASR

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.

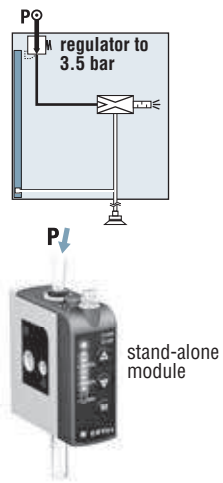


Stand-alone or Island Modules?

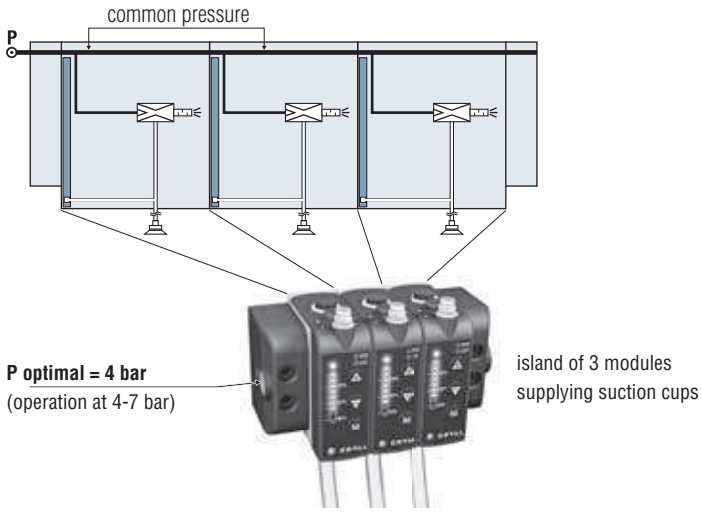
Stand-alone modules are suitable for the most common applications; one module controls one or more suction cups which all operate according to the same sequence.
When several suction cups are operating according to different sequences, multiple modules are required, which can be:
- several stand-alone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



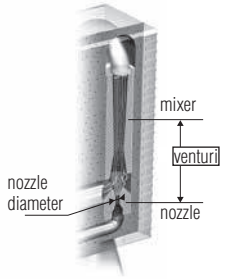
LEMP

Mini Vacuum Pumps without control with ASR

Selection Guide

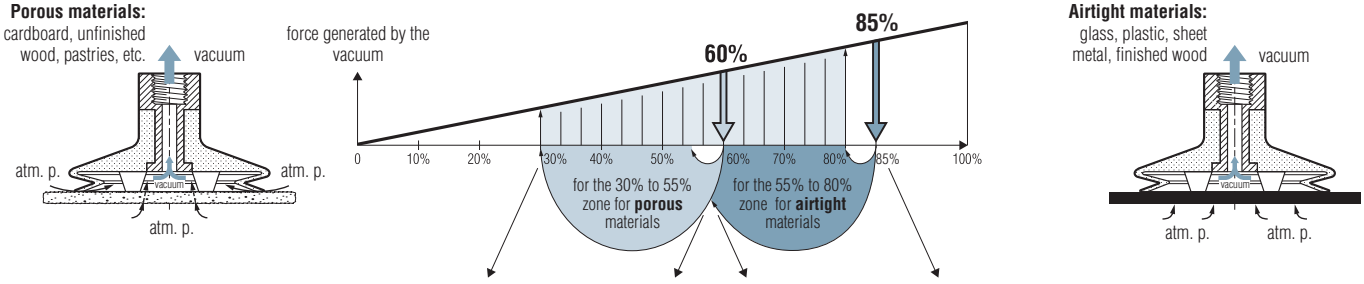
AIR Saving Regulator

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

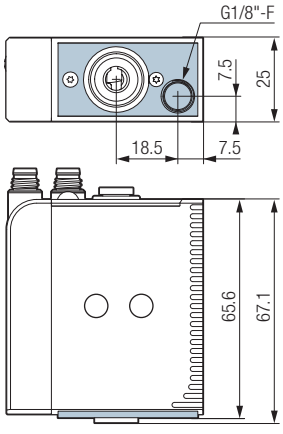
For common applications, the vacuum switch is needed, with the dialogue face for digital display and adjustment.
However, some applications may just require a simple operation, without an "object gripped" return signal. The simplified version may then be chosen, with no vacuum switch, display, or adjustment.

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

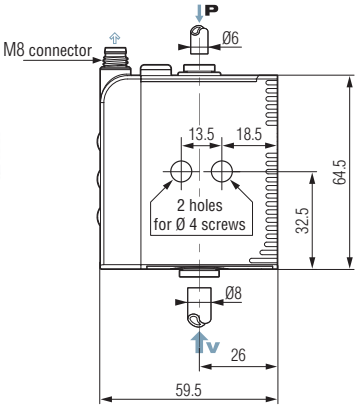
Mini Vacuum Pumps without control with ASR

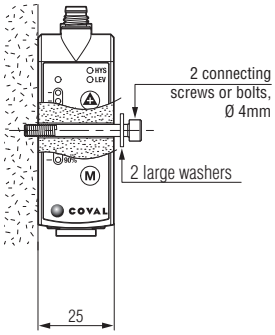
Dimensions / Mounting options

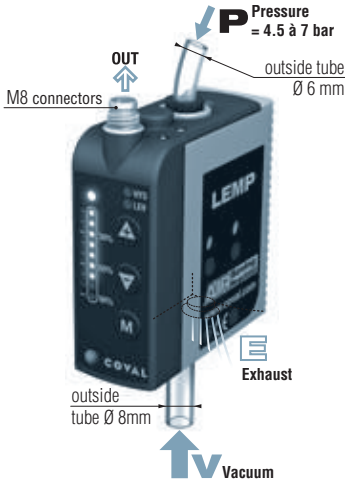
AIR Saving Regulator

Stand-alone Modules

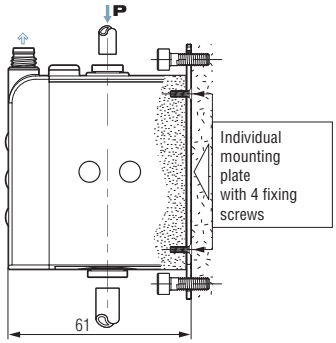
Side mounting

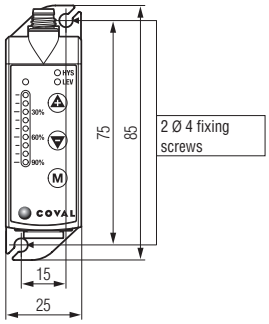






Front mounting



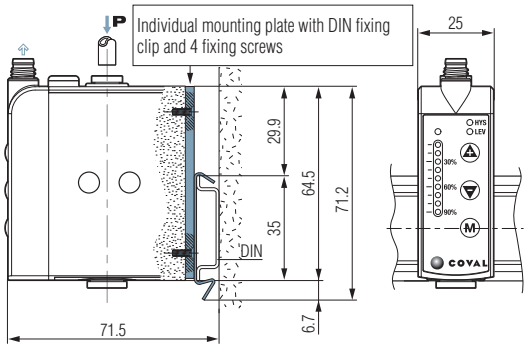


For front mounting, order the necessary kit, in addition to the module:

Front mounting kit:
1 plate + 4 screws

Part No.: LEMFIXA

Mounting on DIN rail

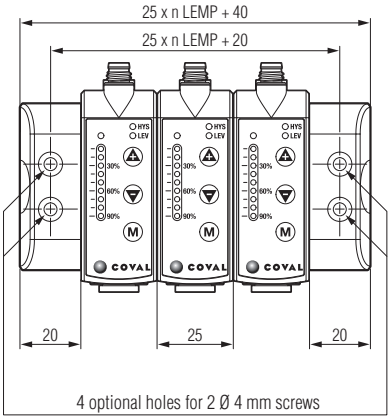


A module can be clipped onto a DIN rail. For this purpose, the module must first be equipped with an individual DIN installation plate, ordered separately:

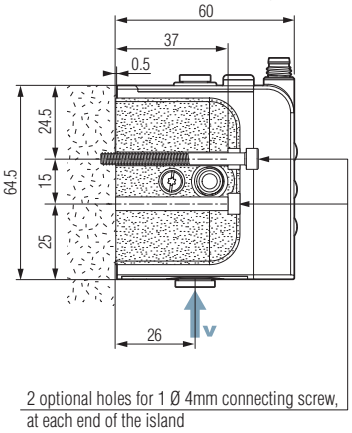
DIN rail mounting kit:
1 plate/clip + 4 screws

Part No.: LEMFIXB

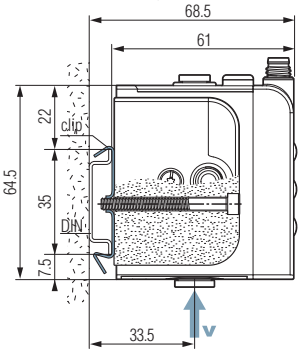
Islands



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

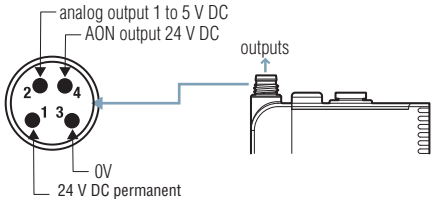
- Measuring range: -1 to 0 bar.
- Precision: ± 1.5% of the range.
- Hysteresis: adjustable from 0% to 100%.
- Output threshold: 1 x T.O.R. in NO.
- Analog output: 1 V DC to 5 V DC on the measuring range.
- Switching power: 125 mA, PNP.
- Threshold status display: 1 green LED.
- Supply voltage 24V DC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

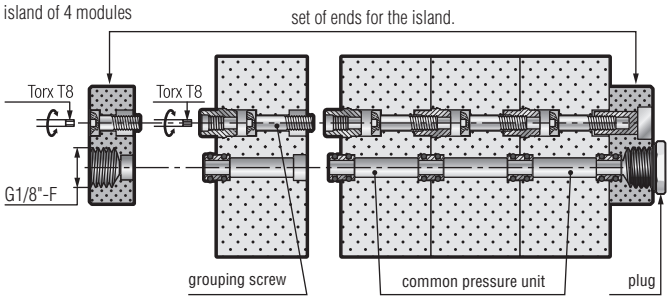


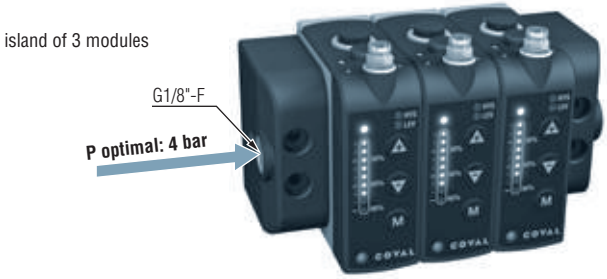
Accessories

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

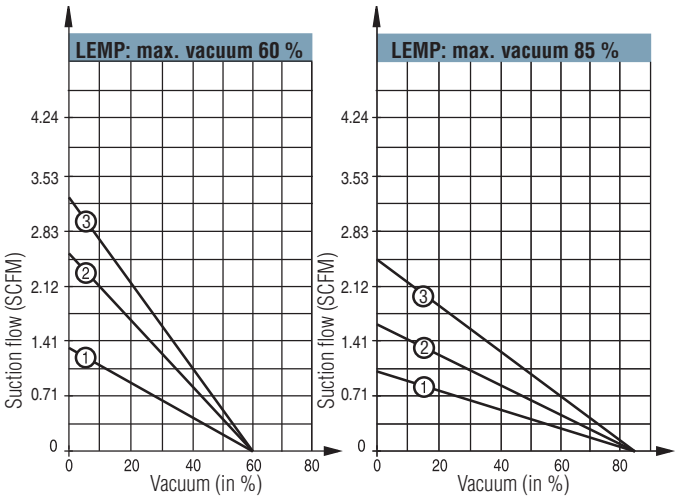




Maximum number of modules in an island:

- 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

7

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

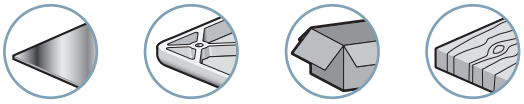
Integrated Mini Vacuum Pumps with ASR
(Air Saving Regulator)

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

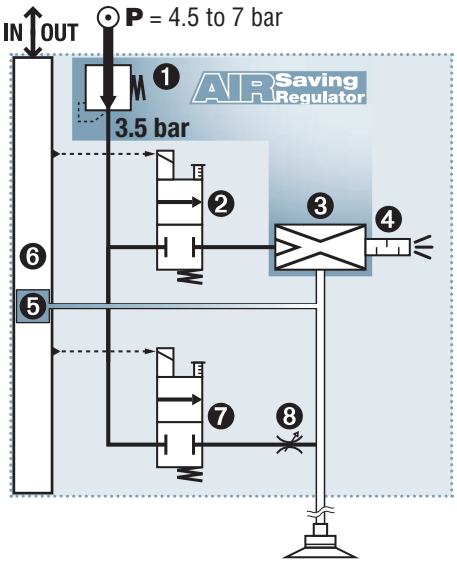


For all objects, porous or airtight

Compact Integration

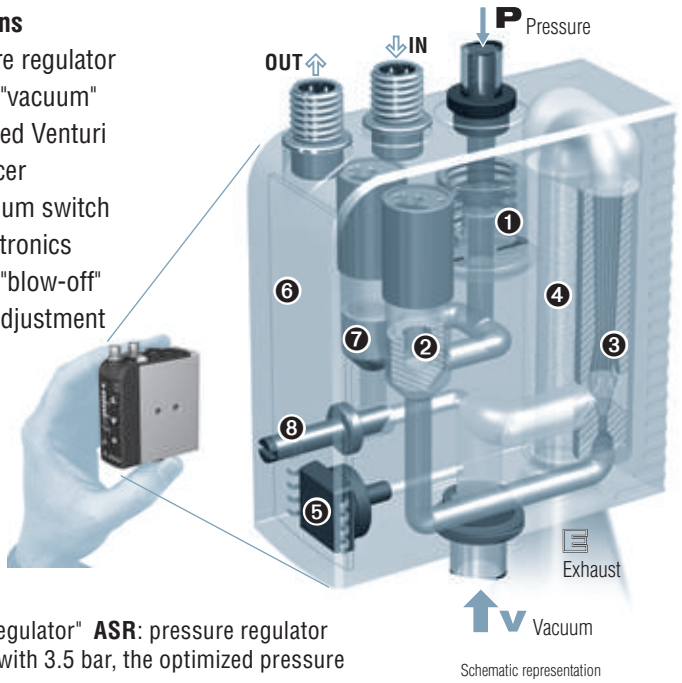
The illustrations below demonstrate the 8 functions integrated in the mini-module, and their respective roles in operation.
The result of this COVAL innovation is:

- **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

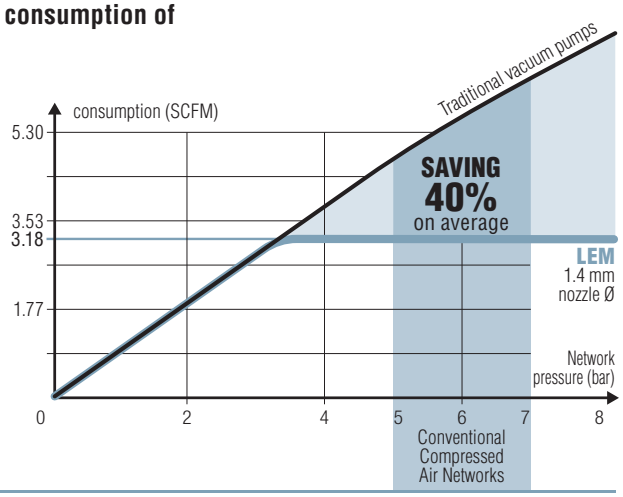
The LEM vacuum pumps, which integrate an **ASR** "venturi regulator" combination, maintain ideals that COVAL values greatly: reducing both compressed air consumption and noise generation.

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

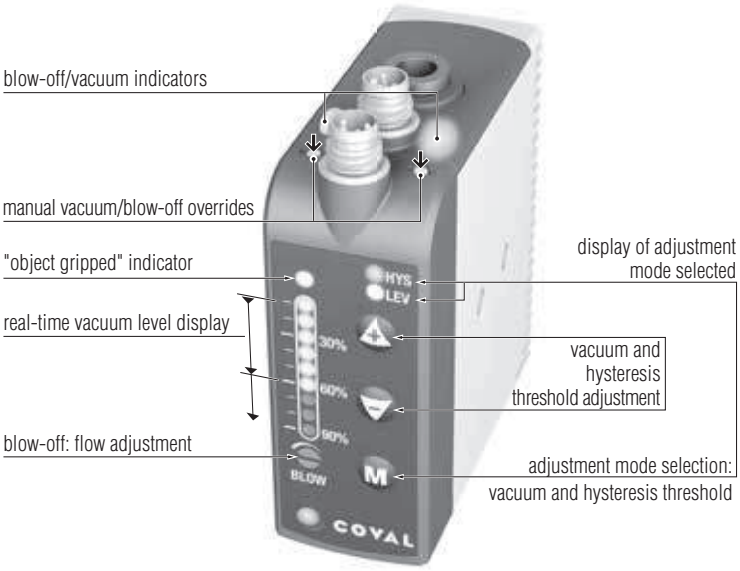
with blow-off (LEM__X__**SVO**)

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

Integrated Mini Vacuum Pumps with ASR

Stand-alone and Island Modules / Option

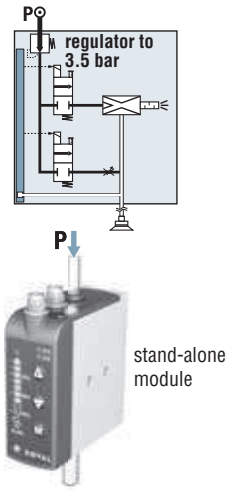
AIR Saving Regulator

Stand-alone or Island Modules?

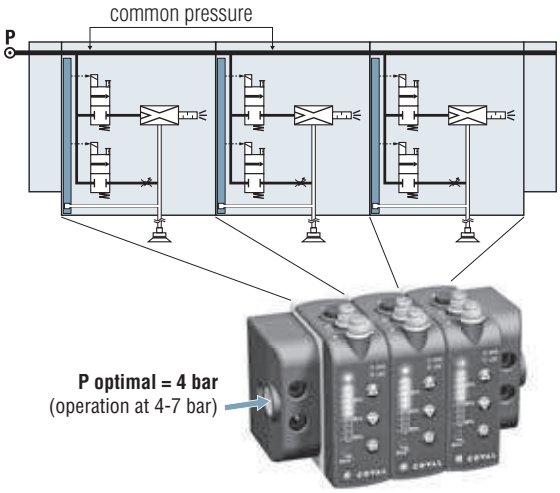
Stand-alone modules are suitable for the most common applications; one module controls one or more suction cups which all operate according to the same sequence.
When several suction cups are operating according to different sequences, multiple modules are required, which can be:
- several stand-alone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



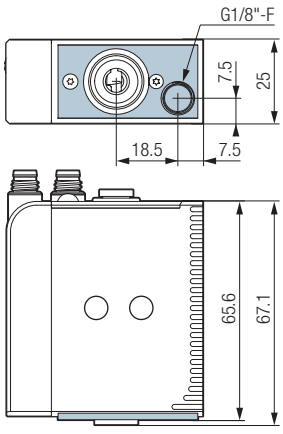
island of 3 modules supplying suction cups according to different sequences

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.



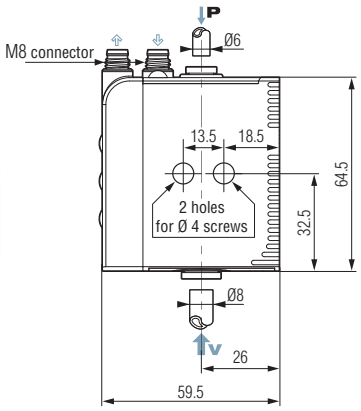
Integrated Mini Vacuum Pumps with ASR

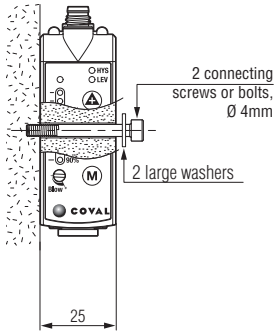
Dimensions / Mounting options

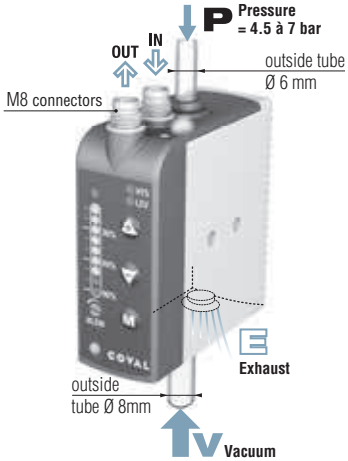
AIR Saving Regulator

Stand-alone Modules

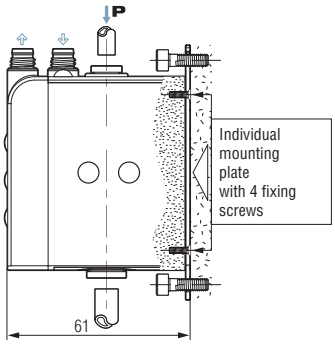
Side mounting

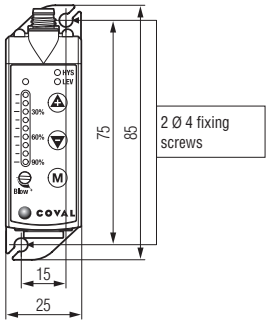






Front mounting

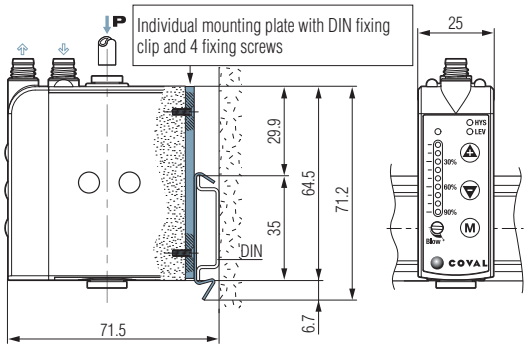




For front mounting, order the necessary kit, in addition to the module:

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

Mounting on DIN rail



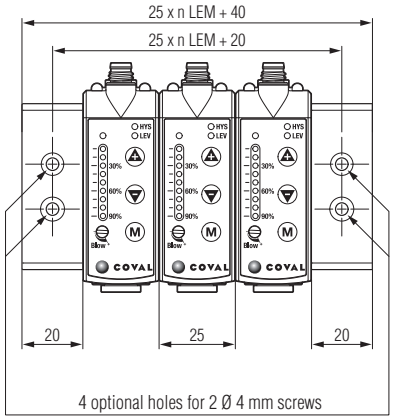
A module can be clipped onto a DIN rail. For this purpose, the module must first be equipped with an individual DIN installation plate, ordered separately:

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

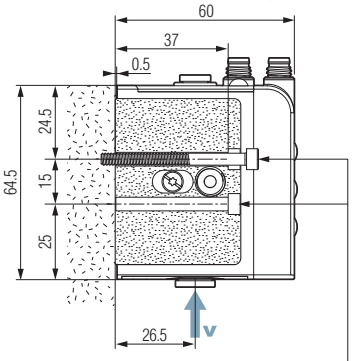
8

LEM

Islands

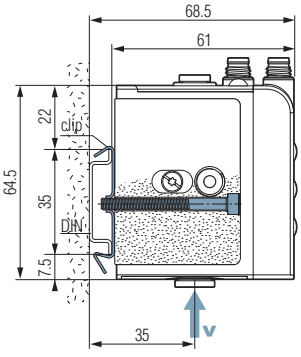


Front mounting



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

Mounting on DIN rail



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

LEM

Integrated Mini Vacuum Pumps with ASR

Selection Guide

AIR Saving Regulator

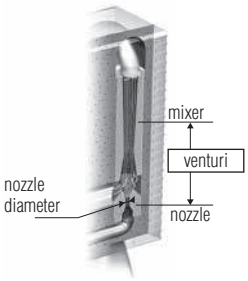
LEM: Versatile Series for all Applications

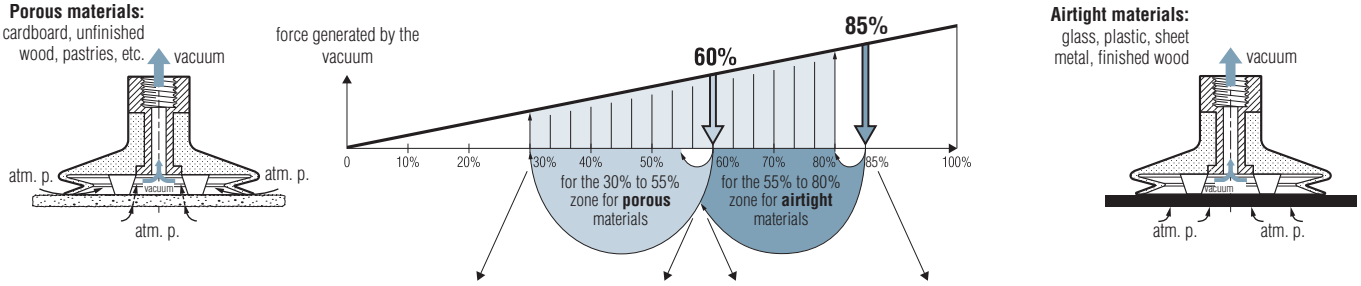
The opposite page demonstrates the versatility of this series. In addition to a very wide range of complete, stand-alone, or island vacuum pumps, there are the options of no blow-off and/or no vacuum switch, and for specific applications.

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%

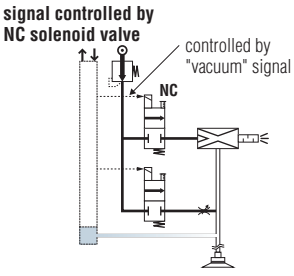
Time to create vacuum *(seconds)* **for a volume of 1 liter**

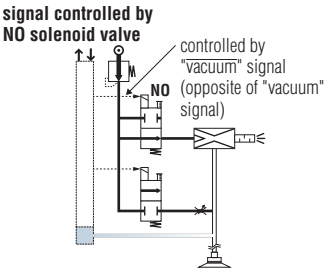
ø nozzle \ vacuum achieved	55%	60%	65%	70%	75%	80%	Air consumed (SCFM)	Air drawn in (SCFM)
1.0 mm	1.76	2.04	2.38	2.80	3.33	4.09	**1.55**	**1.02**
1.2 mm	1.13	1.31	1.53	1.80	2.15	2.64	**2.30**	**1.59**
1.4 mm	0.73	0.85	0.99	1.16	1.38	1.70	**3.18**	**2.47**

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

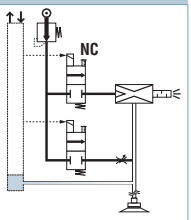
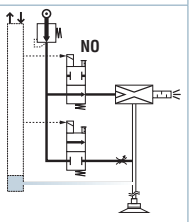
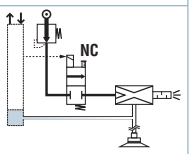
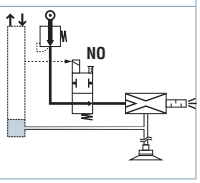
NOZZLE DIAMETER

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. ■ Blow-off controlled by a specific signal	
V	■ Vacuum controlled by NO solenoid valve ➔ vacuum is maintained if electricity is shut off ■ Blow-off controlled by a specific signal	
R	■ Vacuum controlled by NC solenoid valve ■ No blow-off	
U	■ Vacuum controlled by NO solenoid valve ■ 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** 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:

■ **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.

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.

LEM

Integrated Mini Vacuum Pumps with ASR

Characteristics / Assembling an Island

AIR Saving Regulator

Overall Characteristics

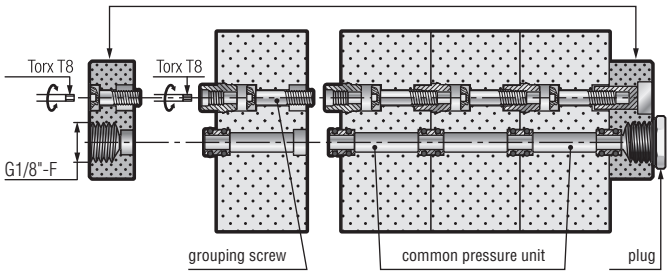
- Supply: non-lubricated air filtered to 5 microns according to standard ISO 8573-1:2010 [4:5:4].
- Operating pressure: 4.5 to 7 bar.
- Mini dynamic pressure: - stand-alone module: P = 4.5 bar.
  - island modules: 4 bar.
- Blow-off: adjustable flow: - stand-alone version: P = 3.5 bar.
  - island version: 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:

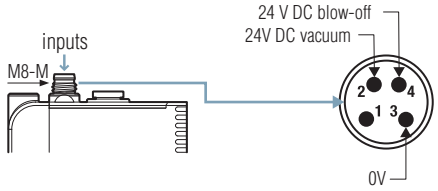
- Ø 1.4 mm nozzle ➔ 5 modules
- Ø 1.2 mm nozzle ➔ 7 modules
- Ø 1 mm nozzle ➔ 9 modules

Integrated Silencer Characteristics

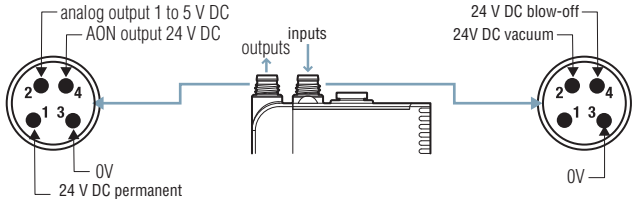
- Noise level: approximately 68 dBA.
- Clog-free silencer.

Electrical Connections

MODULES WITHOUT VACUUM SWITCH FUNCTION



MODULES WITH VACUUM SWITCH FUNCTION



Accessories

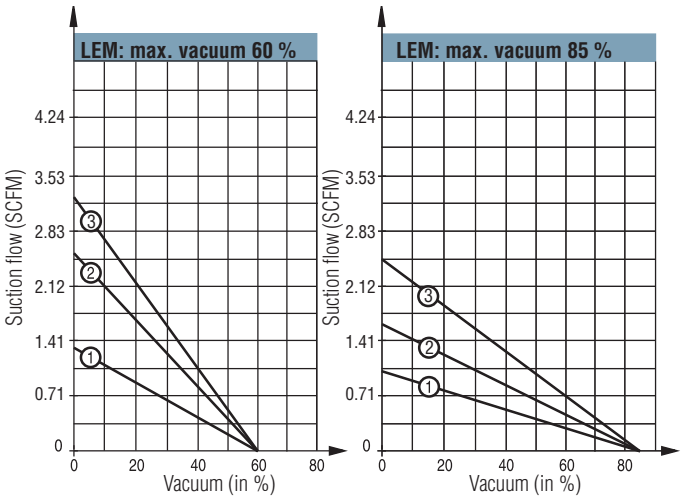
Power supply cable M8, straight, female, 4-pin – open end:

- **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)

AIR Saving Control

Industry-specific applications

For all objects, airtight or not very porous

Advantages

- Energy savings of 75% to 99% (depending on application) thanks to automatic **ASC** (Air Saving Control) operation.
- "All-in-one" solution, no more peripherals to be added.
- Simplified installation and use thanks to the Plug & Play system.
- Unmatched compactness: installation close to suction cups ➔ short response times and energy savings.
- No clogging, thanks to the through-type silencer.
- Controlled or timed blow-off.
- Gripping safety in the event of electricity shut-off.
- Smart communication ➔ Easier experience at all stages: initial settings, production, maintenance.

Compact Integration

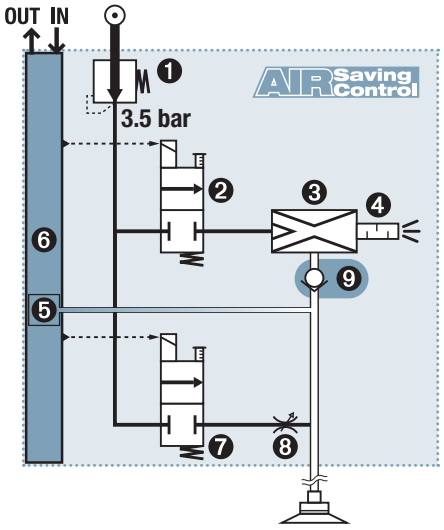
The illustrations below demonstrate the 9 functions integrated in the mini-module, and their respective roles in operation.
The result of this COVAL performance is:
- **A mini module** (≅ 130 g) that is easy to install close to the suction cups, reducing the volume to be evacuated ➔ increased speed and energy savings.
- **A complete module**, therefore not requiring any additional function or connections.

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

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

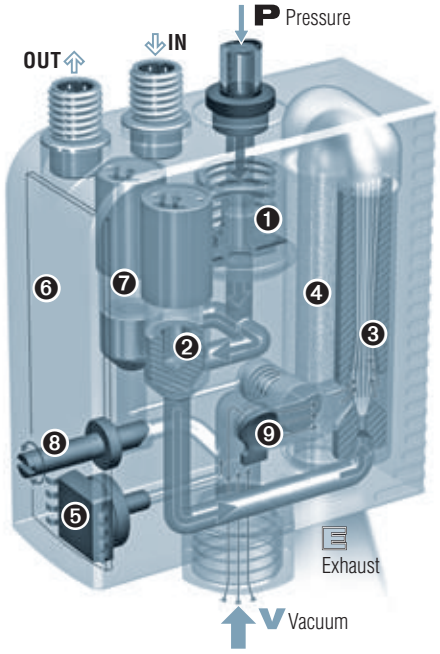
AIR Saving Control

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 no longer consumes air when gripping the product.**

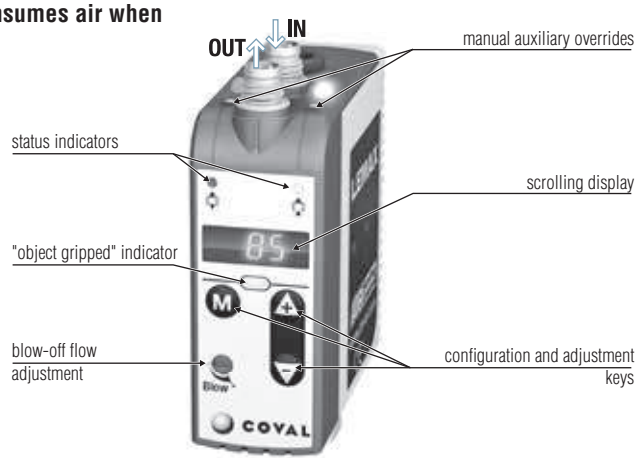


Schematic representation

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.

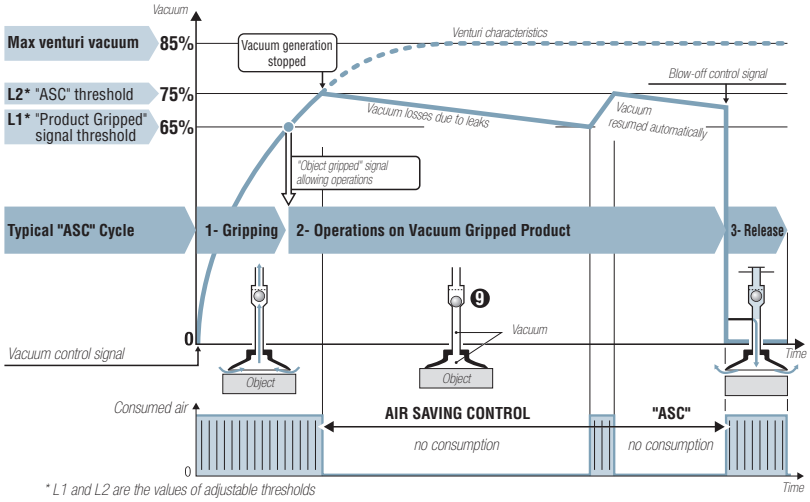


LEMAX

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:

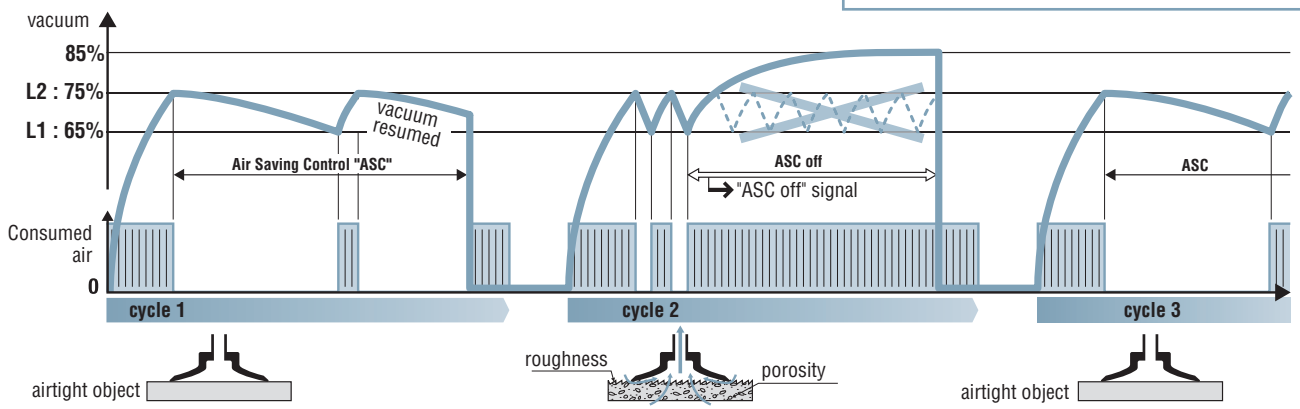
1- No specific adjustment: The initial setting (L1 = 65%, L2 = 75%) is suitable for most applications.

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.

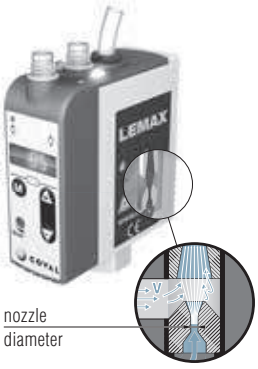
On the other hand, during "**ASC**" operation, a large nozzle quickly reaches the vacuum threshold generating power shut-off.

In conclusion:

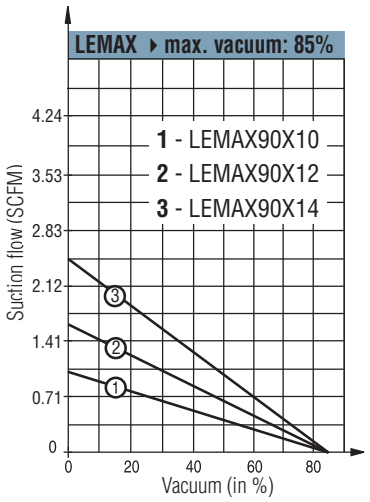
- A large nozzle enables quicker gripping without consuming more during "**ASC**" operation.
- A small nozzle consumes less only when operating continues without "**ASC**".

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

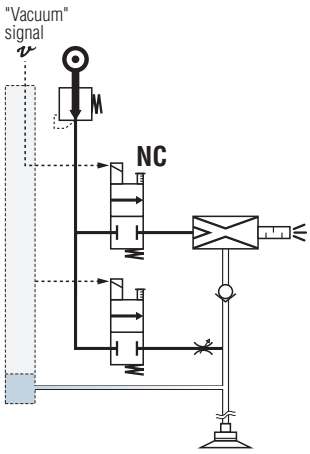
Vacuum controlled by a NC (Normally Closed) solenoid valve remains the simplest standard option to use. In the event of an electricity shutoff, the vacuum is interrupted and the object is released. On the contrary, with vacuum control by NO (Normally Open) solenoid valve, the vacuum continues to be generated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

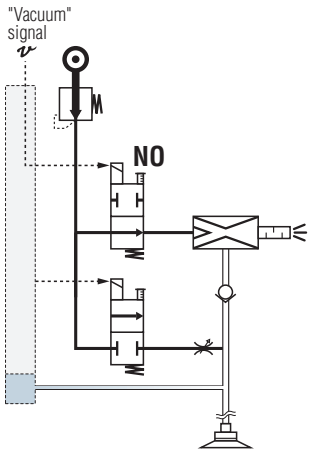
- NC version, the signal v controls the vacuum generation.
- NO version, the signal v controls the vacuum shutdown.

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?

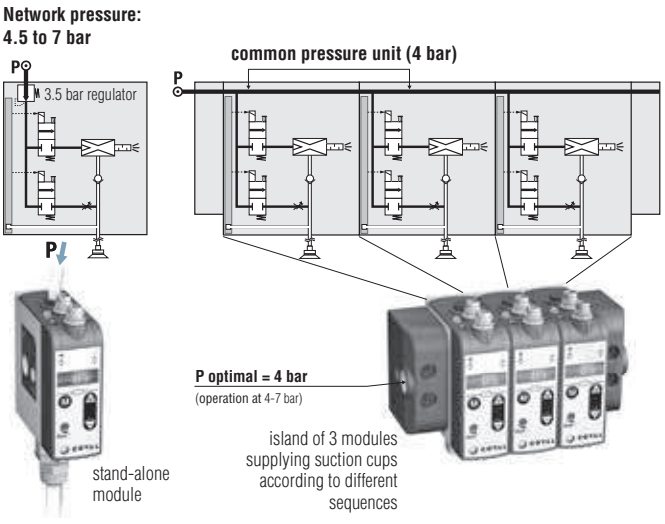
Stand-alone modules are suitable for the most common applications: one module controls one or more suction cups which all operate according to the same sequence.

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

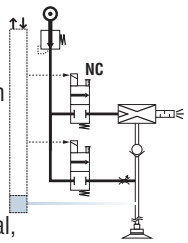
Ø 1.4 mm nozzle	**14**
Ø 1.2 mm nozzle	**12**
Ø 1 mm nozzle	**10**

COMPOSITION OF THE MODULE

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

LEMAX90X__**S**__

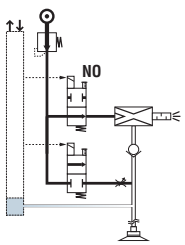
- In the event of an electrical shut-off, vacuum is no longer generated.
- Optional configured blow-off:
  - by specific signal,
  - automatic, timed 0 to 9.9 sec. (➔ a single control signal vacuum and blow-off).



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

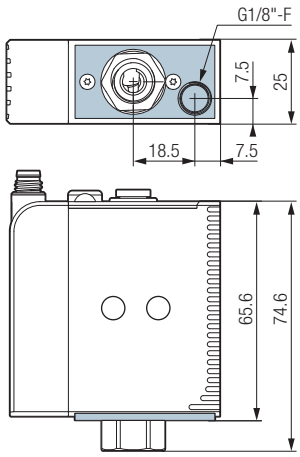
AIR Saving Control

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).

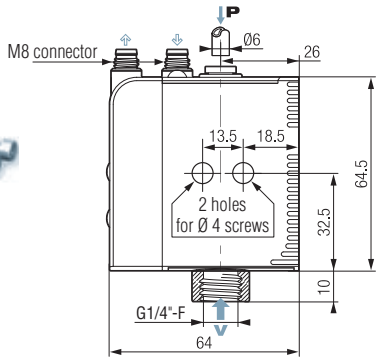
This option must be specified at time of ordering as it cannot be added later.

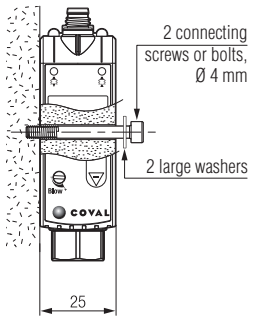
Note: The design of the exhaust manifold and vacuum pumps do not guarantee the complete sealing of the exhaust and therefore cannot be used in a "clean room" environment.

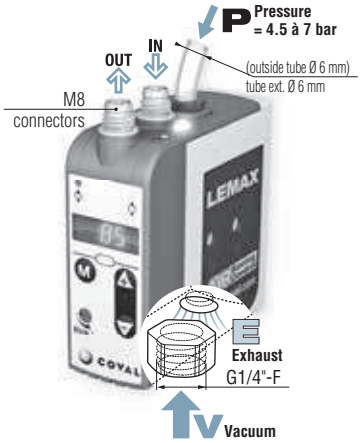


Stand-alone Modules

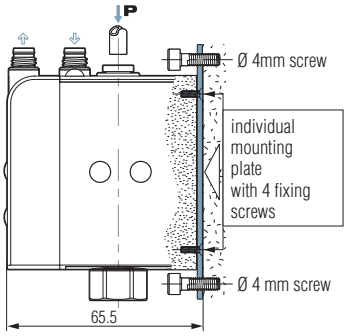
Side mounting

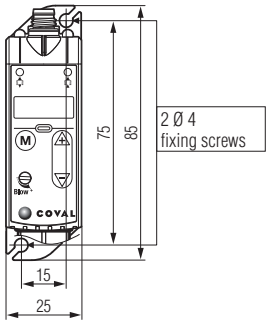






Front mounting

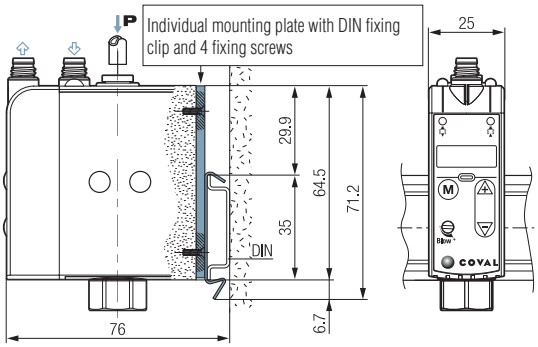




For front mounting, order the necessary kit, in addition to the module:

Front mounting kit: 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

8

LEMAX

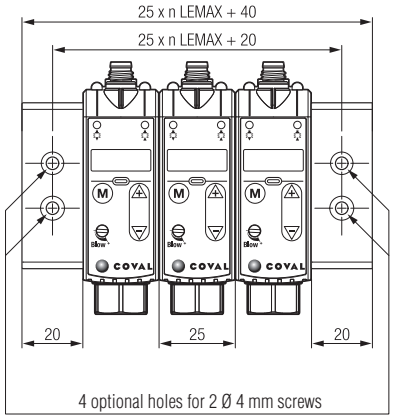
LEMAX

Integrated Mini Vacuum Pumps with "ASC"

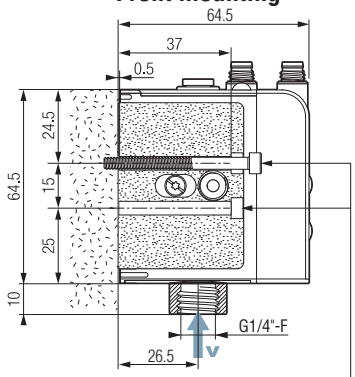
Dimensions, Mounting Options

AIR Saving Control

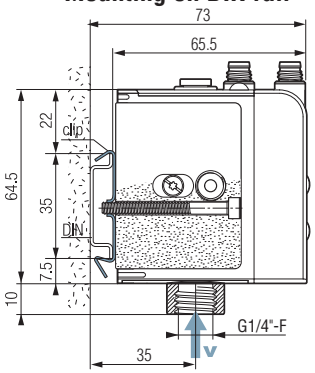
Islands



Front mounting



Mounting on DIN rail

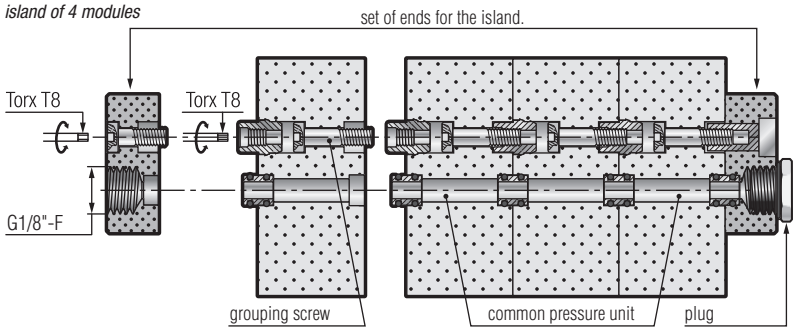


DIN rail mounting kit: 2 clips + 2 screws

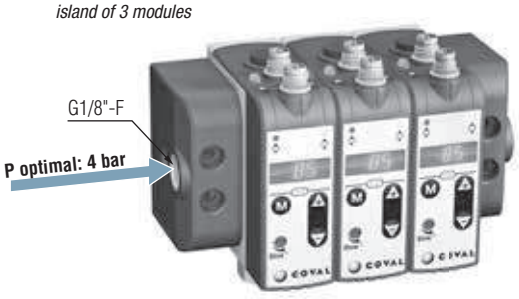
Part No.: LEMFIXC

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.

8

LEMAX

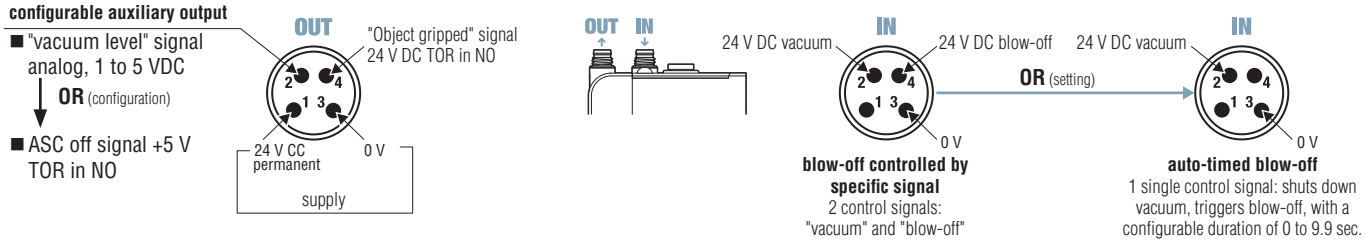
LEMAX

Integrated Mini Vacuum Pumps with "ASC"

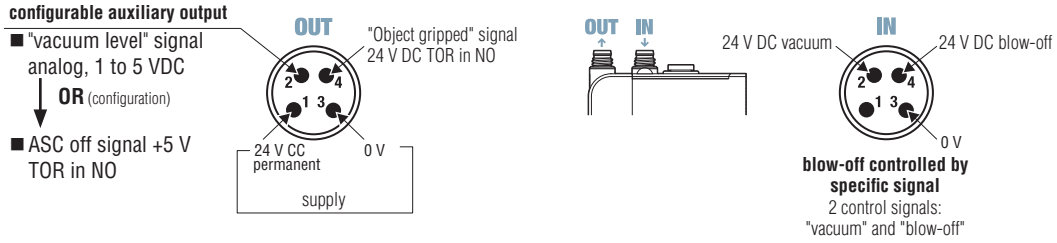
Connectors

AIR Saving Control

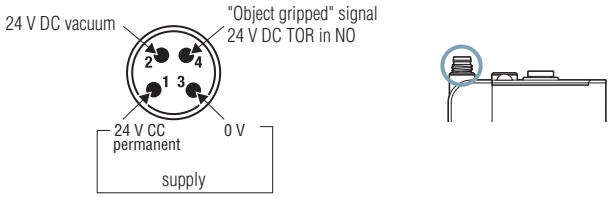
For NC Vacuum Pumps with 2 M8 4-pin connectors, model LEMAX90X..S..



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



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.

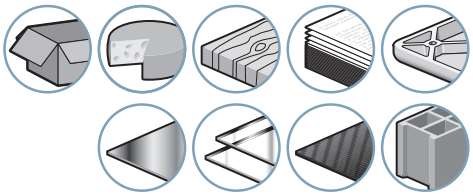
LEMAX IO

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.

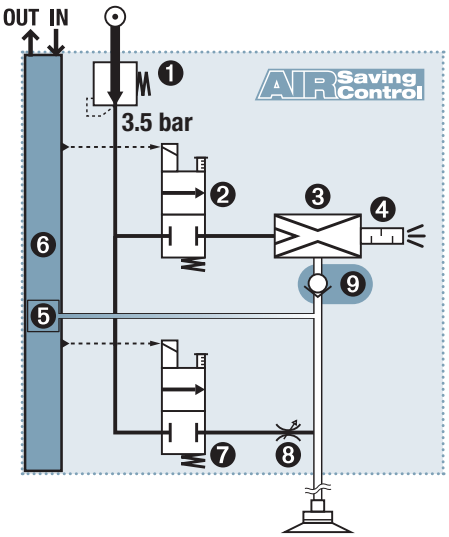
Compact Integration

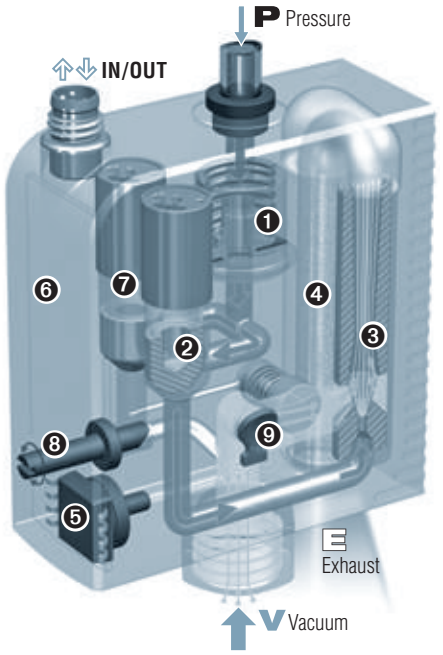
The illustrations below show the 9 functions integrated into the mini-module, and their respective roles in operation.
The result of this COVAL performance is:

– **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

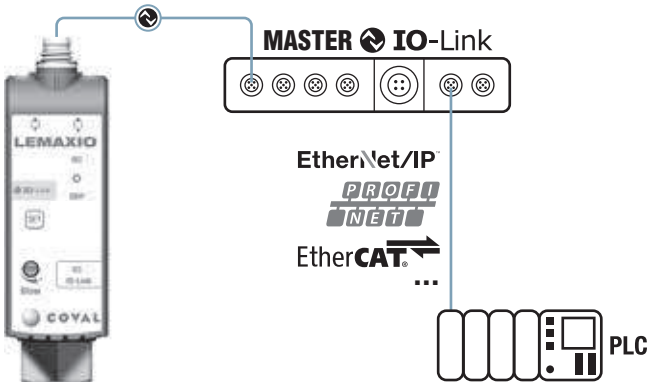
90% energy savings (on average).

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



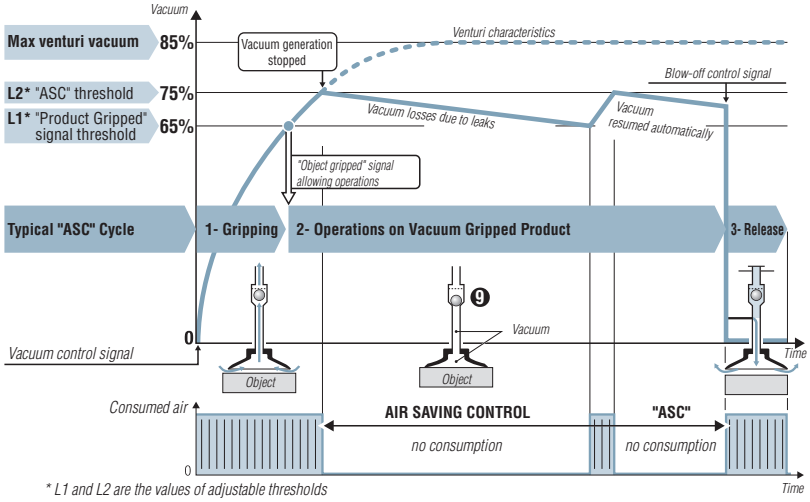
LEMAX IO

Mini Vacuum Pumps with Communication IO-Link

Energy Savings

AIR Saving Control — IO-Link

"Air Saving Control" 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:

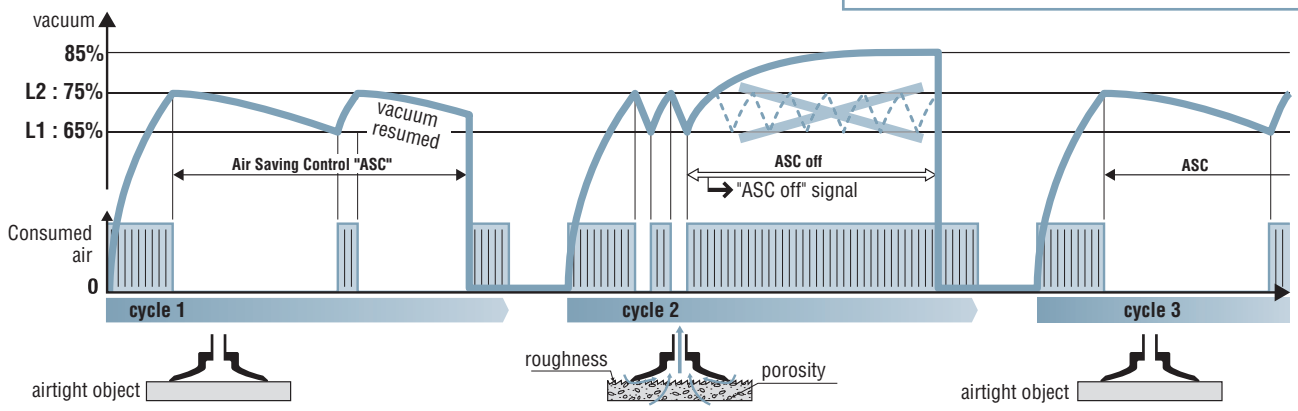
1- No specific adjustment: The initial setting (L1 = 65%, L2 = 75%) is suitable for most applications.

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.

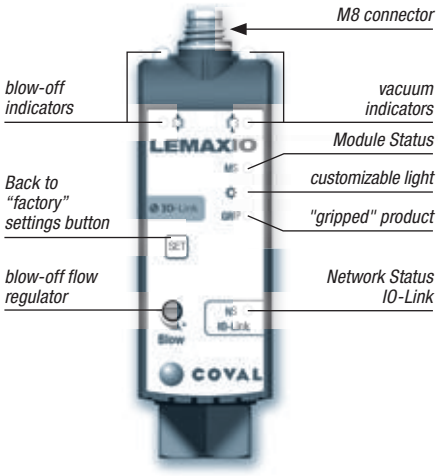
LEMAX IO

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.

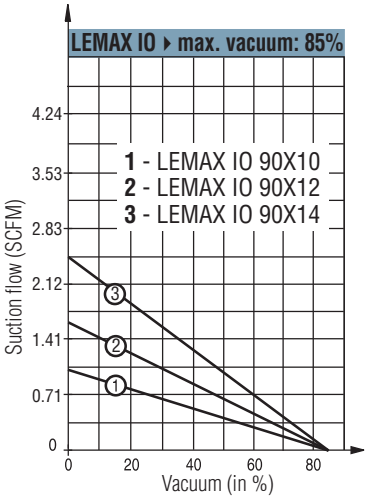
PROCESS OUTPUT DATA

- 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

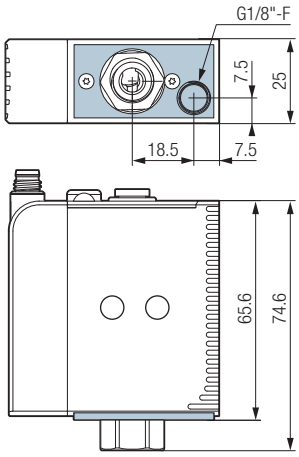
Option, Choice of Layout

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.

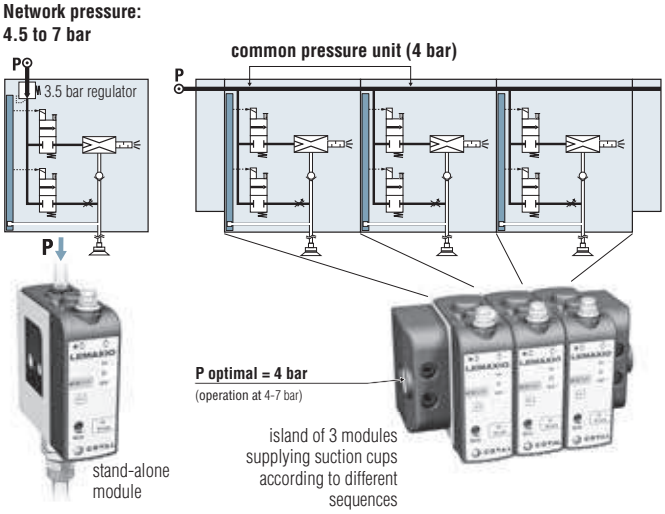


Stand-alone or Island Modules?

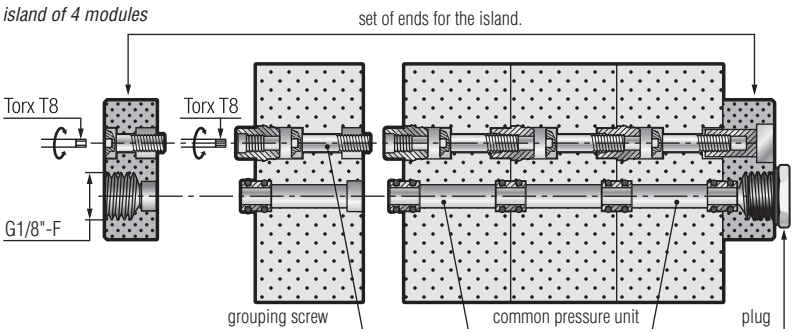
Stand-alone modules are suitable for the most common applications: one module controls one or more suction cups which all operate according to the same sequence.

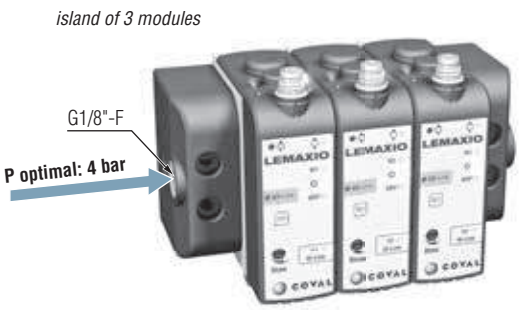
When several suction cups are operating according to different sequences, multiple modules are required, which can be:
- several autonomous modules;
- a group of these modules with an internal common pressure unit.

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**

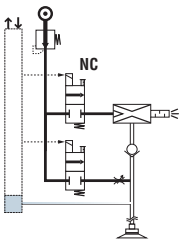
NOZZLE DIAMETER

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

COMPOSITION OF THE MODULE

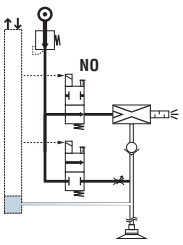
Vacuum pump controlled by a Normally Closed (NC) solenoid valve — **S**

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

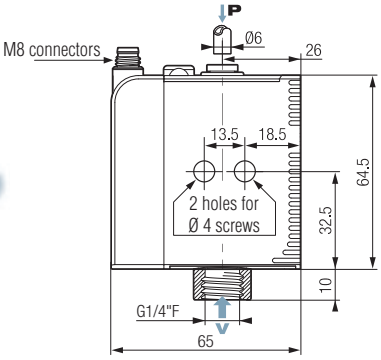
Mini Vacuum Pumps with Communication IO-Link

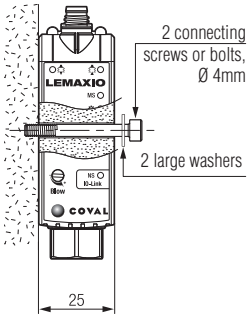
Dimensions, Mounting Options

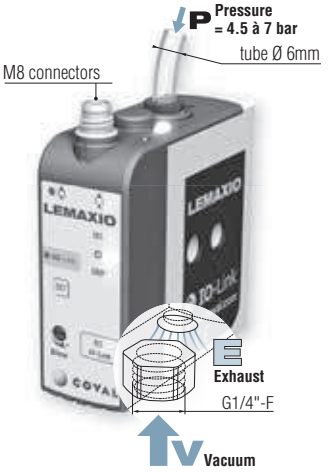
AIR Saving Control — IO-Link

1- Stand-alone Modules

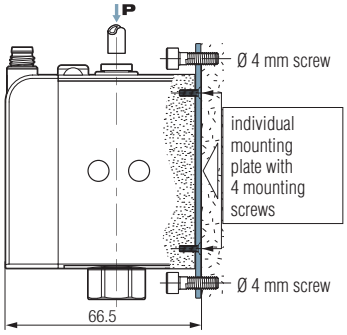
Mounting from side

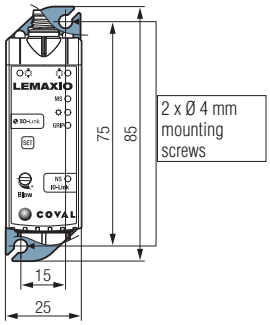






Mounting from front



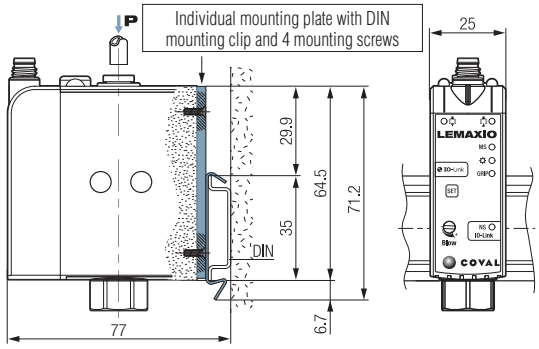


To mount from front, in addition to the module, a mounting kit must be ordered:

Kit for mounting from front:
1 plate + 4 screws

Part No.: LEMFIXA

Mounting on DIN rail

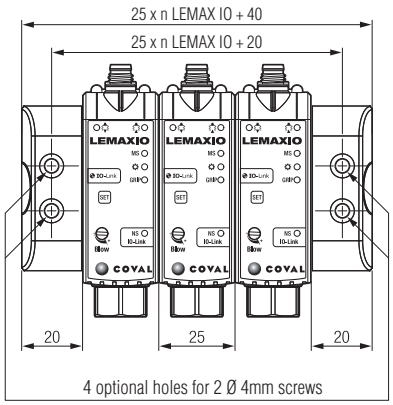


For static mounting (for example, in a cabinet), a module can be clipped onto a DIN rail. For this purpose, the module must first be equipped with an individual plate for mounting onto a DIN rail

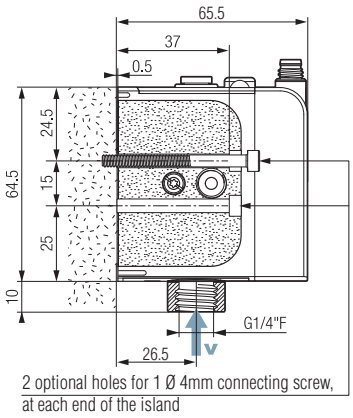
DIN rail mounting kit:
1 plate/clip + 4 screws

Part No.: LEMFIXB

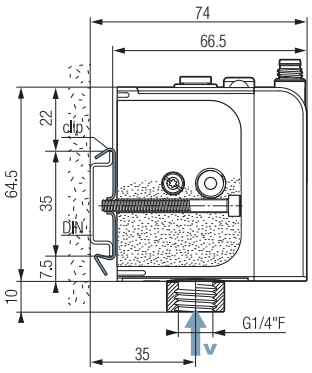
2- Islands



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

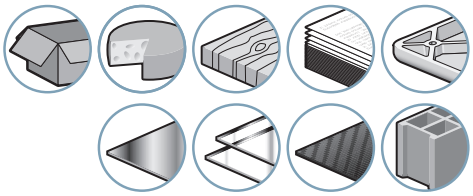
1st Mini Vacuum Pump on Industrial Fieldbus

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

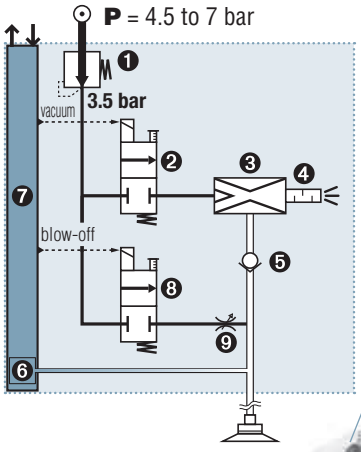


Compact Integration: The COVAL Technique

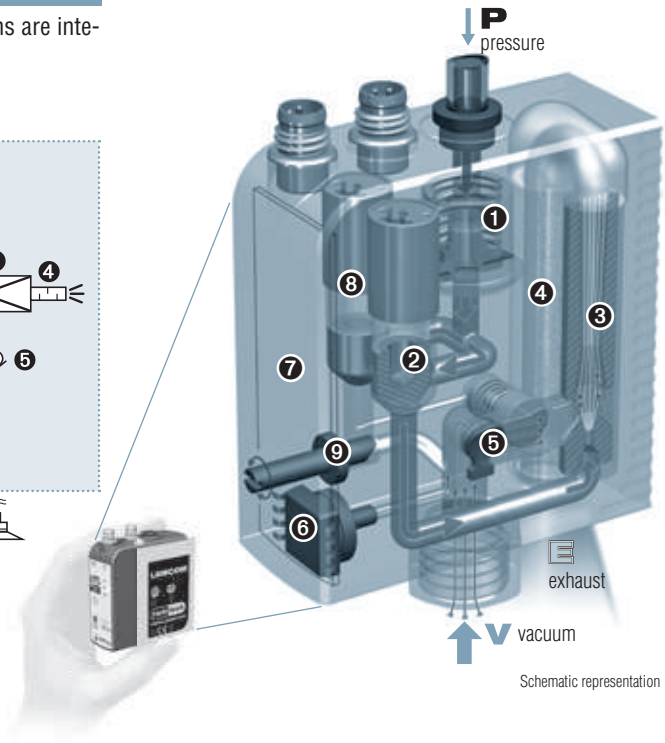
The illustrations demonstrate the COVAL advantage: all necessary functions are integrated into a complete and self-governing mini-module.

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



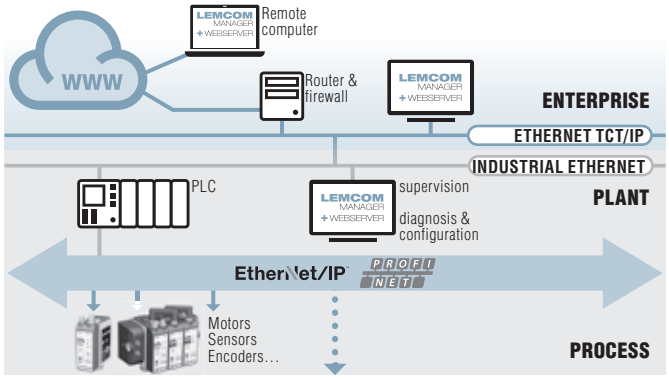
PROFINET EtherNet/IP



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.

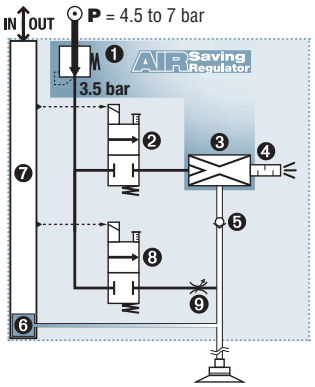
Integrated Energy-saving Technologies

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.**

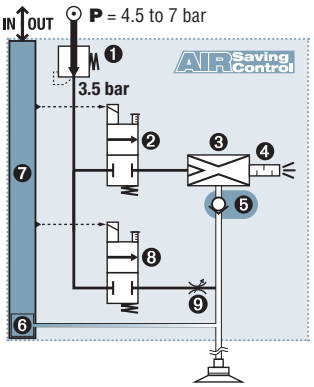


AIR Saving Control

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

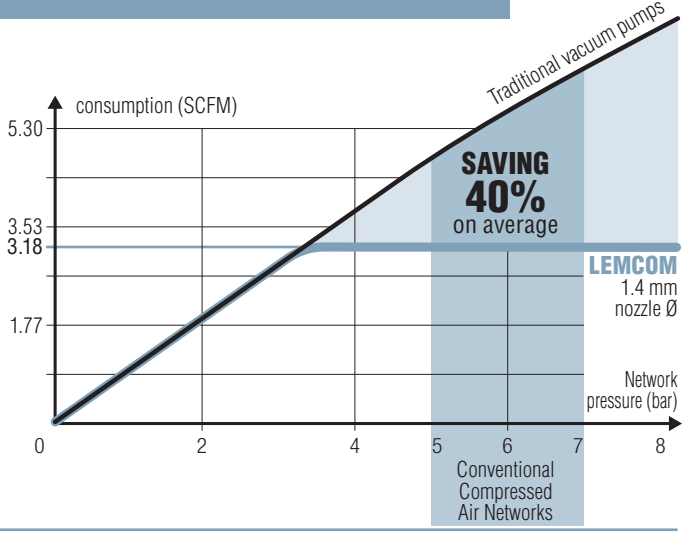
LEMCOM series vacuum pumps, which integrate an **ASR** "venturi regulator" combination, maintain ideals that COVAL values greatly: reducing both compressed air consumption and noise generation.

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.



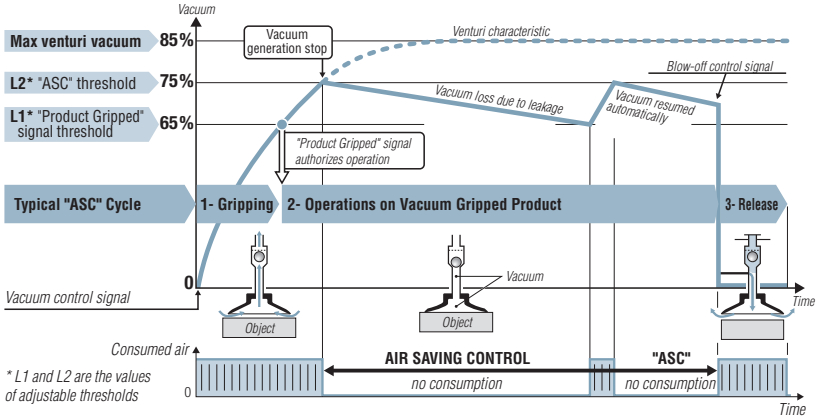
LEMCOM

1st Mini Vacuum Pump on Industrial Fieldbus

Energy Savings

PROFINET EtherNet/IP

AIR Saving Control "Air Saving Control" Cycle



As illustrated above, the **LEMCOM** module automatically executes the "**ASC**", cycle, thus saving the maximum amount of energy, based on the following 3 phases.

1- Gripping the object

The "vacuum" solenoid 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.

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 %

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

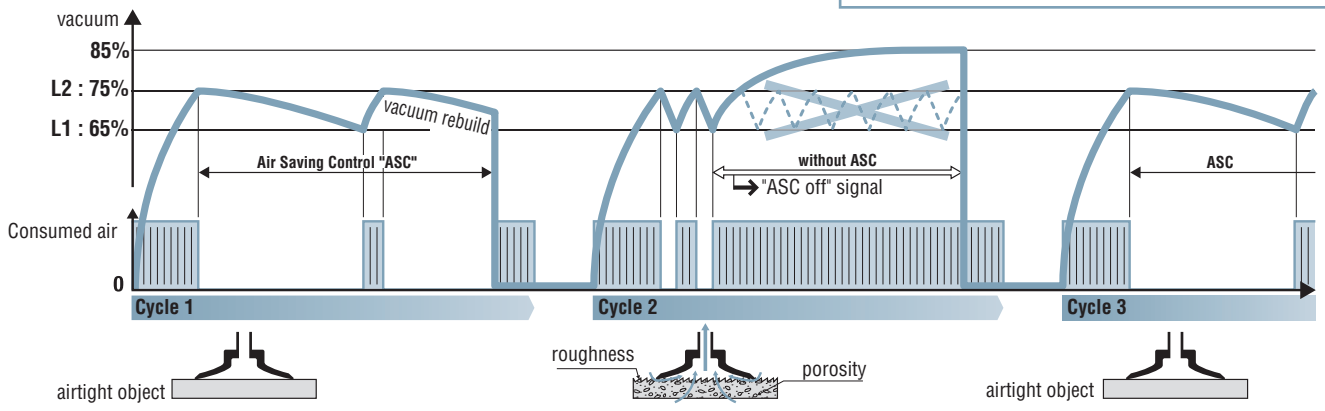
Saving energy has become essential. With LEMCOM, thanks to ASC, energy is saved automatically without interfering with established practices:

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:

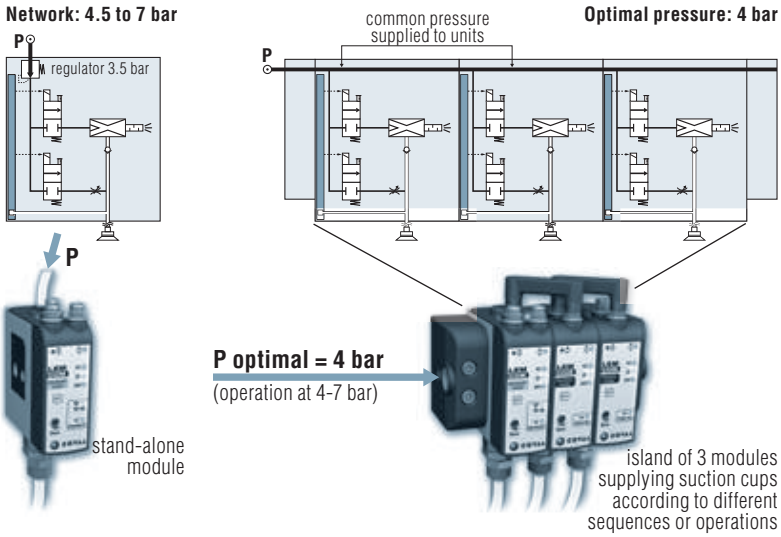
- several autonomous modules, OR
- a group of these modules with an internally shared pressure supply

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.

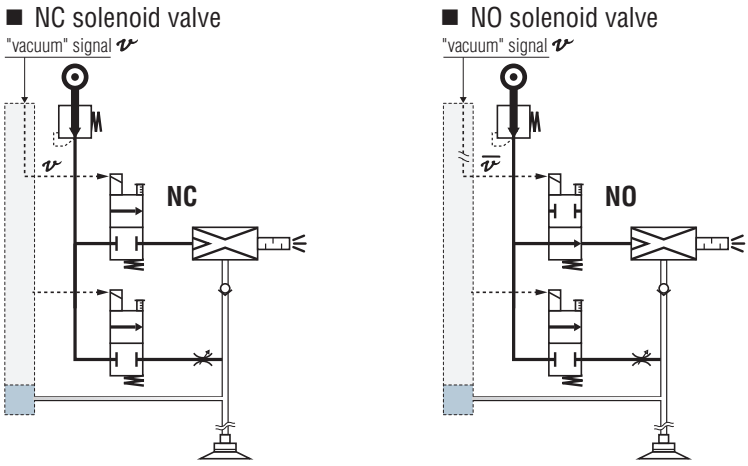
The maximum number of modules in an island depends on the power of the modules that must be active simultaneously:

- 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

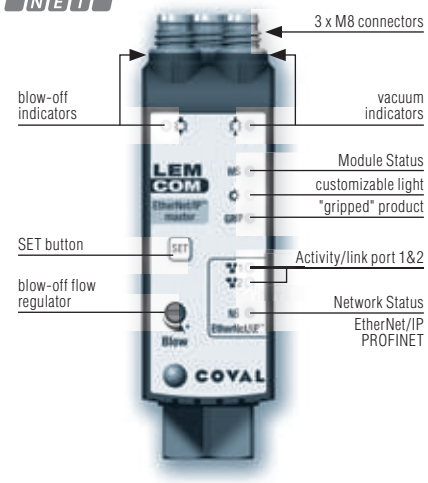
Vacuum control by NC (Normally Closed) solenoid valve is the most common: in the event of an electrical shut-off, vacuum is no longer generated. On the other hand, with a NO (Normally Open) solenoid valve, vacuum continues to be generated in the event of an electrical shut-off, providing positive object-gripped 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.



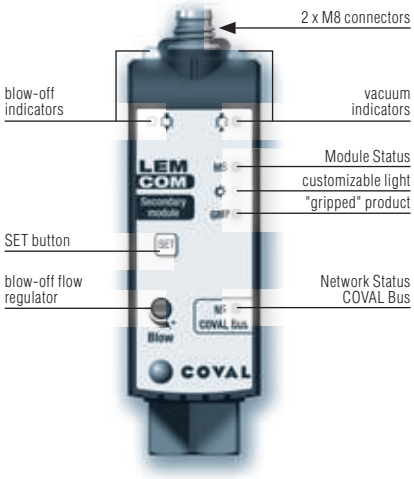
Communications Panel

LEMCOM master

PROFINET EtherNet/IP



LEMCOM secondary module



8

LEMCOM

LEMCOM

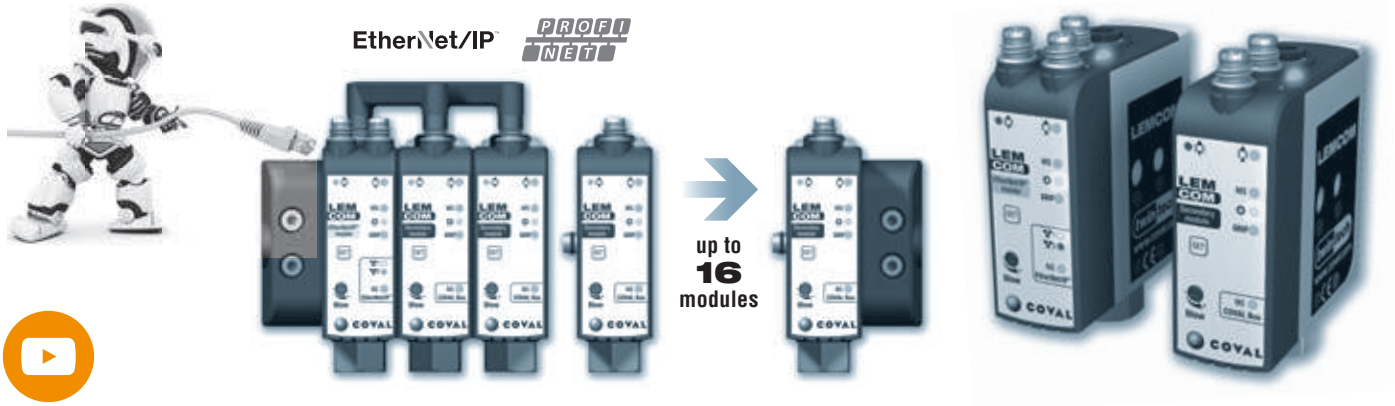
1st Mini Vacuum Pump on Industrial Fieldbus

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

EtherNet/IP

A Setting for Every Application

The LEMCOM is based on an innovative, efficient product structure:

- The "master" module manages communication on the fieldbus, assures management of the "secondary" modules and is a fully-integrated vacuum pump. Its 2 communication ports enable a continuous fieldbus.
- The "secondary" modules are interconnected with the "master" module via the COVAL bus.

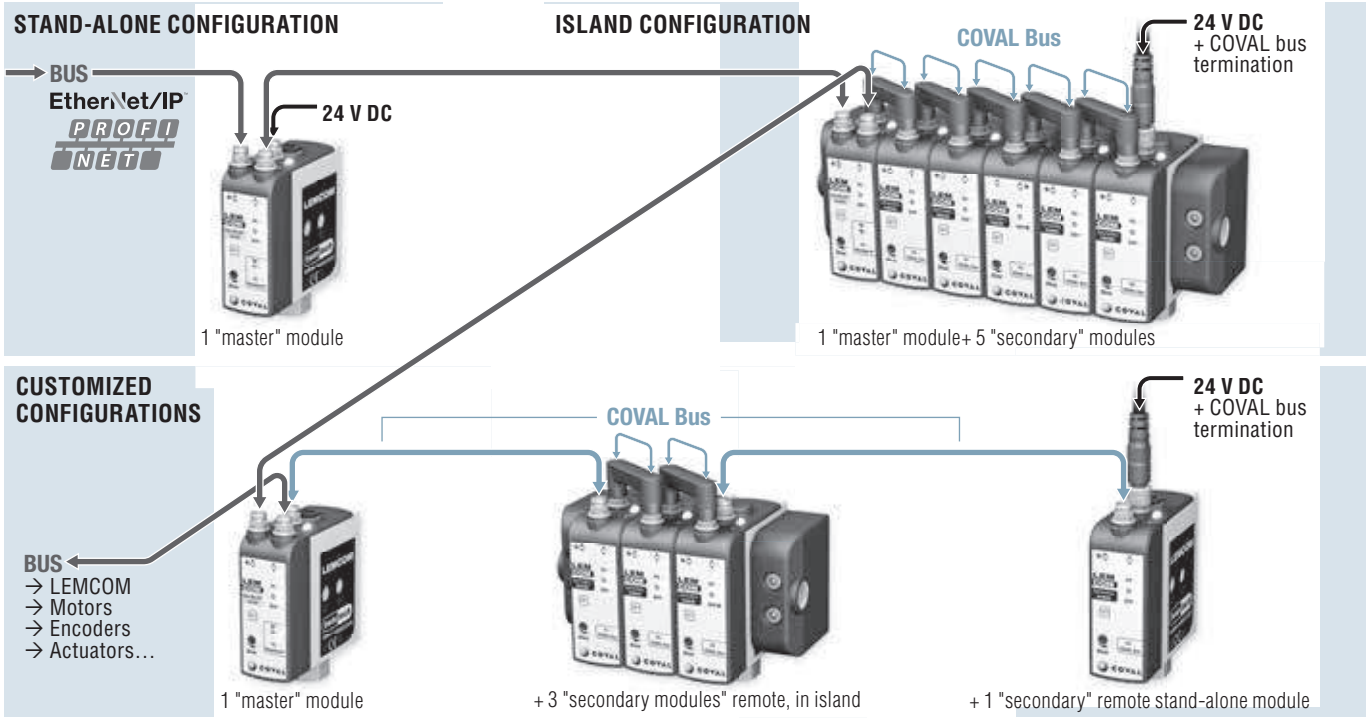
Contact between the "master" module and the "secondary" modules is confirmed by an M8 connecting bridge for island configurations or by a M8/M8 standard cable for configurations based on remote modules.

Advantages:

This product structure guarantees flexibility in selection, enabling use of LEMCOMs in stand-alone, island or mixed configurations. As a result, vacuum generators may be placed in close proximity to the application, guaranteeing a reduction:

- in gripping time
- in cycle time
- in energy consumption.

Because setup and diagnosis of the LEMCOM is carried out remotely, it is not necessary to install them in easily accessible zones.



Full Remote Access

LEMCOM parameters can easily be updated remotely and in several ways. Configuration is possible using LEMCOM Manager PC software, the embedded web server (EtherNet/IP and PROFINET) or by sending vacuum parameters directly from the PLC during use or on initialization.

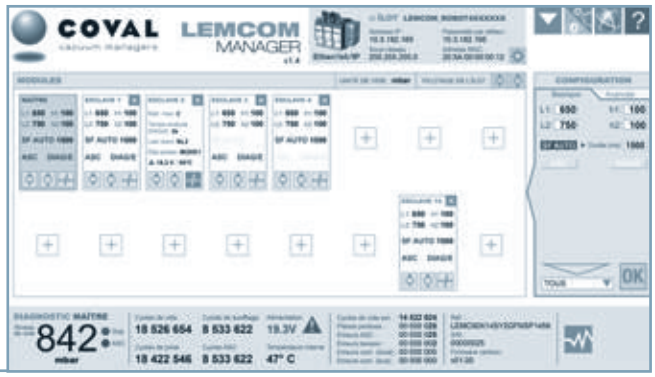
This flexibility enables the LEMCOM user to adapt to all types of applications without direct intervention on the vacuum generator.

EtherNet/IP PROFINET

- Embedded web server.
- Implicit (I/O) and explicit messaging (setting) (EtherNet/IP).
- Synchronous (I / O) and asynchronous data (configuration) (PROFINET)

LEMCOM MANAGER

- Dedicated universal application: LEMCOM Manager.



LEMCOM

1st Mini Vacuum Pump on Industrial Fieldbus

Selection Guide

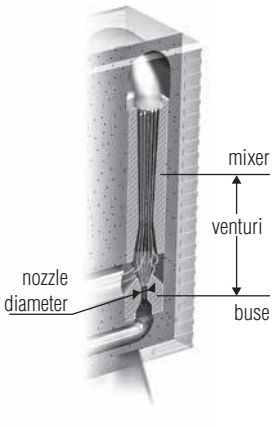
PROFINET EtherNet/IP

Venturi Specifications

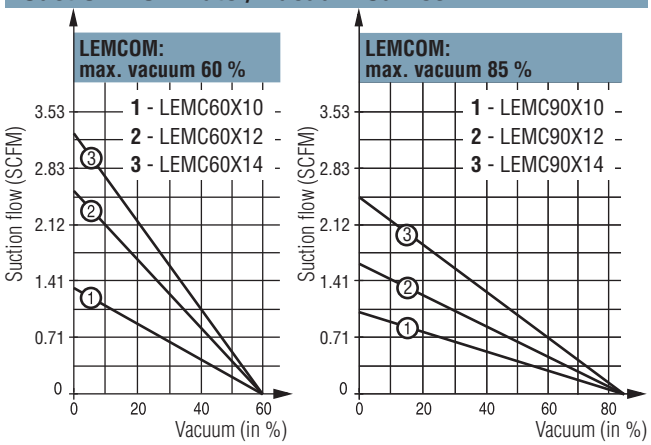
1- Maximum Vacuum Level
Dependent upon the mixer profile:

- 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):

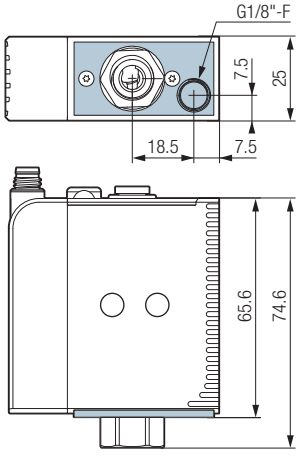
Ø buse	gripping time (65% vacuum) *(s)*	Time up to 75% vacuum *(s)*	Consumed Air *(ft³)*
1.0 mm	2.38	3.33	0.077
1.2 mm	1.53	2.15	0.077
1.4 mm	0.99	1.38	0.077

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

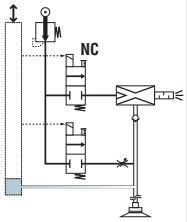
1 mm Ø nozzle	**10**
1.2 mm Ø nozzle	**12**
1.4 mm Ø nozzle	**14**

MODULE COMPOSITION

S — **NC Vacuum pump with blow-off**

LEMC__X__**S**__G__

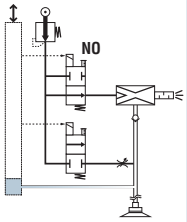
- **NC** vacuum control valve:
  - → in case of electrical cut-off, vacuum generation stops.
- Blow-off configured on site at choice:
  - Blow-off controlled by specific signal;
  - Automatically delayed blow-off time from 0 to 10 s.
- Adjustable blow-off flow rate.



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

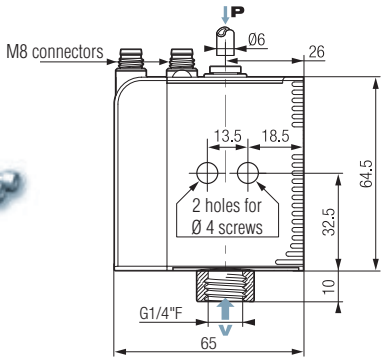
1st Mini Vacuum Pump on Industrial Fieldbus

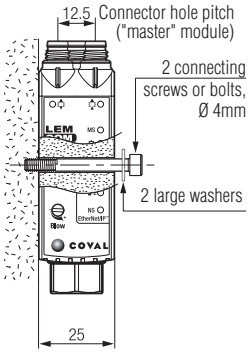
Dimensions, Mounting Options

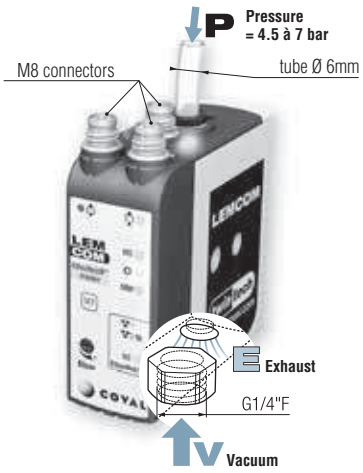
PROFINET EtherNet/IP

1- Stand-alone Modules

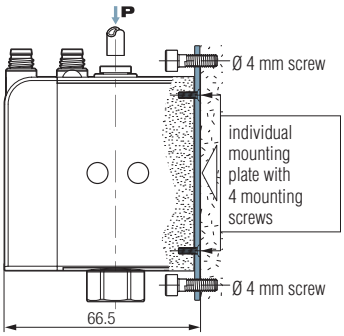
Mounting from side

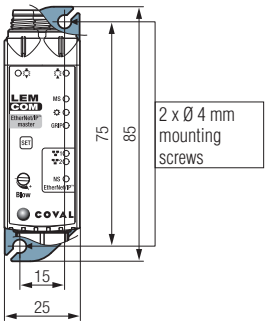






Mounting from front



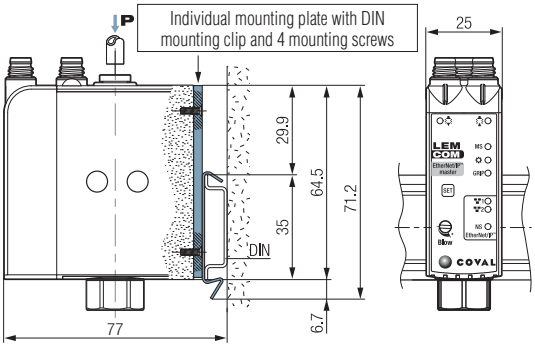


To mount from front, in addition to the module, a mounting kit must be ordered:

Kit for mounting from front:
1 plate + 4 screws

Part No.: LEMFIXA

Mounting on DIN rail

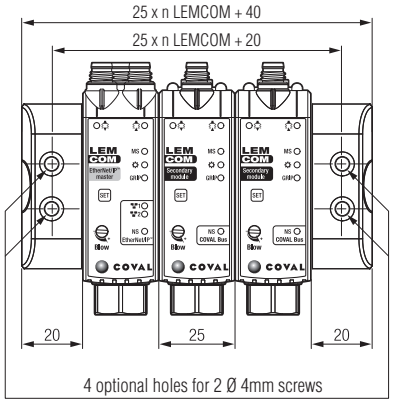


For static mounting (for example, in a cabinet), a module can be clipped onto a DIN rail. For this purpose, the module must first be equipped with an individual plate for mounting onto a DIN rail

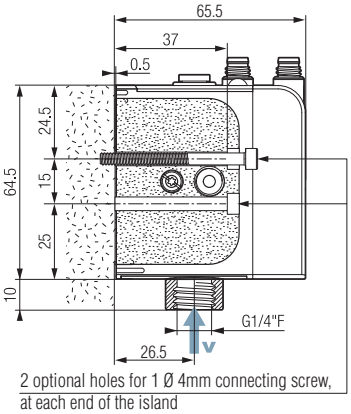
DIN rail mounting kit:
1 plate/clip + 4 screws

Part No.: LEMFIXB

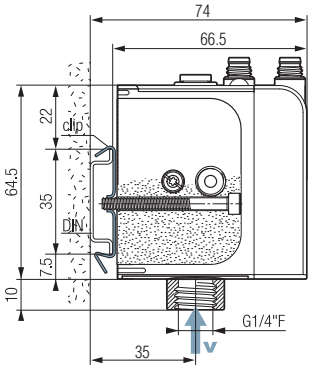
2- Islands



Mounting from front



Mounting on DIN rail



DIN rail mounting kit:
2 clips + 2 screws

Part No.: LEMFIXC

LEMCOM

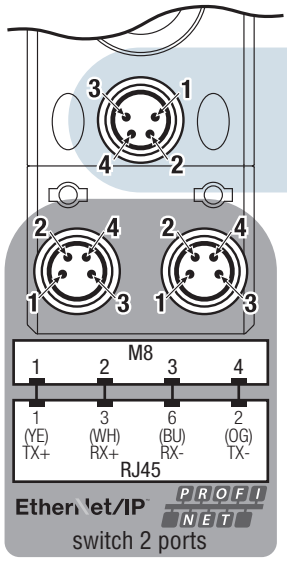
1st Mini Vacuum Pump on Industrial Fieldbus

Connections

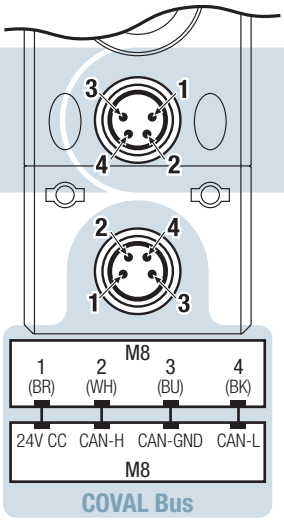
EtherNet/IP

Electrical Connections

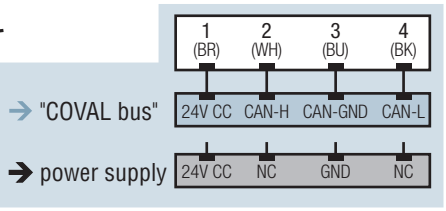
LEMCOM master
EtherNet/IP PROFINET



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.

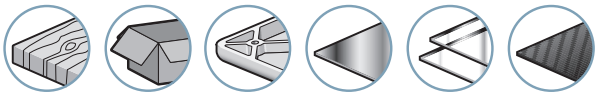
LEM+

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

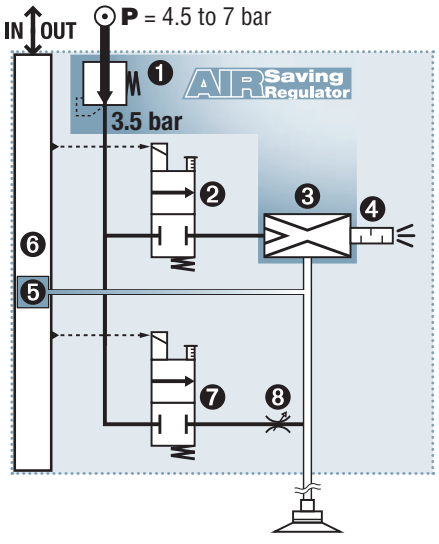
❹ Optimized silencer

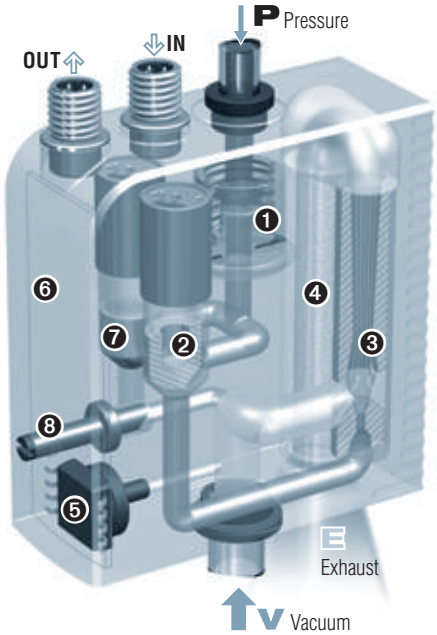
❺ Electronic vacuum sensor

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

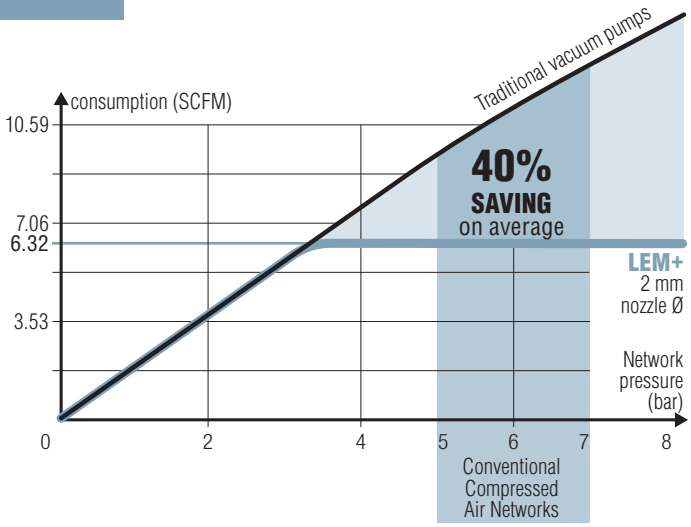
The LEM+ vacuum pumps, which integrate an **ASR** "venturi regulator" combination, maintain ideals that COVAL values greatly: reducing both compressed air consumption and noise generation.

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.

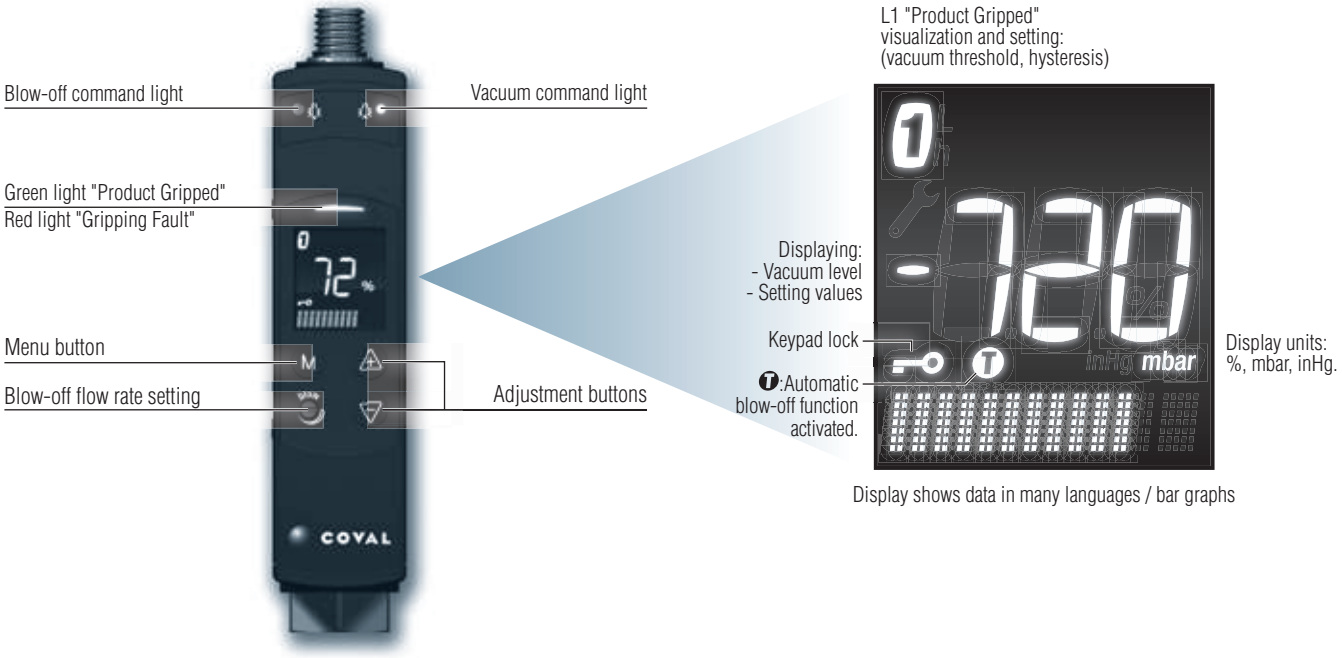
➔ **Simplified & Protected Installation and Operation.**

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.**



LEM+

Compact, High Flow Vacuum Pumps

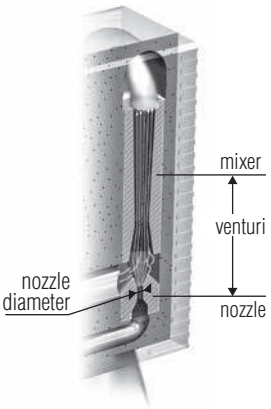
Selection Guide

AIR Saving Regulator

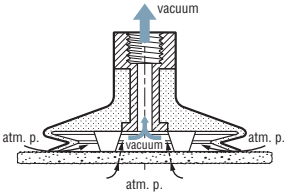
Select Vacuum Level and Nozzle Diameter

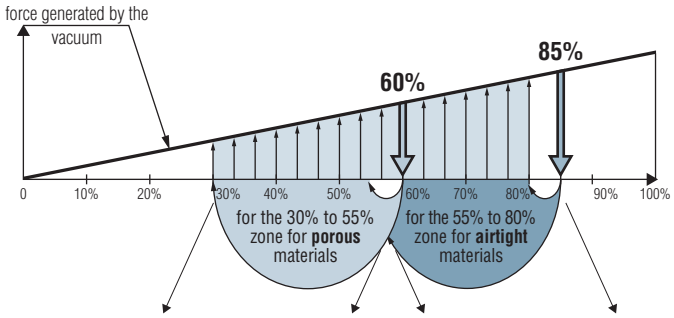
The introductory guide in this catalog shows that for porous objects, a 30-55% vacuum is economical and effective. This is obtained with a 60% maximum vacuum pump.
The table below helps to select the nozzle diameter which generates enough vacuumed air flow to respond in the time required by the application,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

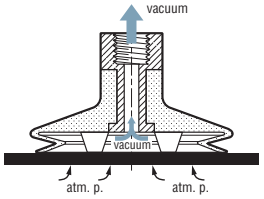


Porous materials:
cardboard, unfinished wood, pastries, etc.





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

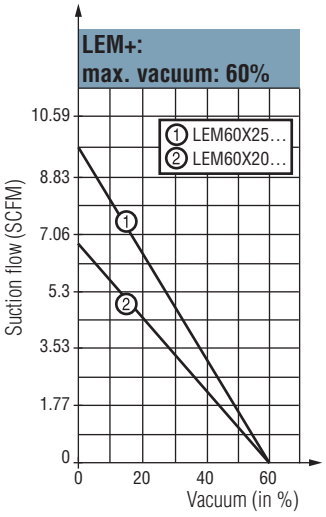


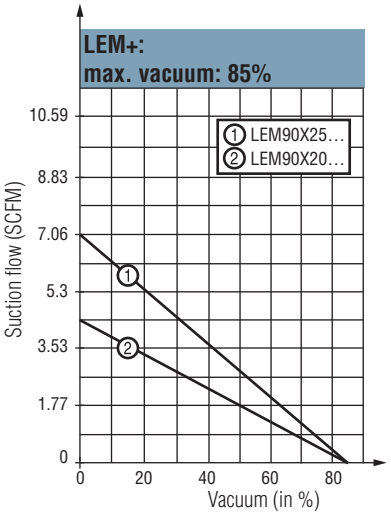
Porous Objects ▸ Maximum Vacuum Level: 60%					
Time to create vacuum (seconds) **for a volume of 1 liter**				**Air consumed** (SCFM)	**Air drawn in** (SCFM)
vacuum achieved / Ø nozzle	**35 %**	**45 %**	**55 %**		
2.0 mm	0.16	0.27	0.42	**6.32**	**6.67**
2.5 mm	0.11	0.18	0.31	**9.18**	**9.71**

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



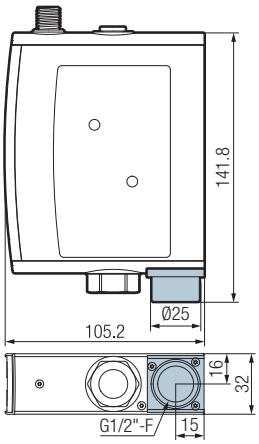


Exhaust manifold: option E

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

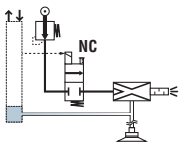
2 mm nozzle Ø	**20**
2.5 mm nozzle Ø	**25**

MODULE COMPOSITION

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

LEM__X__**R**V_C__PG1

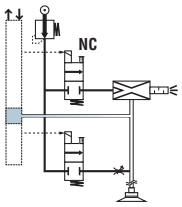
- Single command signal.
- **NC** vacuum command valve.



NC Vacuum Pump With Blow-Off — **S**

LEM__X__**S**V_C__PG1

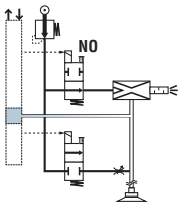
- 2 command signals.
- **NC** vacuum command valve.
- Blow-off configured on site, at choice:
  - Blow-off controlled by specific signal;
  - Automatic blow-off function (blow-off time configurable from 0 to 10s), only with VA option (advantage: reduced PLC I/O requirement).
- Adjustable blow-off flow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

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.

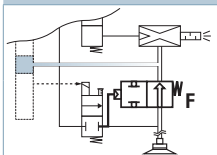
Vacuum pump with vacuum sensor & dialogue — **VA C24**

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+

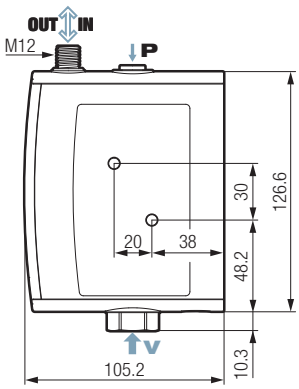
Compact, High Flow Vacuum Pumps

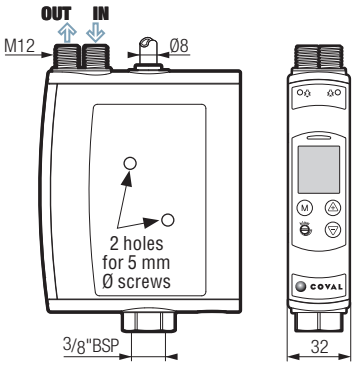
Dimensions, Mounting Options

AIR Saving Regulator

Side Mounting

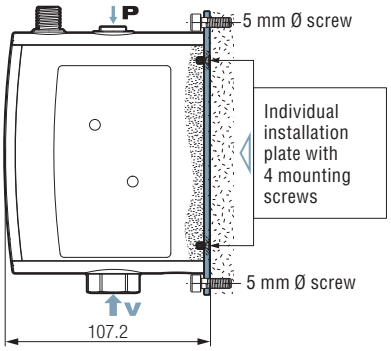
- Version: one M12 connector
- Version: two M12 connectors

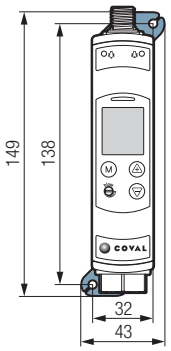




Mounting from the side is the simplest to implement: Two Ø 5 mm through screws or bolts with large washers.

Mounting from Front

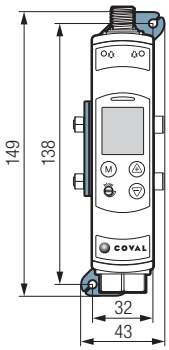


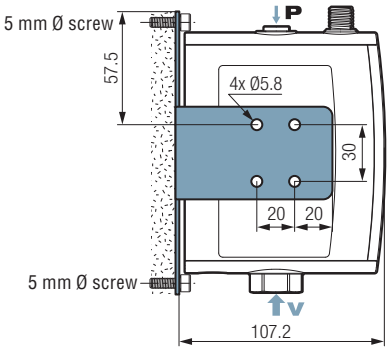


For mounting from the front, in addition to the module, you need to order an additional kit:

Mounting from front kit:
1 plate + 4 screws

Part No.: LEMFIX2A



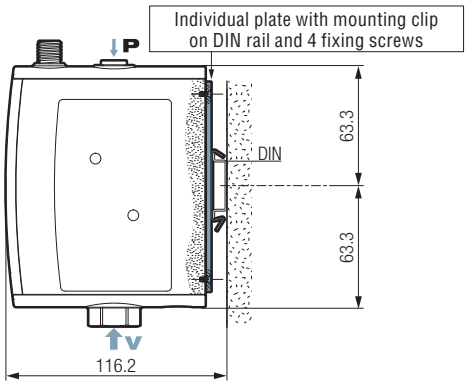


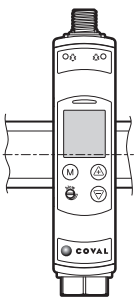
For front installation with side pump mounting this kit is needed in addition to the module:

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

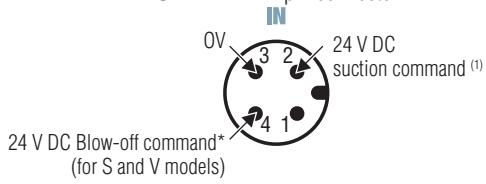
- 24V DC, switching output / NO, switching capacity: 125 mA PNP.

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

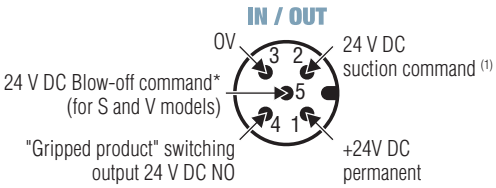
- "Vacuum level" signal, analogic 1 to 5V DC of measuring range.

Electrical Connections

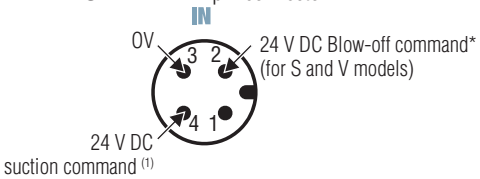
▪ **C14:** 1 M12 4-pin connector

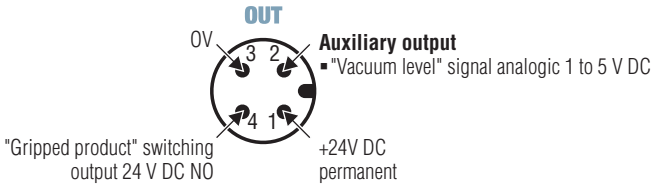


▪ **C15:** 1 M12 5-pin connector



▪ **C24:** 2 M12-4 pin connector





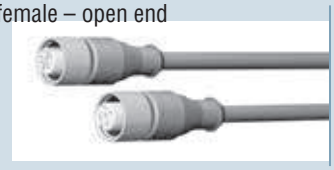
(1) 24 V DC suction command, depending on version:
*- for vacuum pumps model **R** and **S** (vacuum control NC valve): 24 V DC vacuum control*
*- for vacuum pumps Model **V** (vacuum control NO valve): 24 V DC vacuum off command*

** **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+

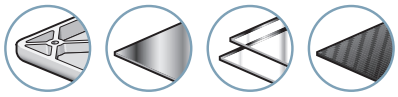
Compact, High Flow Vacuum Pumps

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):

nozzle Ø \ max. vacuum	85%
2.0 mm	4.41
2.5 mm	7.06

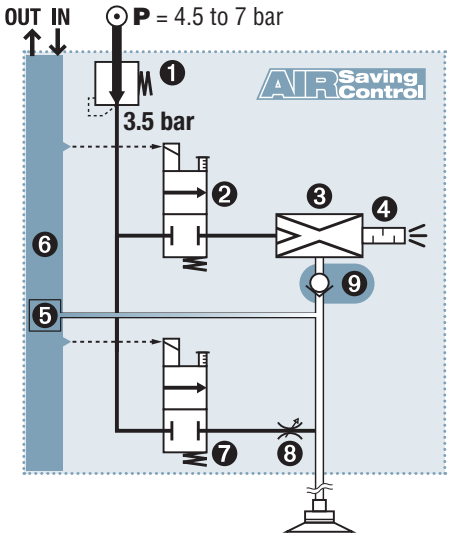
8

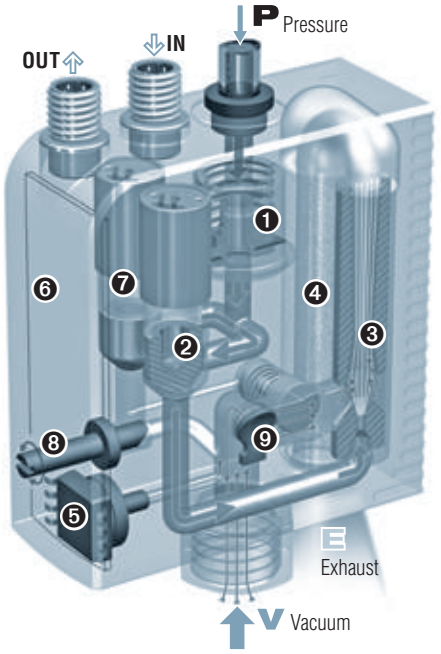
LEMAX+

Integration

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

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.

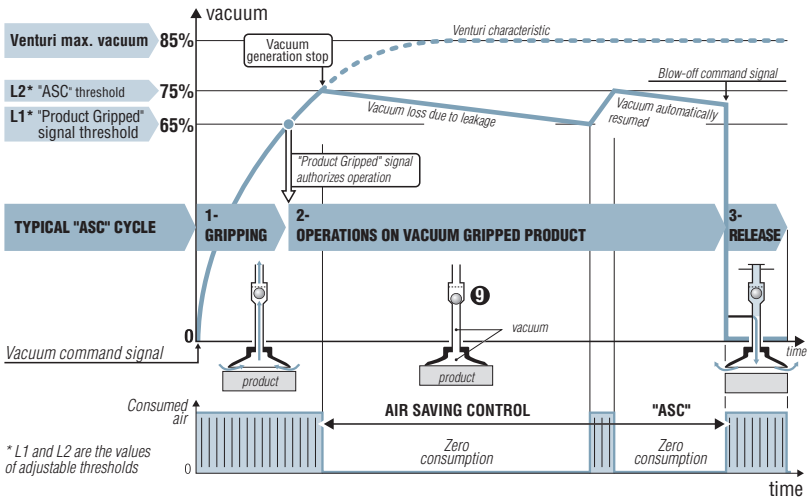
→ Once vacuum is established, the pump does not continue to consume air to hold the product.

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%).

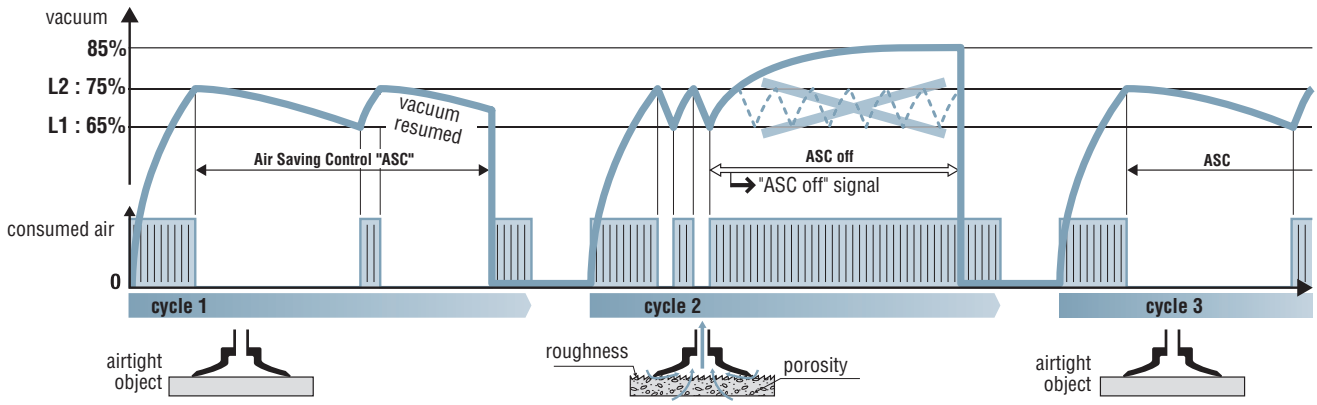
3- Releasing the object

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.

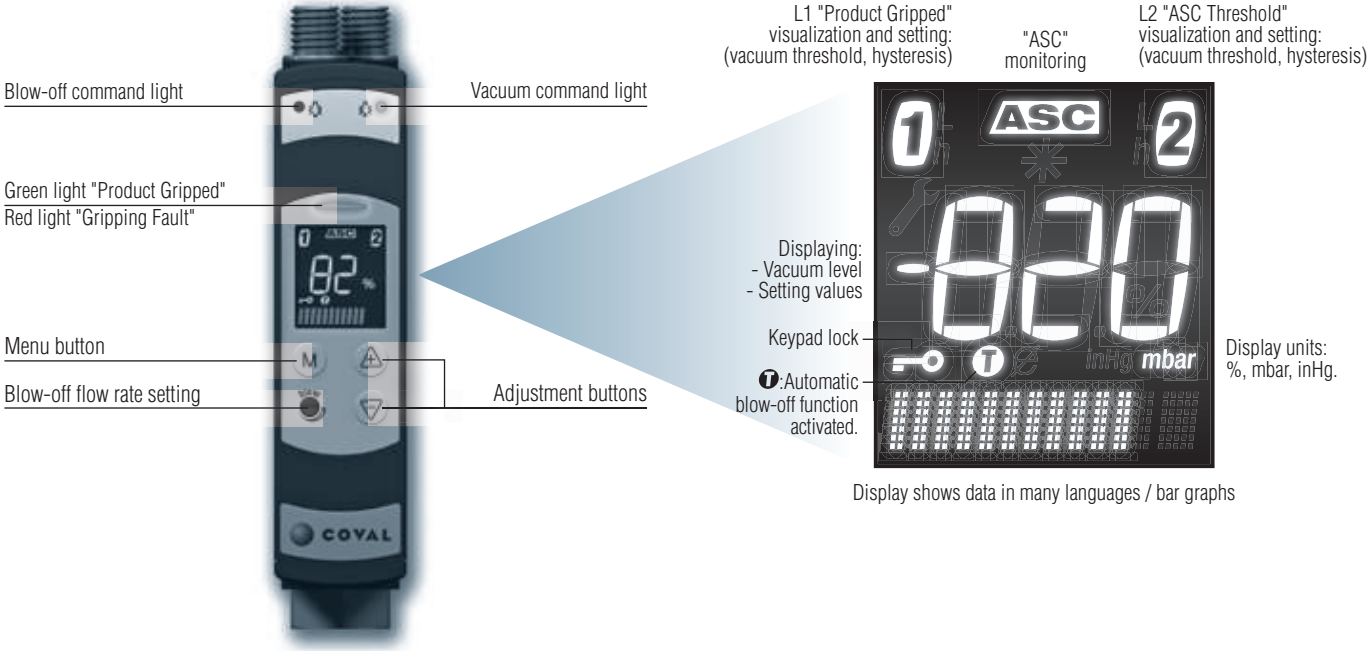
➔ **Simplified & Protected Installation and Operation.**

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.

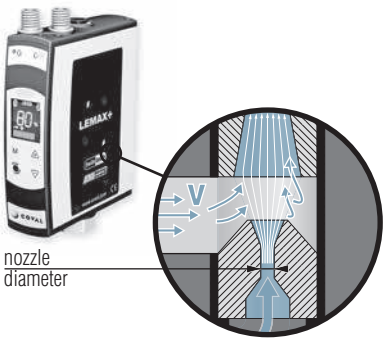
On the other hand, during "**ASC**" operation, a large nozzle quickly reaches the vacuum threshold generating power shut-off.

In conclusion:

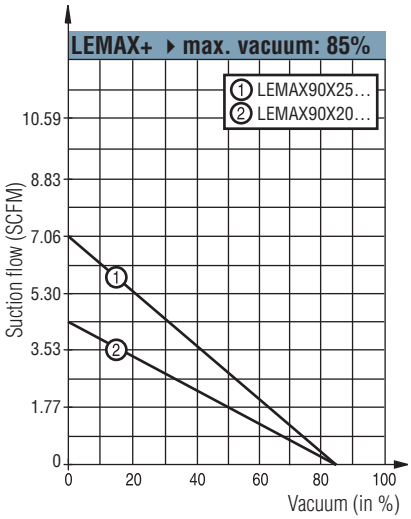
- A large nozzle enables quicker gripping without consuming more during "**ASC**" operation.
- A small nozzle does not consume less when operating with "**ASC**" off.

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 (ft³)
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



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

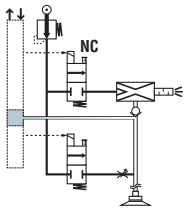
2 mm nozzle Ø	**20**
2.5 mm nozzle Ø	**25**

MODULE COMPOSITION

S

NC Vacuum Pump With Blow-Off

LEMAX__X__**S**V_C__PG1

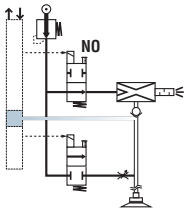


- 2 command signals.
- **NC** vacuum command valve.
- Blow-off configured on site, at choice:
  - Blow-off controlled by specific signal;
  - Automatic blow-off function (blow-off time configurable from 0 to 10s.).
    Advantage: reduced PLC I/O requirement.
- Adjustable blow-off flow rate.

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

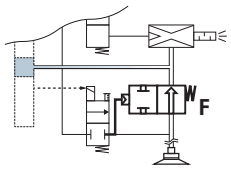
- Stand alone I/O.
- "Gripped product" switching output 24V DC / NO.
- 1 configurable auxiliary output:
  - either "Vacuum level" signal analogic 1 to 5V DC.
  - or "Without ASC" signal +5V DC switching output NO.

***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.

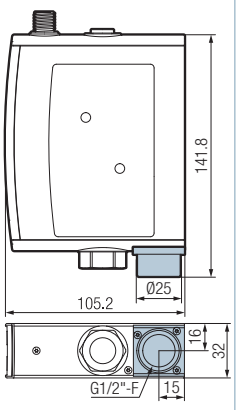
NB: If option **F** is selected, no blow-off flow rate setting is available.

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+

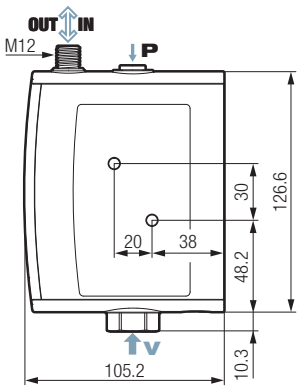
Compact, High Flow Vacuum Pumps

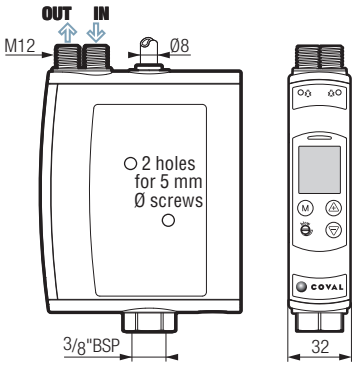
Dimensions, Mounting Options

AIR Saving Control

Side Mounting

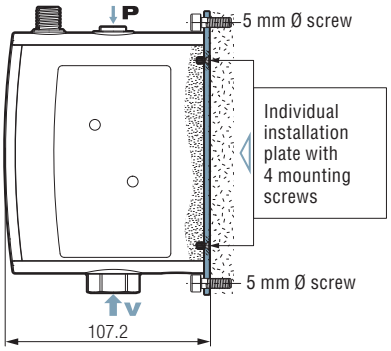
- Version: one M12 connector
- Version: two M12 connectors

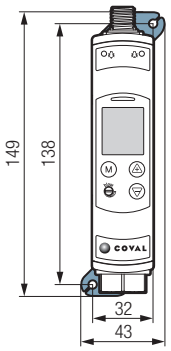




Mounting from the side is the simplest to implement: Two Ø 5 mm through screws or bolts with large washers.

Mounting from Front

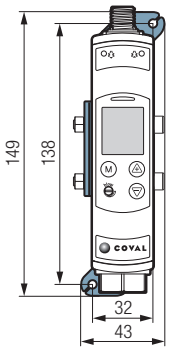


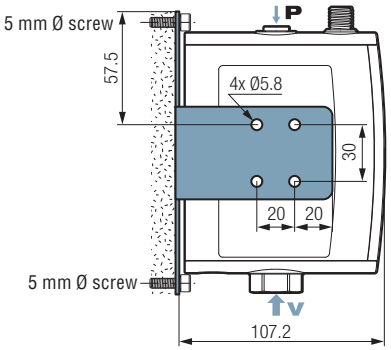


For mounting from the front, in addition to the module, you need to order an additional kit:

Mounting from front kit:
1 plate + 4 screws

Part No.: LEMFIX2A



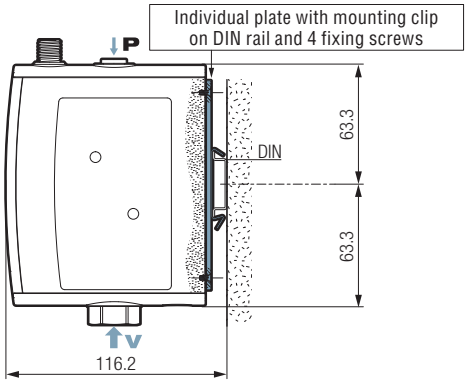


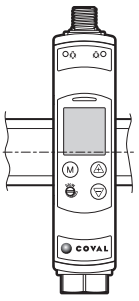
For front installation with side pump mounting this kit is needed in addition to the module:

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)

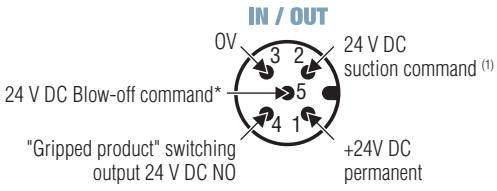
- either "Vacuum level" signal, analogic 1 to 5V DC of measuring range.
- or "without ASC" signal +5V DC NO switching output.

ASC: Regulation & Self-Adaptation

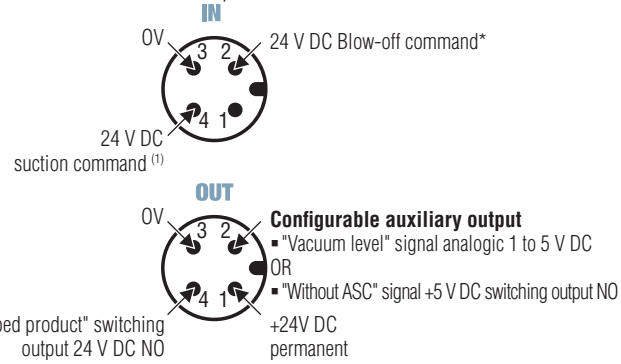
- Continuous monitoring of the leakage level: Back-off or automatic return to operation with ASC.

Electrical Connections

▪ **C15:** 1 M12 5-pin connector



▪ **C24:** 2 M12-4 pin connector



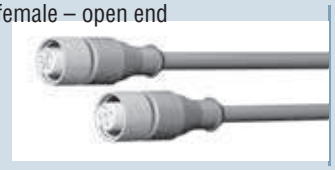
(1) 24 V DC suction command, depending on version:
*- for vacuum pumps model **S** (vacuum control NC valve): 24 V DC vacuum control*
*- for vacuum pumps Model **V** (vacuum control NO valve): 24 V DC vacuum off command*

** **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.

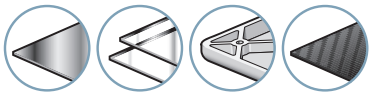
GVMAX HD

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

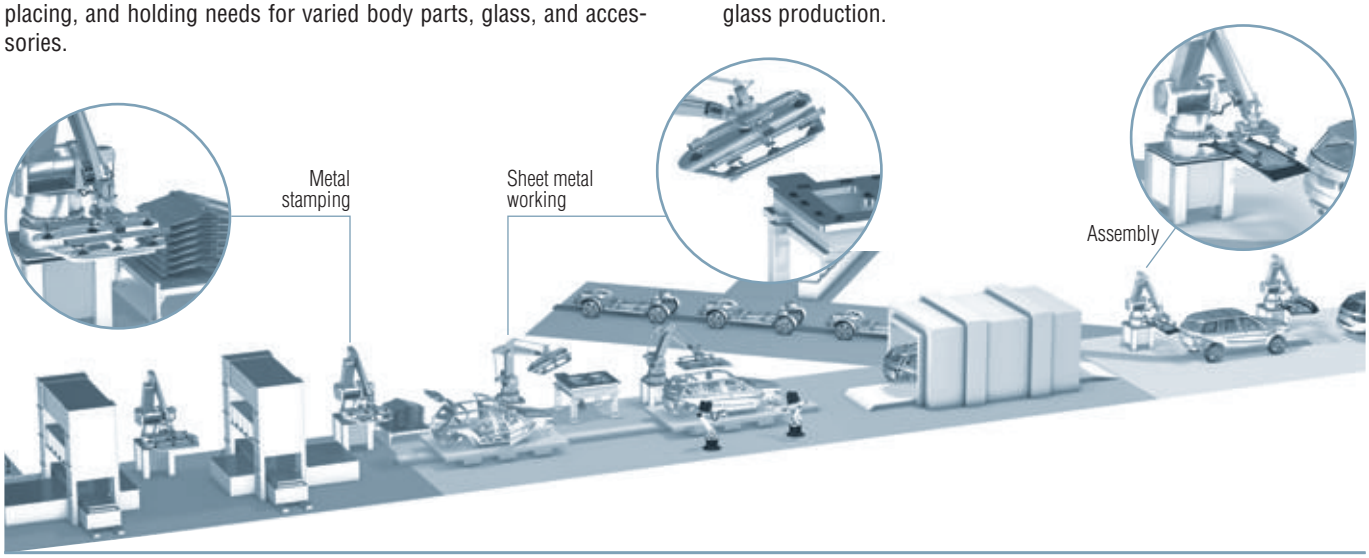
Main Specifications

- 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

8

GVMAX HD

GVMAX HD

Heavy Duty Communicating Vacuum Pumps

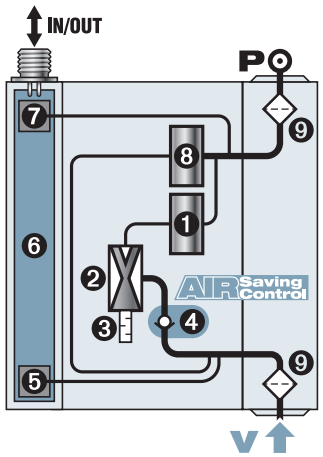
Integration and Performance

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



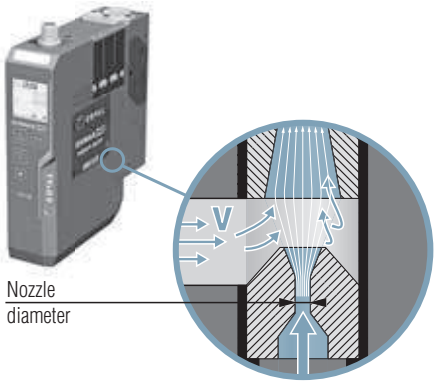
+ AIR Saving Control
90% energy savings *(on average, see p. 8/56)*

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

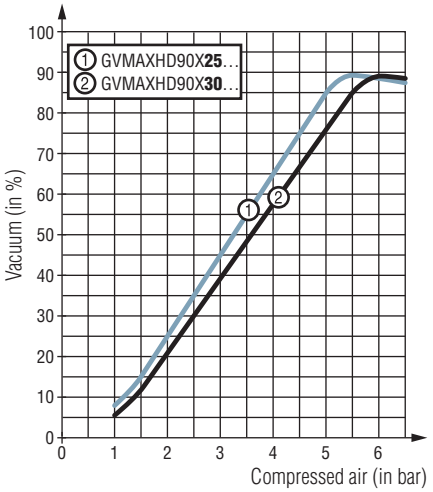
The table specifies the performance levels and evacuation times generated for each nozzle diameter available.

When handling airtight objects, the ASC vacuum control system can help to considerably reduce the consumption of compressed air.

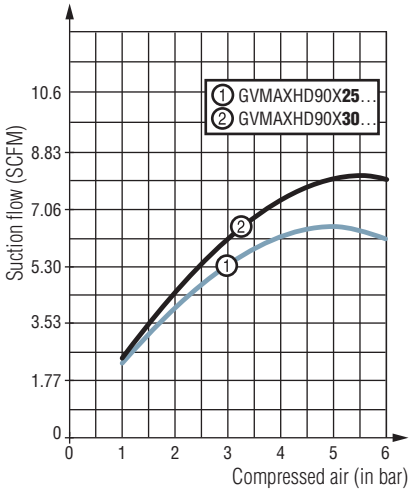


Nozzle dia. \ Vacuum reached	Evacuation time (seconds) of a volume of 1 liter 45 %	55 %	65 %	75 %	Max. vacuum (%)	Air drawn in (SCFM)	Air consumed (SCFM)	Air pressure level (bar)
2.5 mm	0.17	0.24	0.35	0.52	**85**	**6.48**	**10.29**	**5**
3.0 mm	0.15	0.20	0.27	0.42	**85**	**8.05**	**13.3**	**5.5**

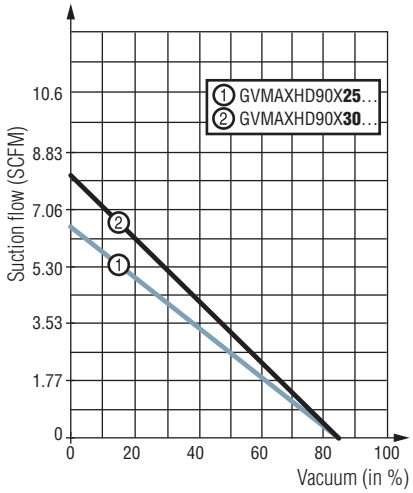
Vacuum Generated/Compressed Air



Suction Flow Rate/Compressed Air



Suction Flow Rate/Vacuum



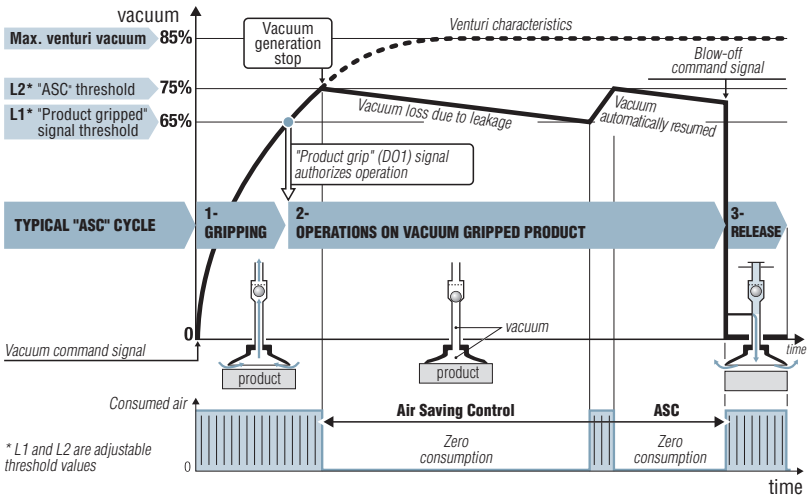
GVMAX HD

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:

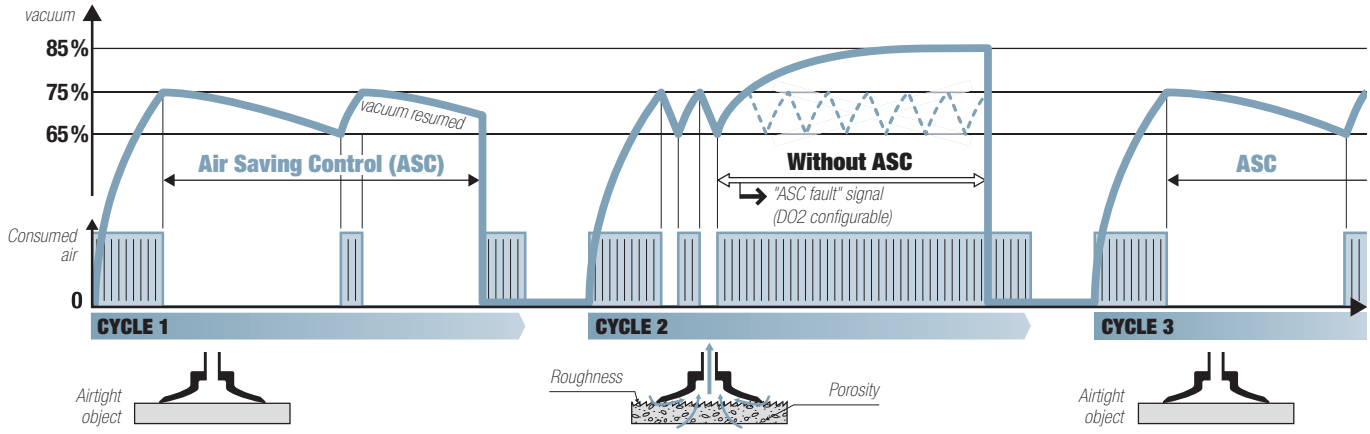
- 76% savings when transferring a object after gripping
- 98% savings when clamping a object during an operation lasting 1 min

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

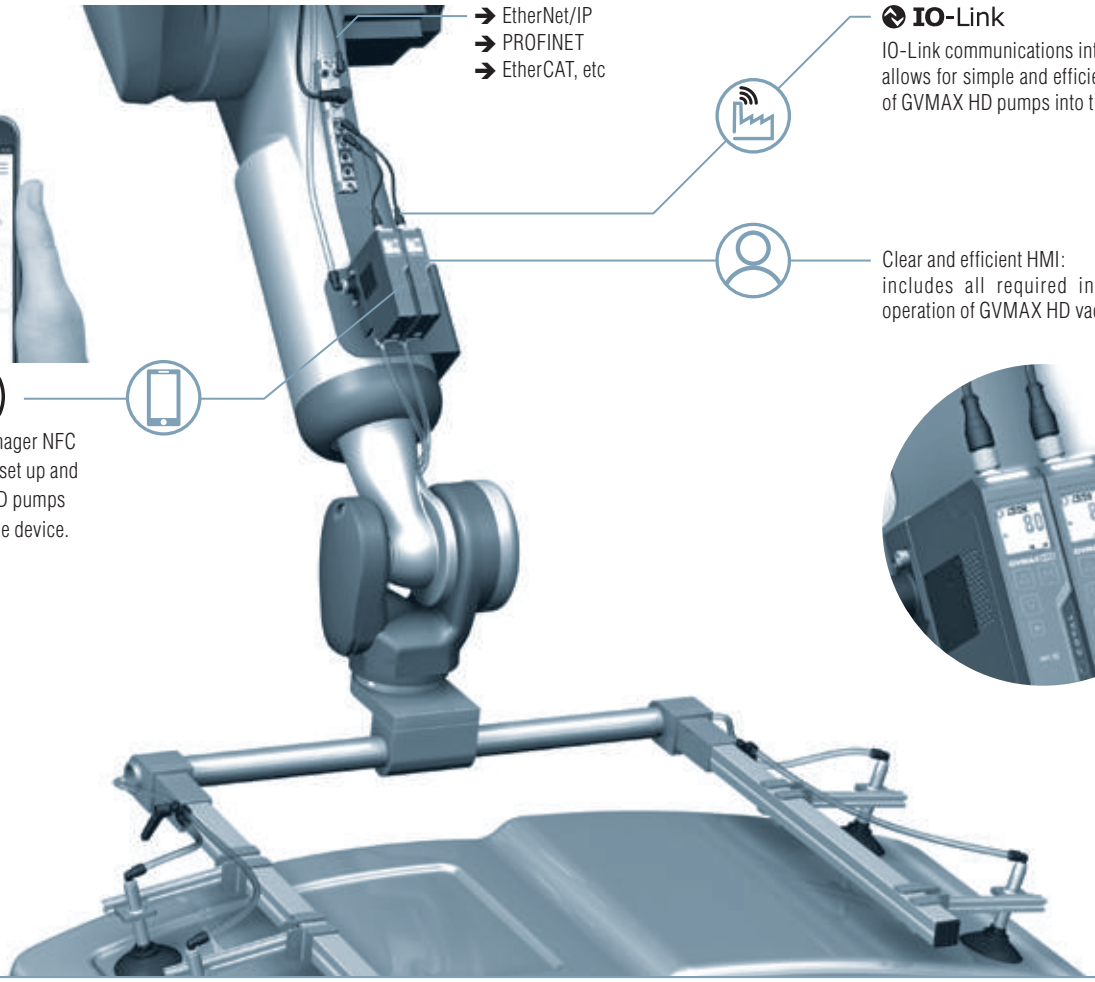
- Vacuum and blow-off control

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

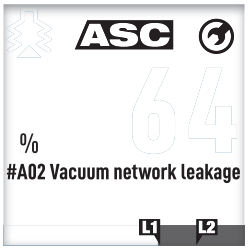
Straightforward Communication

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

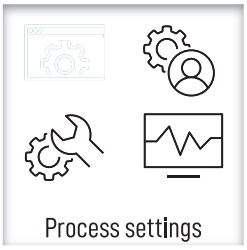


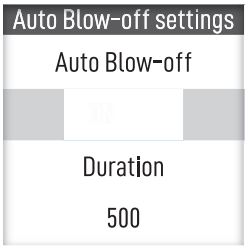
Settings keypad

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

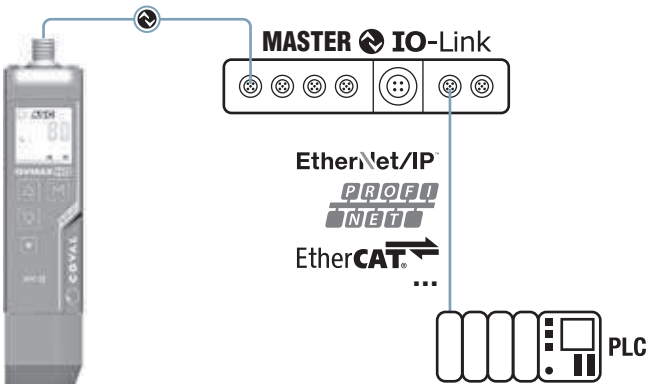
EN FR DE IT ES

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)

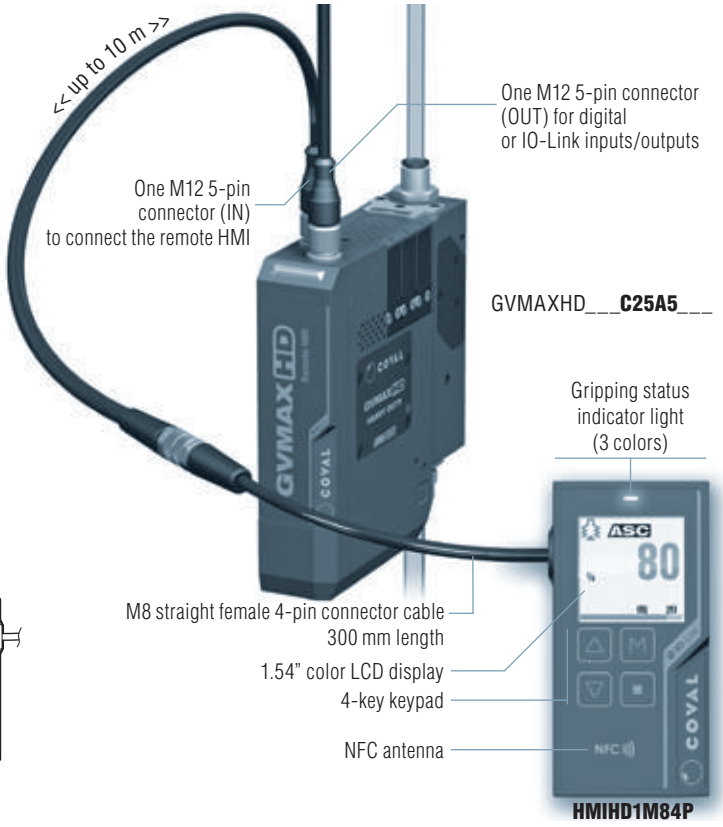
Island of 3 GVMAX HD modules with SMART SWAP system on pneumatic sockets

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.

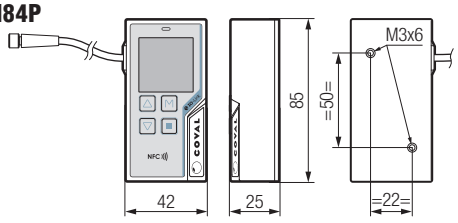
Advantages:

- 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



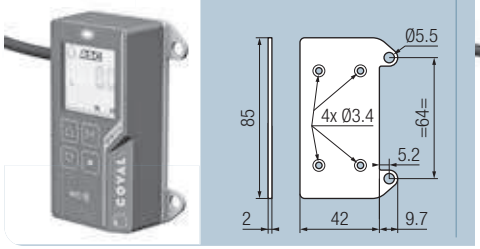
→ **GVMAX HD vacuum pump without HMI**
Part No.: GVMAXHD___**C25A5**___
- Two M12 5-pin connectors
- M12 blanking plug provided for use without HMI

→ **Remote HMI**
Part No.: **HMIHD1M84P**

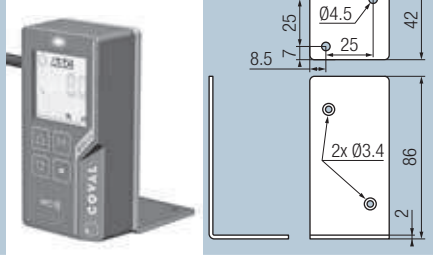


Accessories for remote HMI

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

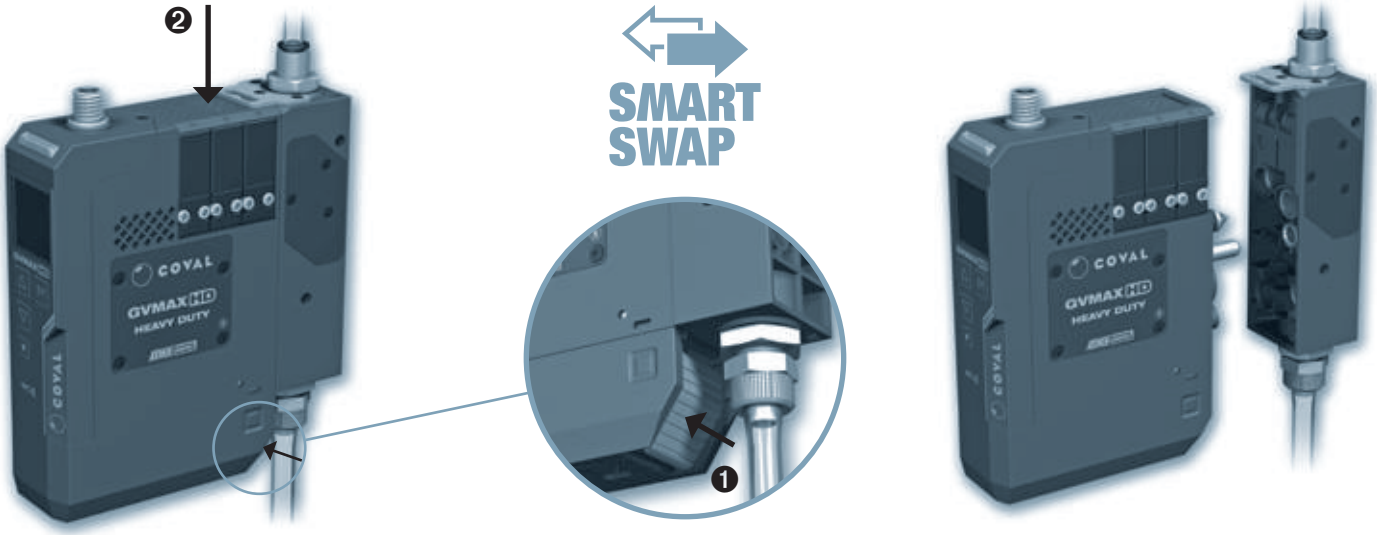
GVMAX HD

Heavy Duty Communicating Vacuum Pumps

Modularity and Maintenance

NFC
IO-Link
AIR Saving Control

SMART SWAP Quick-Mounting System



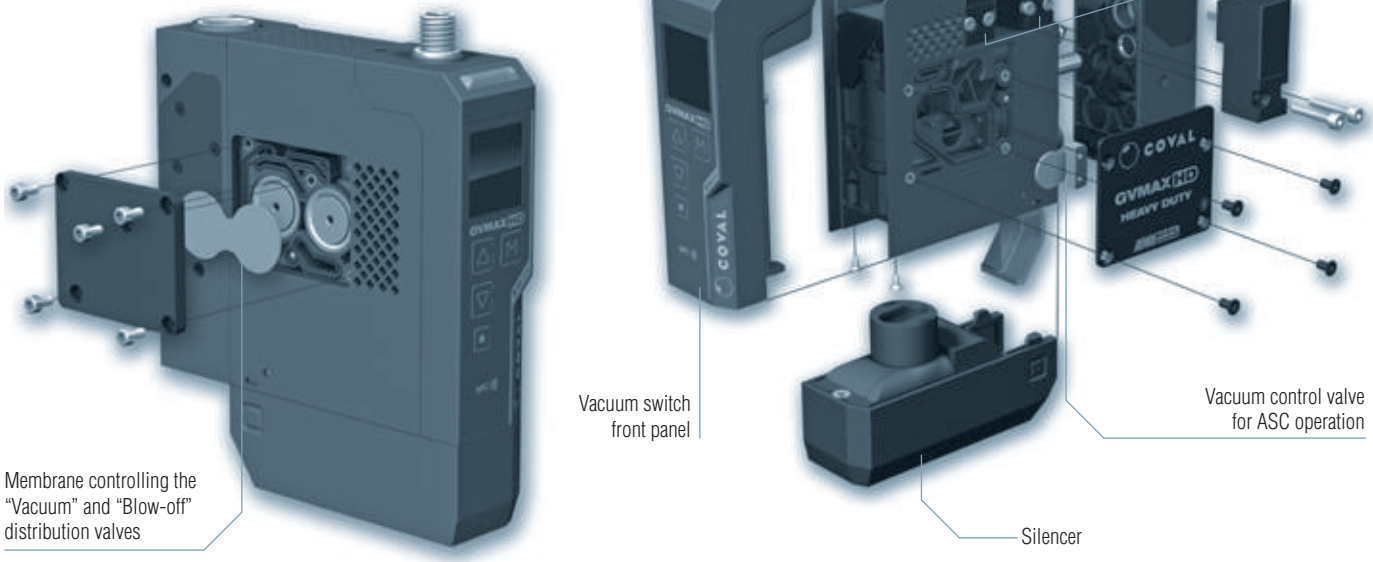
COVAL's patented SMART SWAP quick-mounting system allows you to mount the GVMAX HD module onto its pneumatic socket or remove it in the blink of an eye, without needing to disconnect compressed air and vacuum tubes.

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.



GVMAX HD

Heavy Duty Communicating Vacuum Pumps

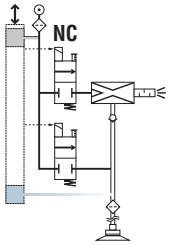
Selection guide

NFC
IO-Link
AIR Saving Control

Vacuum Control: 3 Solutions

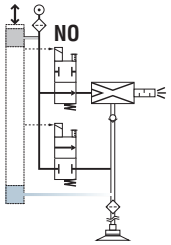
Model GVMAXHD__S: vacuum pump with **NC** vacuum control and **NC** blow-off
In the event of power failure, vacuum is no longer generated. In the event of compressed air failure, the vacuum is no longer maintained.

- 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.

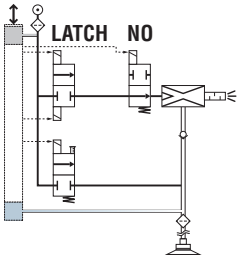
- NO vacuum control solenoid valve
- NC blow-off control solenoid valve
- Blow-off controlled by external signal



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.

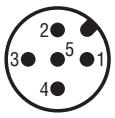


In the event of compressed air failure, the vacuum is no longer maintained.

- 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

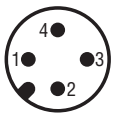


⇄	1	24 V DC
	2	24 V DC suction command (1)
⇄	3	0 V - GND
⇄	4	24 V DC object gripped DO1 - C/Q
	5	24 V DC blow-off command

▪ **C18A1**: One M12 8-pin male connector

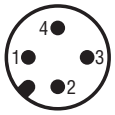
	1	24 V DC object gripped DO1
⇄	2	24 V DC
	3	/
	4	24 V DC suction command (1)
⇄	5	24 V DC ASC Status DO2 - C/Q (2)
	6	24 V DC blow-off command
⇄	7	0 V - GND
	8	/

▪ **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)



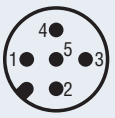
Front connector: OUT

⇄	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.

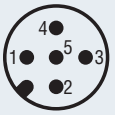
Version for use with remote HMI

▪ **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

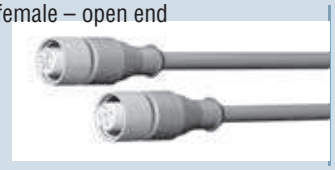
(1) *24 V DC suction command, depending on version:*
- ***S**: 24 V DC vacuum control*
- ***V**: 24 V DC vacuum off command*
- ***L**: 24 V DC vacuum control with min. pulse-triggering of 50 ms*

(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

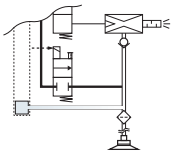
NFC
IO-Link
AIR Saving Control

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**)

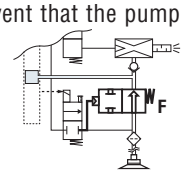
The blow-off flow is directed into the vacuum network and ensures the object is released in most applications.



- 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?

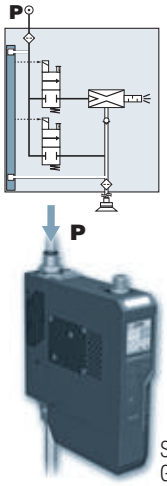
Standalone GVMAX HD vacuum pumps meet the needs of most common applications: a GVMAX HD controls one or several suction cups, which all operate according to the same sequence. Whenever several suction cups operate according to different sequences, several vacuum pumps are required. The choices are as follows:

- Several standalone pumps
- An island assembly including 1 to 4 vacuum pumps and a shared internal pressure supply

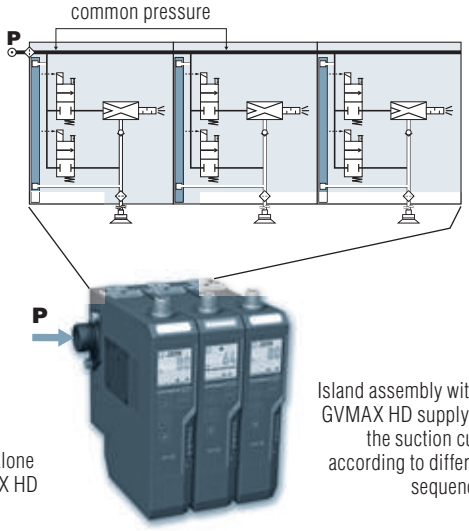
Standalone vacuum pumps are available in 2 versions:

- 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

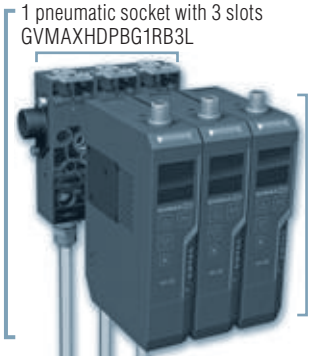


Standalone GVMAX HD



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.

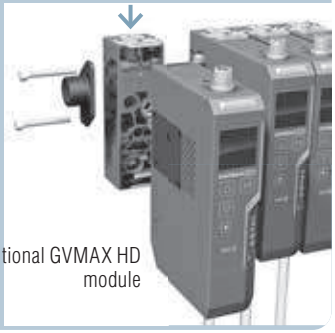
(*) Assembled pneumatic sockets are supplied as standard with the pressure connection on the left side (version L). On request, an R version with right-hand pressure connection or a T version with top pressure connection is available.

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 Choice of blow-off settings: ▪ Controlled by external signal ▪ Automatic timer from 50 to 9999 ms (advantage: saves one controller output)	S
Vacuum pump with **NO** vacuum control and **NC** blow-off ▪ Blow-off controlled by external signal	V
Vacuum pump with **pulse-triggered bistable** vacuum control and **NC** blow-off ▪ Blow-off controlled by external signal	L

BLOW-OFF

Standard blow-off	F1
Powerful blow-off *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 **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

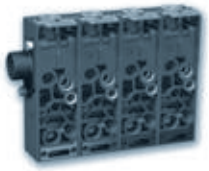
GVMAXHDPBG1RB_L sockets come assembled with the corresponding set of end pieces and the pressure connection on the left side.

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 Choice of blow-off settings: ▪ Controlled by external signal ▪ Automatic timed from 50 to 9999 ms (advantage: saves one controller output)	S
Vacuum pump with **NO** vacuum control and **NC** blow-off ▪ Blow-off controlled by external signal	V
Vacuum pump with **pulse-triggered bistable** vacuum control and **NC** blow-off ▪ Blow-off controlled by external signal	L

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 **For use with remote HMI**

BLOW-OFF

F1	Standard blow-off
F2	**Powerful blow-off** *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

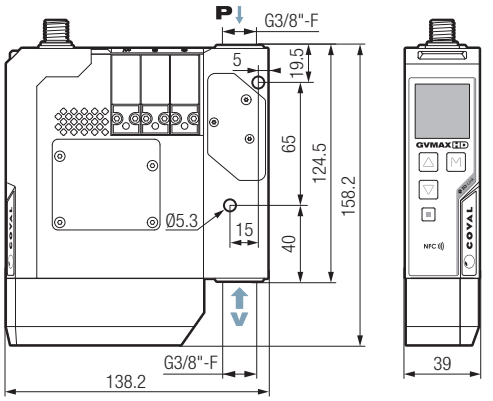
Heavy Duty Communicating Vacuum Pumps

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

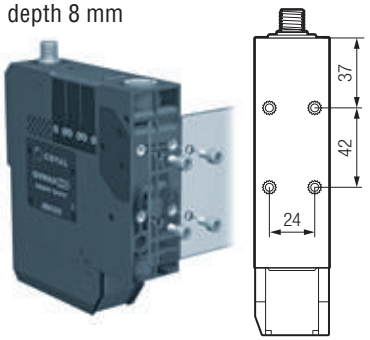
www.coval.com

3D COVAL Data

Front Panel Installation

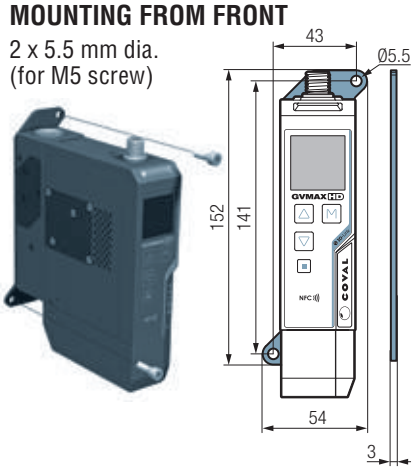
MOUNTING FROM REAR

4 x M5 screw threads, depth 8 mm



MOUNTING FROM FRONT

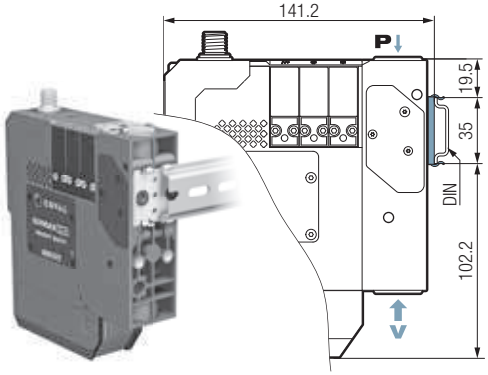
2 x 5.5 mm dia. (for M5 screw)



For front panel installation, order the following installation kit:

Part No.: **GVMAXHDFIXA**
(1 plate + 4 fastening screws)

Installation on DIN Rail



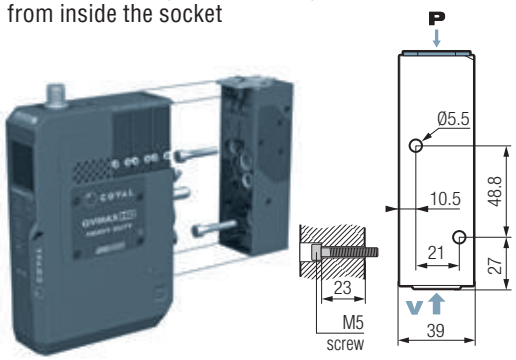
The pump can be mounted on a DIN rail for a static installation (e.g. in a cabinet).
In this case, it must be equipped with an installation clip that is to be ordered separately:

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

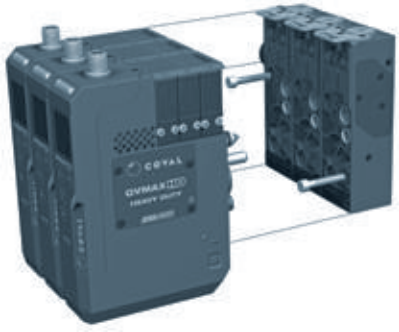
STANDALONE VERSION

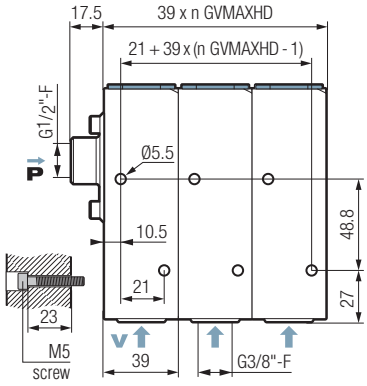
2 x 5.5 mm dia. (for M5 screws) from inside the socket



ISLAND VERSION

2 x 5.5 mm dia. (for M5 screws) from inside the socket





8

GVMAX HD

GVMAX HD

Heavy Duty Communicating Vacuum Pumps

Technical specifications

NFC
IO-Link
AIR Saving Control

- 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

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.

Industry-specific applications

Advantages

- Robust: resistant to the harsh environments of production lines
- High performance: optimized multi-stage Venturi system that guarantees powerful suction flow rates and reduced compressed air consumption.
- Modular: configurable according to needs and easy maintenance.
- Communicating: efficient communication system for all use levels, clear and easy to read HMI, NFC technology for mobile use, and IO-Link communications interface for straightforward networking.

Main Specifications (depending on version)

- 80% vacuum
- 3 powerful suction flow rates:
  - CMSHD90X50__ → 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

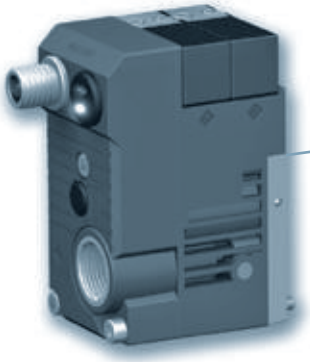
Different configurations available for the exhaust:

CMSHD____K
Silencer

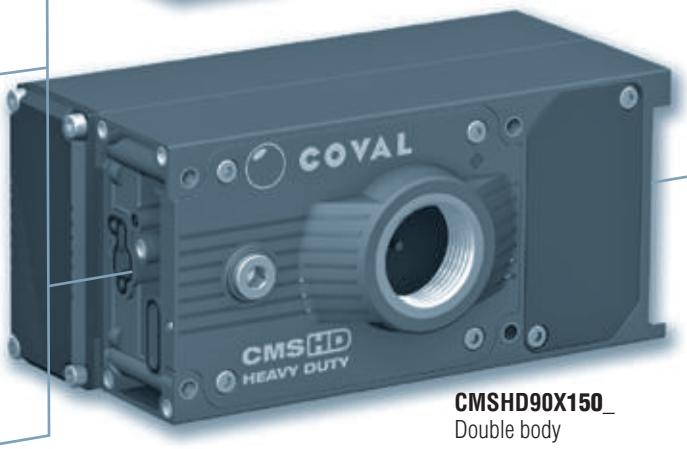
CMSHD__NVO_
Pressure connection end plate

CMSHD90X50_ / CMSHD90X100_
Simple body

CMSHD__SVO / VVO_
Control valve block for vacuum and blow-off without vacuum switch



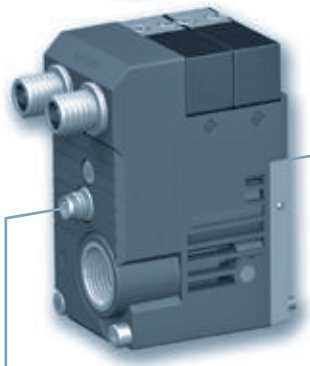
CMSHD____F
Diffuser



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

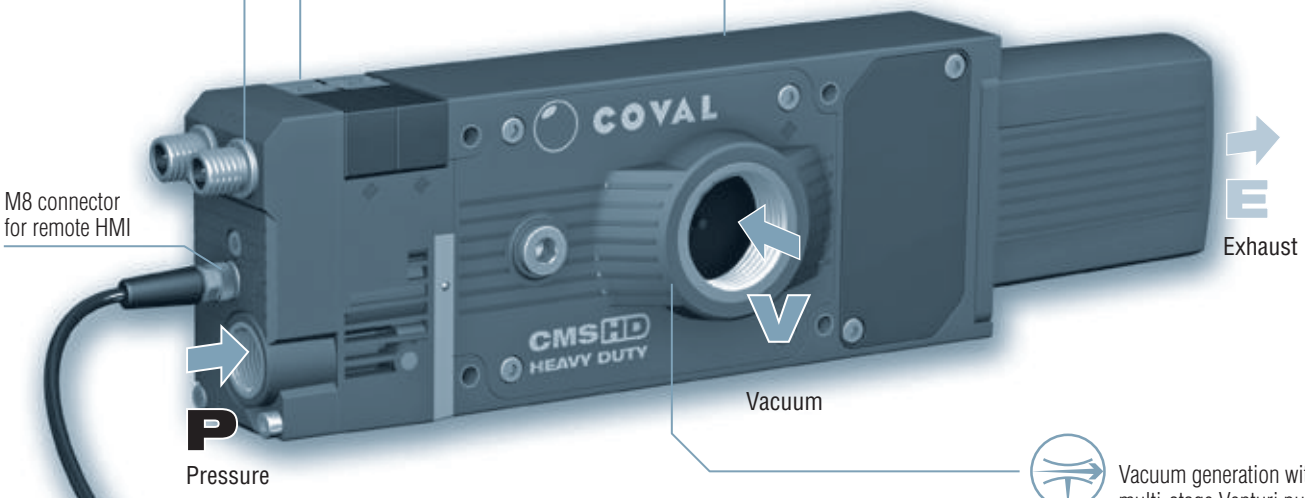
CMS HD with control and vacuum switch

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

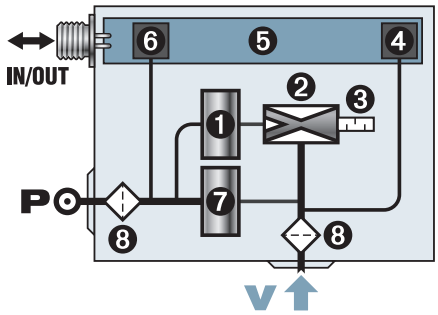
NFC

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

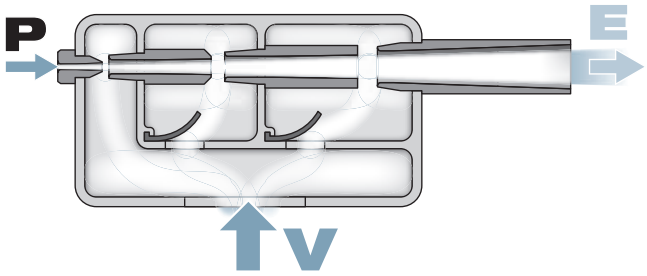


Primary Functions

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.

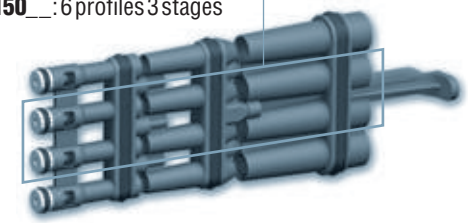


Performance Determined by CMS HD Model

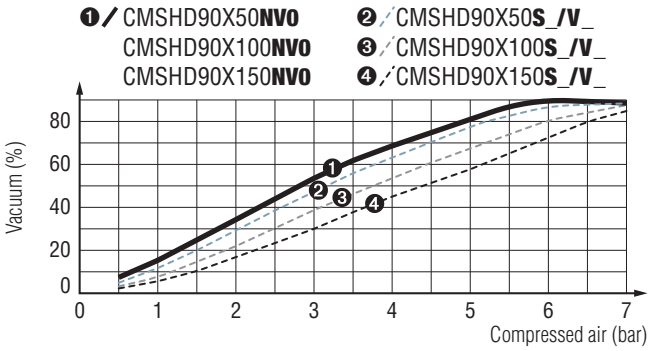
Model	Max. vacuum (%)	Air drawn in (SCFM)	Air consumed (SCFM)	Air pressure level* (bar)
CMSHD90X50	80	24.72	7.77	5.5
CMSHD90X100	80	38.85	14.83	5.5
CMSHD90X150	80	56.50	21.90	5.5

** 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**_*

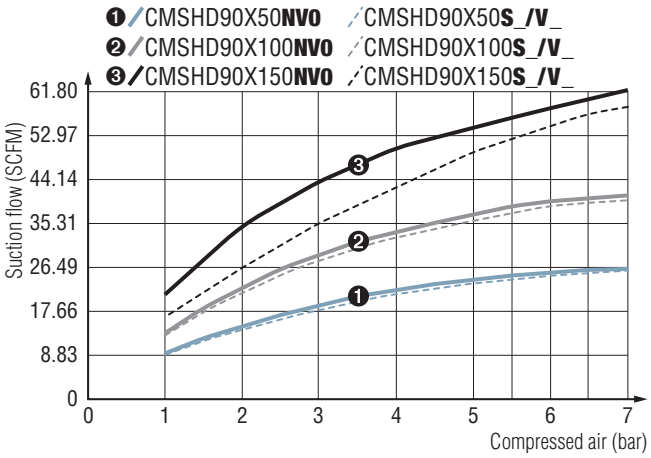
- CMSHD90X**50**__: 2 profiles 3 stages
- CMSHD90X**100**__: 4 profiles 3 stages
- CMSHD90X**150**__: 6 profiles 3 stages



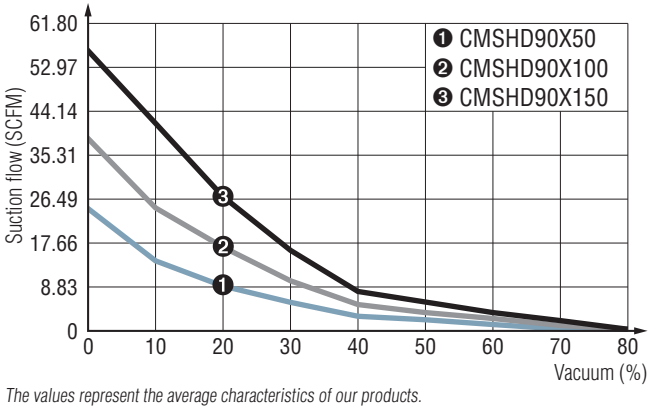
Vacuum / Compressed air



Suction flow / Compressed air



Suction Flow / Vacuum



The values represent the average characteristics of our products.

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

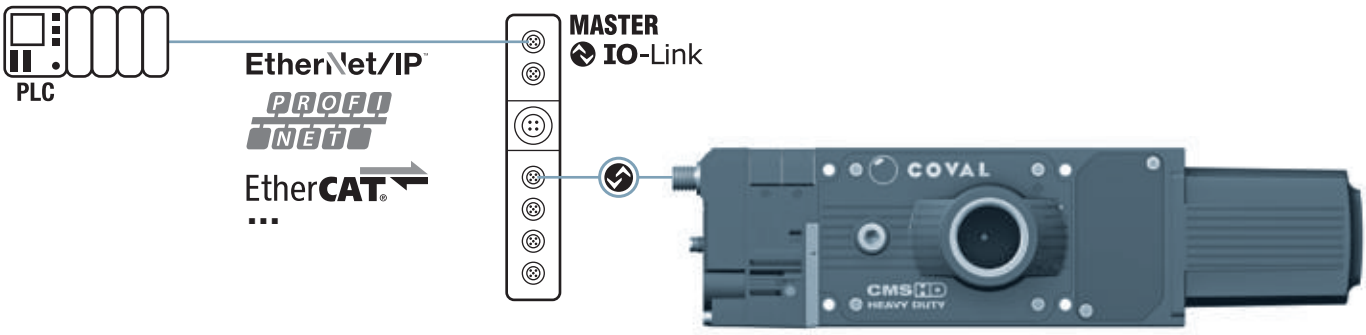
- Instantaneous vacuum level
- Object gripped and object lost information
- Alarms (high/low pressure, high/low voltage)
- Instantaneous pressure

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.

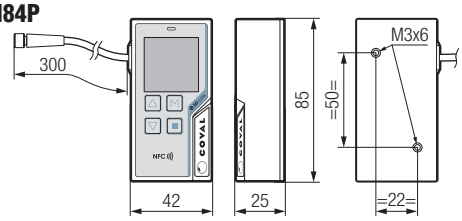
Advantages:

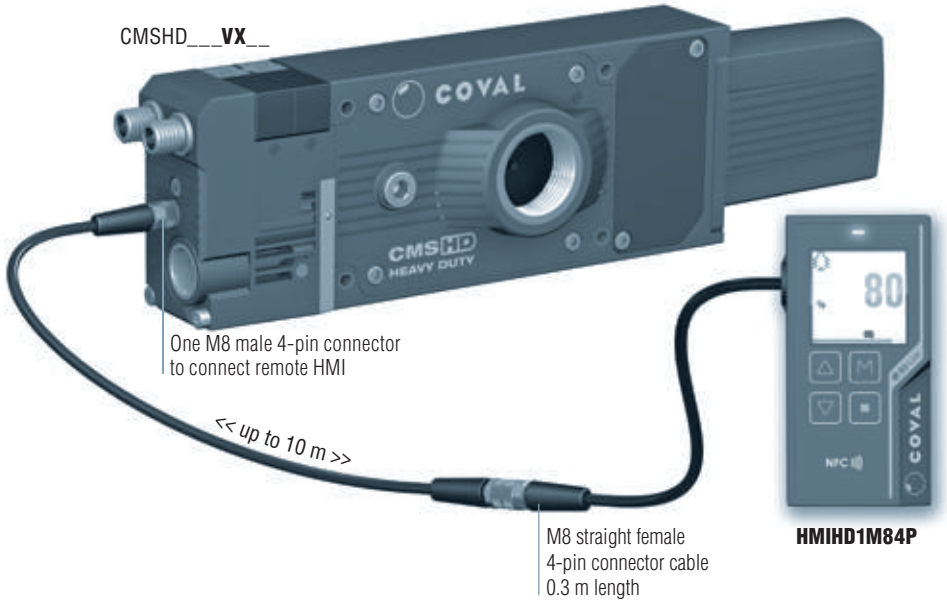
- Place the HMI in an easily accessible and visible area
- Use one HMI for several CMS HD multi-stage vacuum pumps
- Copy settings from one pump to another
- Use the CMS HD multi-stage vacuum pump without any HMI connected

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**

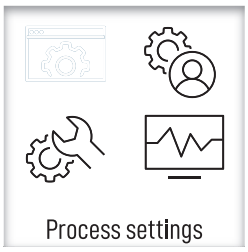


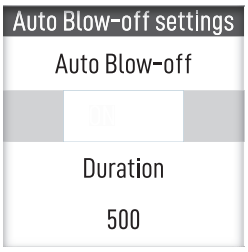


Remote HMI Dialog Front Panel

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

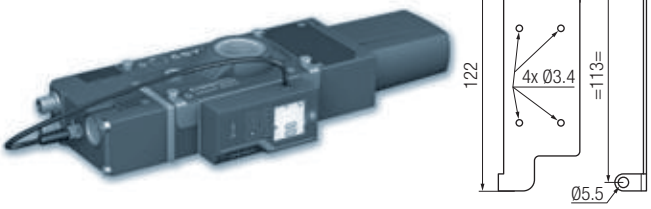
Download on the App Store

NFC APP: COVAL Vacuum Manager
Available for Android and iOS

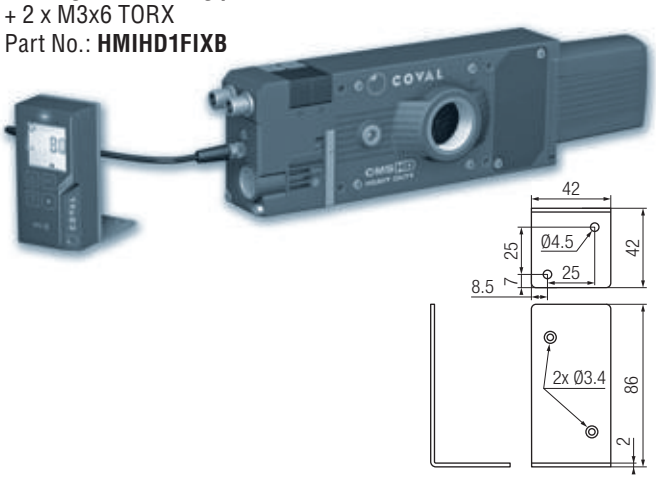
Accessories for remote HMI

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

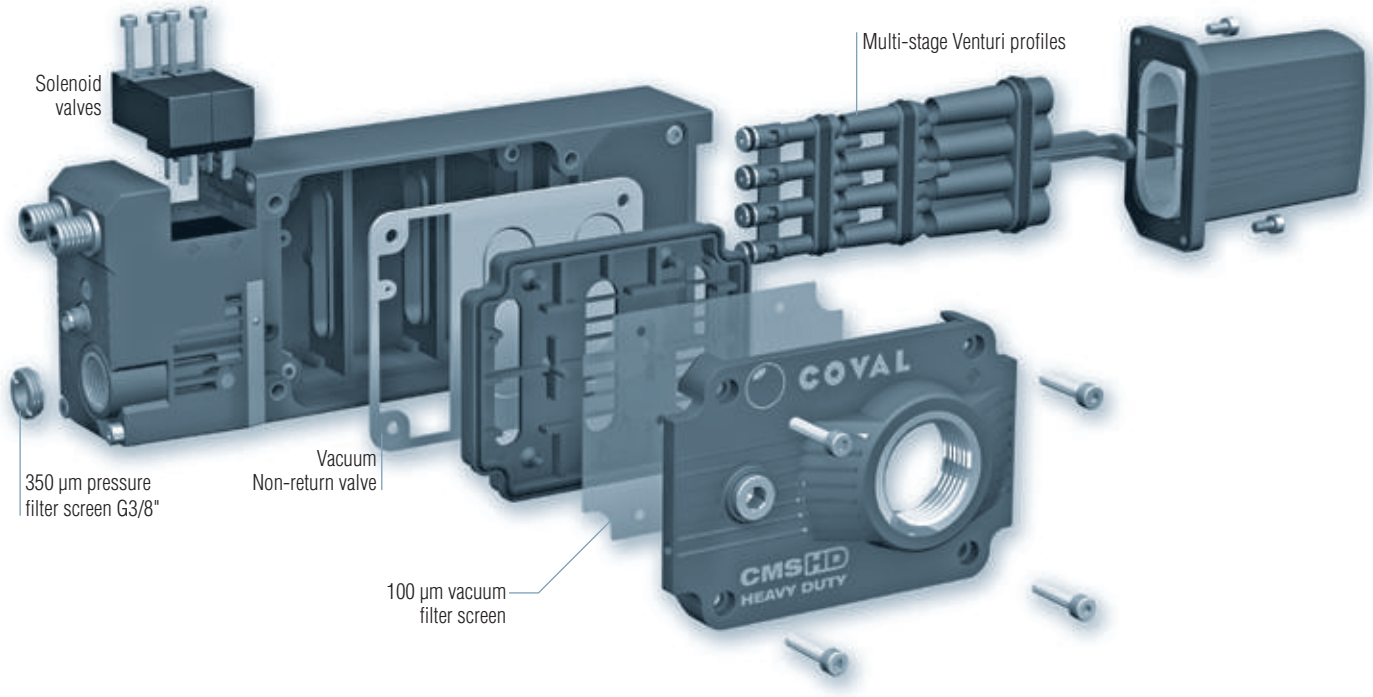
Exhaust collector
CMSHD___E version
- G1" female connection

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

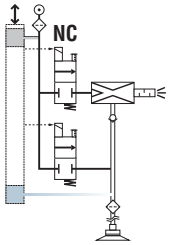
Selection guide

NFC

IO-Link

Vacuum Control: 2 Solutions

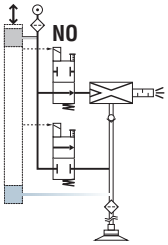
Model CMSHD__S: vacuum pump with **NC** vacuum control and **NC** blow-off control. In the event of power failure, vacuum is no longer generated. In the event of compressed air failure, the vacuum is no longer maintained.



- 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.

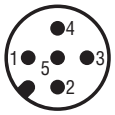


- NO vacuum control solenoid valve
- NC blow-off control solenoid valve
- Blow-off controlled by external signal

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

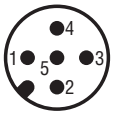
1	24 V DC object gripped DO1
2	24 V DC
3	/
4	24 V DC suction command (1)
5	24 V DC object lost DO2 - C/Q (2)
6	24 V DC blow-off command
7	0 V - GND
8	/

- 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



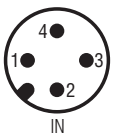
1	24 V DC
2	24 V DC suction command (1)
3	0 V - GND
4	24 V DC object gripped DO1 - C/Q
5	24 V DC blow-off command

- One M8 4-pin male connector → remote HMI

1	24 V DC
2	RS485 (DATA+)
3	0 V - GND
4	RS485 (DATA-)

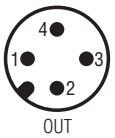
VXC24X:

- 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	V0	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:

CMSHD90X100NV0G4K

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): ▪ Controlled by external signal ▪ Automatic timer from 50 to 9999 ms (advantage: saves one controller output).	S
Vacuum pump with **NO** vacuum control and **NC** blow-off control. ▪ Blow-off controlled by external signal	V

VACUUM SWITCH / HMI		CONNECTORS	
Multi-stage vacuum pump without vacuum switch and HMI	V0	C15P	▪ One M12 5-pin male PNP
▪ Simplified CMS HD with control, without settings and dialogs ▪ Digital inputs/outputs mode (SIO)			
Multi-stage vacuum pump with integrated vacuum switch and pressure sensor, without HMI	VX	C15X	▪ One M12 5-pin male configurable as PNP or NPN ▪ One M8 4-pin male for remote HMI
▪ Electronic vacuum switch ▪ Digital Output DO1 "object gripped" 24 V DC / NO ▪ Digital input/outputs mode (SIO) / IO-Link ▪ Compatible with remote HMI			IO-Link
		C18X	▪ One M12 8-pin male configurable as PNP or NPN ▪ One M8 4-pin male for remote HMI ▪ Digital Output DO2 configurable 24 V DC / NO
			IO-Link
		C24X	▪ Two M12 4-pin male configurable as PNP or NPN ▪ One M8 4-pin male for remote HMI ▪ Digital Output DO2 configurable 24 V DC / NO
			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 **V0** 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

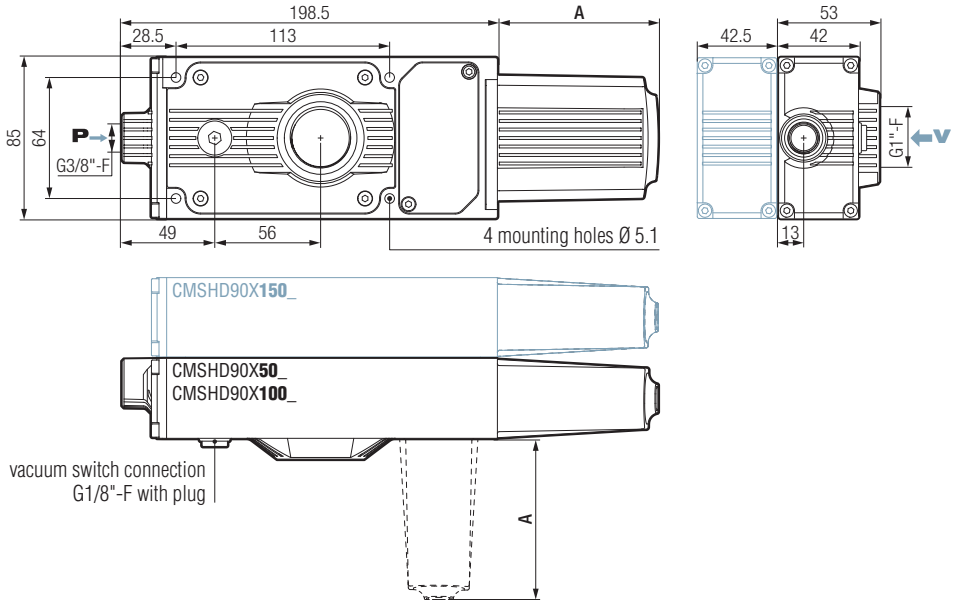
Heavy Duty Multi-stage Vacuum Pumps

Dimensions

NFC

IO-Link

CMS HD Without Control

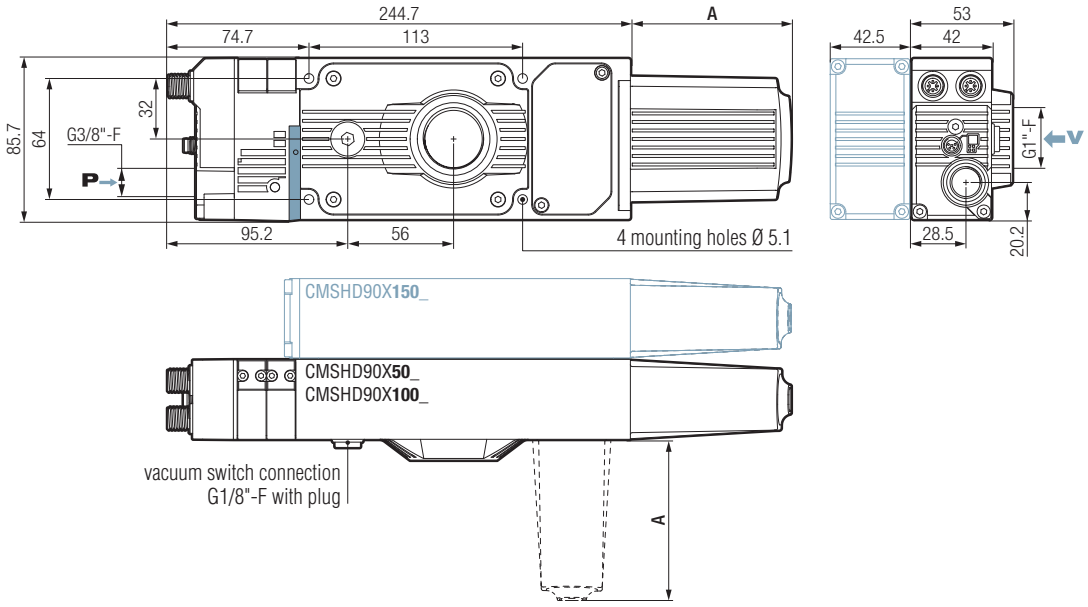


Note: all dimensions are in mm.

3D COVAL Data

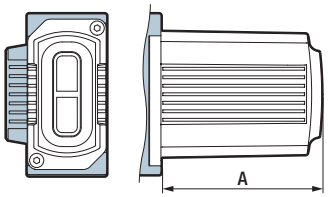
You can access 3D files of all our products in formats compatible with the main CAD software on our website **www.coval.com**

CMS HD With Control

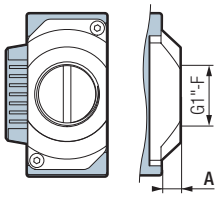


Exhaust Options

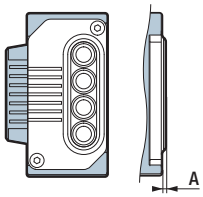
Through-type silencer
CMSHD___**K** version



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

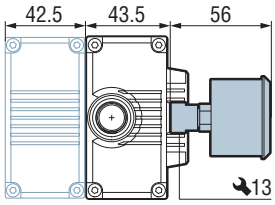
- COVAL VACUUM MANAGER Mobile app available:
  - Android, version 8.1 and higher
  - iOS, version 13 and higher

NFC
IO-Link

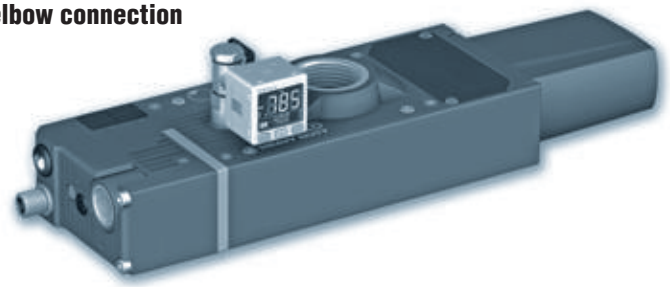
To visualize the vacuum level

Vacuum gauge Ø 40 mm
Part No. VAF11140RDM18G

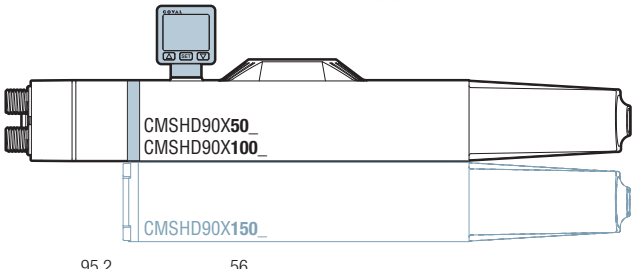
- Damping: by silicone movement (patented).
- Measuring: Bourdon tube in CuSn.
- Precision: cl. 2.5 (+/- 2.5% of max. scale value).
- Frame: black ABS
- Vacuum connection: G1/8"-M

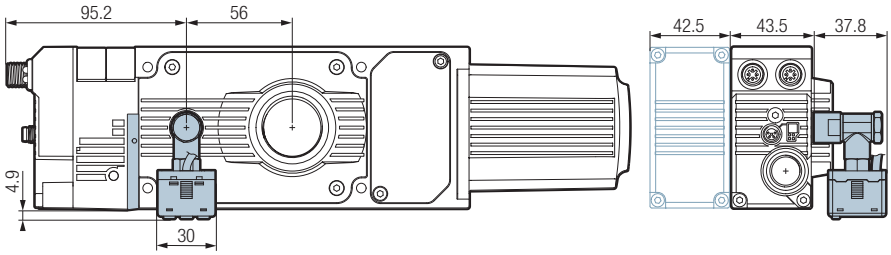


Electronic vacuum switch with 3-color display with adjustable elbow connection
Part No. PSD100CPNPRCOM18G



- 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

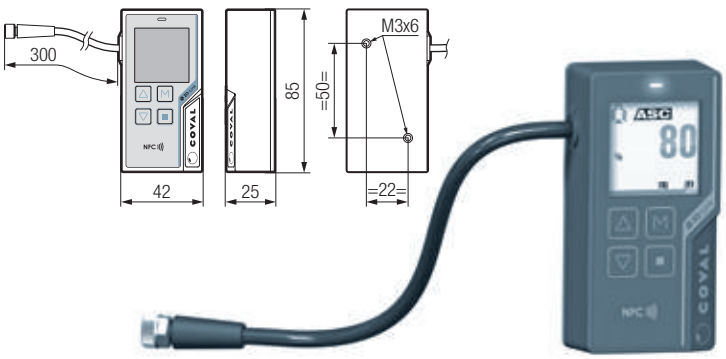




Remote HMI

(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

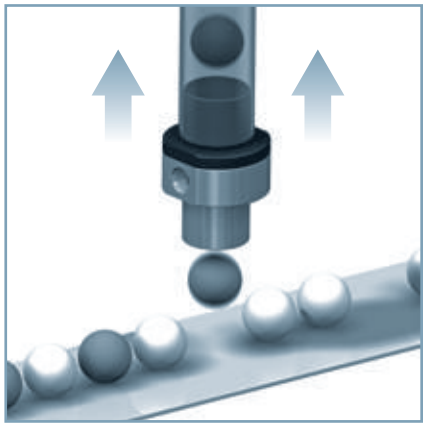
P 9/6

Air Amplifiers

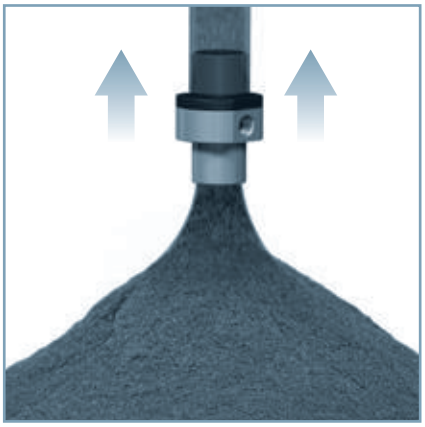
Applications

BLOW-OFF, CLEANING, WASTE SUCTION

SORTING BY WEIGHT

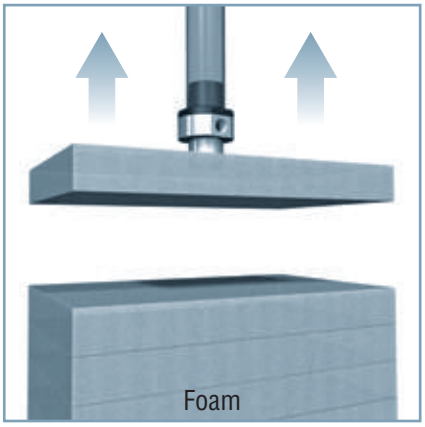


TRANSPORT OF GRANULES (rice, grains of wheat or coffee, etc.)



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.

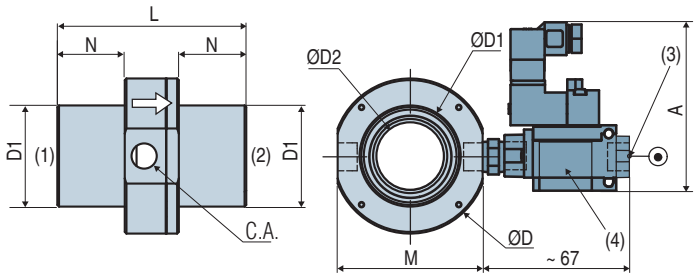
- Gripping of very porous, lightweight products: foam, carpet, cakes, leather, etc.
- Transport of powdery materials: powders, granules,etc.
- Transporting small, lightweight objects: paper clips, rice, coffee, etc.
- Smoke evacuation, chamber depressurization, etc.

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).



(1) Suction
(2) Discharge
(3) G1/4"-F
(4) Control valve, optional. Note: the valve is incompatible with the M40C model.
A = 77 mm for an AP2 valve + DIN connection (connector supplied)

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

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	**P1**	Pneumatic
	10 C	10 mm	**AP214**	C.A. control valve	**E1**	24 V DC DIN
	20 C	20 mm				
	30 CV	30 mm				
	40 CV	40 mm				

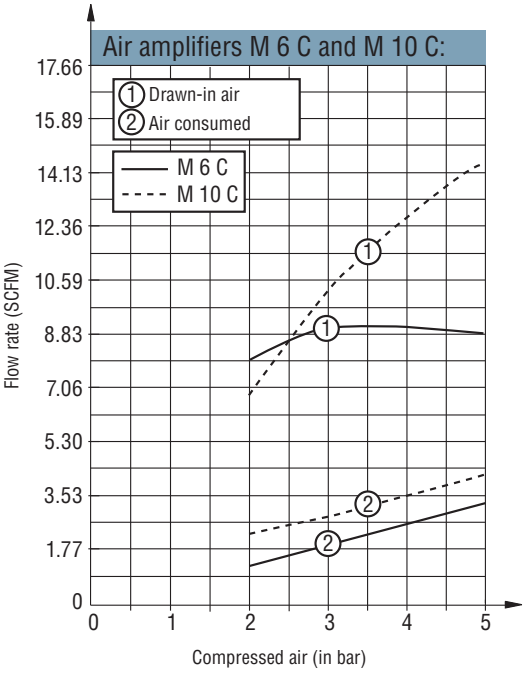
M--C
Air Amplifiers
Performance Curves

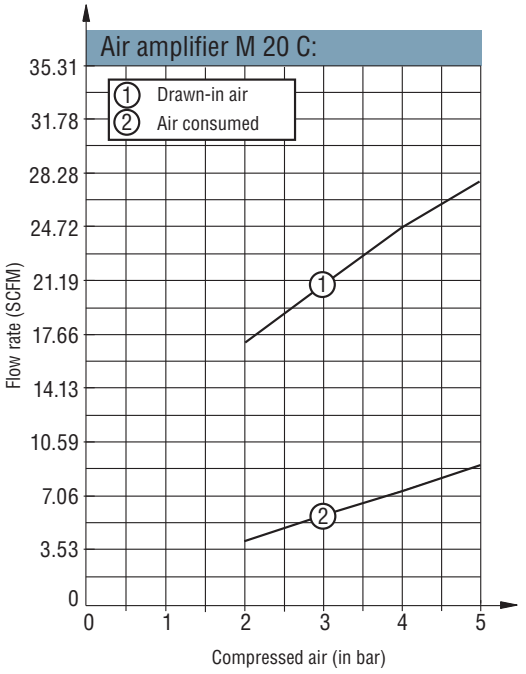
Maximum Vacuum / Supply Pressure

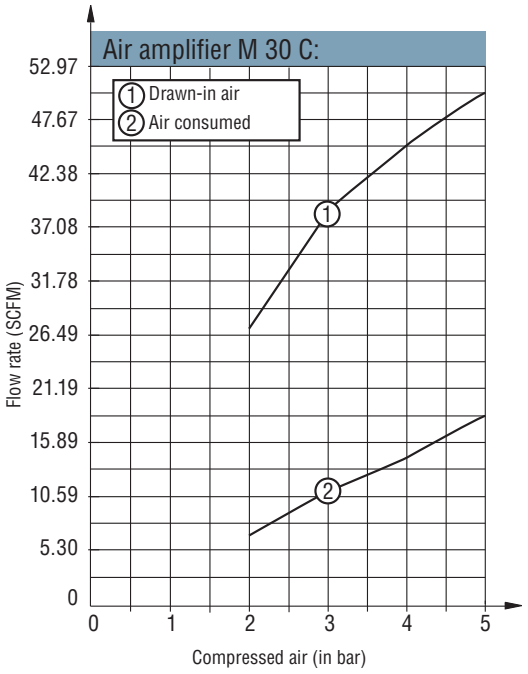
	Supply pressure / Maximum vacuum (in Bar) (in mm CE)			
	2	**3**	**4**	**5**
M 6 C	900	1500	2000	2600
M 10 C	200	500	700	1000
M 20 C	207	310	400	510
M 30 CV	90	130	220	280
M 40 CV	140	200	284	360

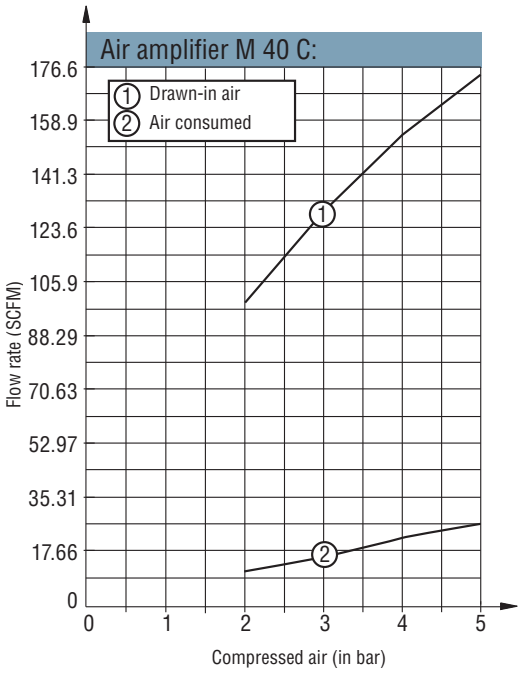
Maximum Overpressure / Supply Pressure

	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

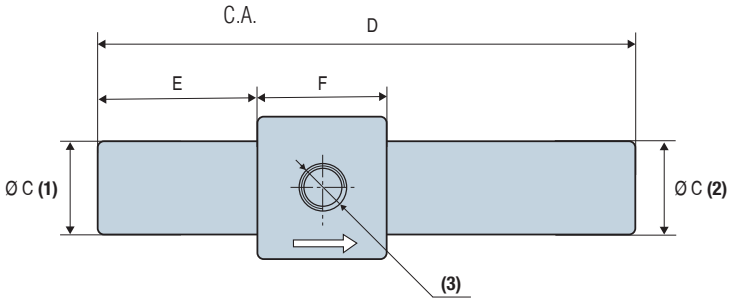
Pressure (bar)	Level of vacuum (%)	Suction rate: (SCFM)	Consumption (SCFM)
3	6.1	71.16	16.88
4	8.7	77.69	21.68
5	10.9	83.69	25.92

Characteristics MD38X6C

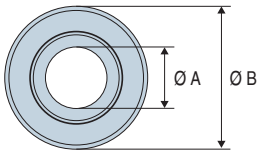
Pressure (bar)	Level of vacuum (%)	Suction rate: (SCFM)	Consumption (SCFM)
3	2.7	123.60	16.88
4	4	140.38	21.68
5	5	154.33	25.92

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



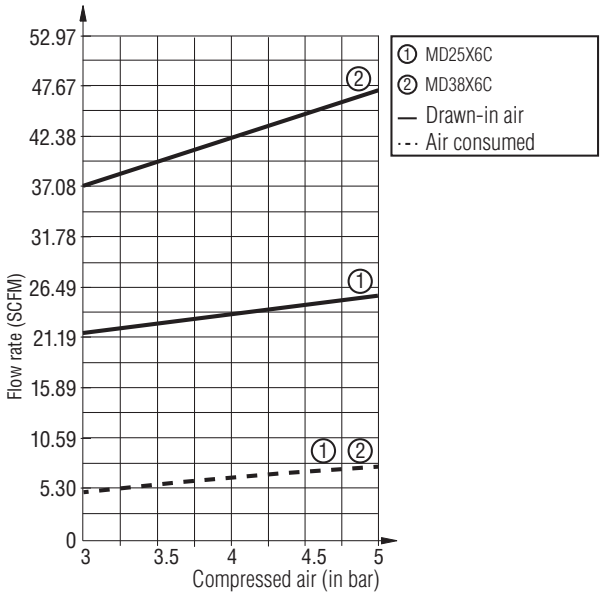
(**1**) Suction
(**2**) Discharge
(**3**) Pressure connection G3/8"-F



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	

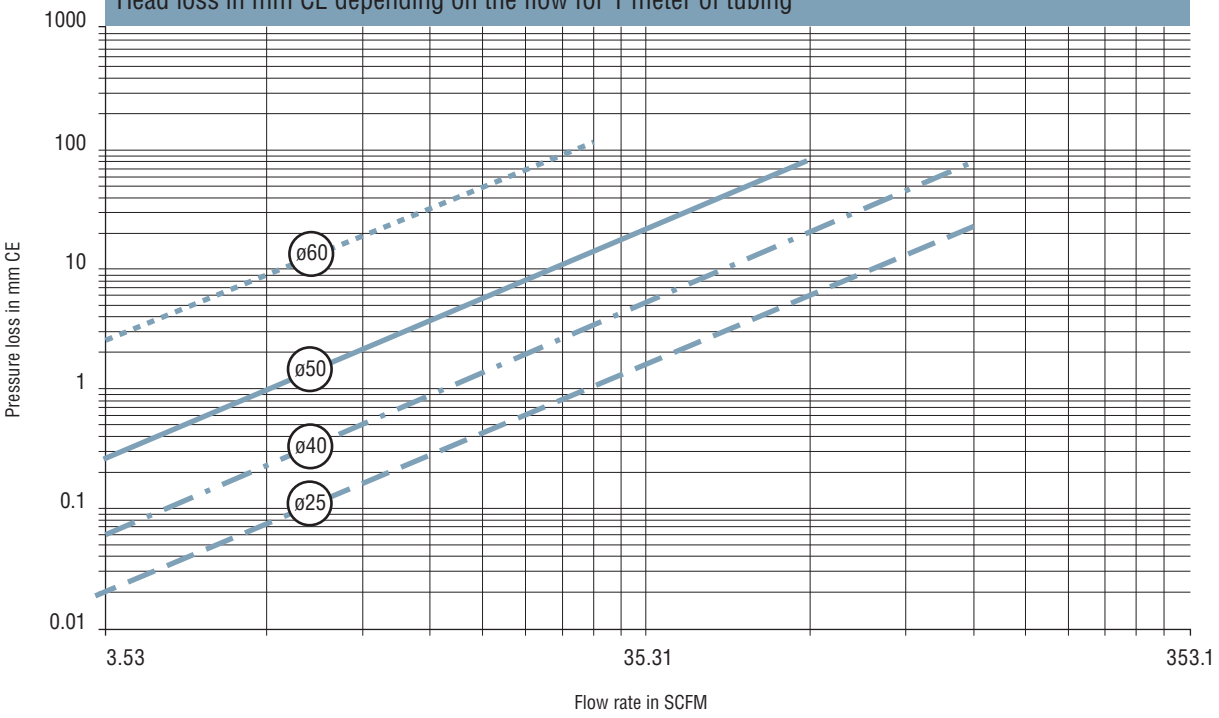
TVM
Pipes for Air Amplifiers

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

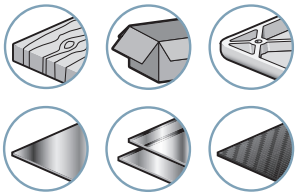
- Flow rate up to 735.7 ft³/min
- Maximum vacuum: -410 mbar absolute
- Available:
  - 50 and 60 Hz
  - Single-stage and two-stage
- Wide range of vacuum to meet specific applications
- Vibration-free
- Maintenance-free: self-lubricated bearings, contactless impeller

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 60	2.4 2.8	85	0.18 0.216	2800 3360	175-260/300-450 202-300/350-520	1.08/0.62 1.08/0.62	G1/4"-F	59 61	7
PVS8M1	50 60	4.7 5.3	85	0.35 0.42	2700 3200	230 +/-10%	3.9 3.4	G3/8"-F	58 61	9.5
PVS8T3	50 60	4.7 5.3	85	0.37 0.44	2800 3150	175-260/300-450 202-300/350-520	2.35/1.35 2.4/1.4	G3/8"-F	58 61	9.5
PVS10M1	50 60	5.9 7	85	0.37 0.44	1380 1630	230 +/-10%	3.0 3.4	G1/2"-F	60 62	16
PVS10T3	50 60	5.9 7	85	0.37 0.45	1420 1700	175-260/300-450 202-300/350-520	2.3/1.33 2.35/1.36	G1/2"-F	60 62	16
PVS16M1	50 60	9.4 11.2	85	0.55 0.66	1360 1600	230 +/-10%	4.6 5.2	G1/2"-F	61 64	22.5
PVS16T3	50 60	9.4 11.2	85	0.55 0.70	1420 1700	175-260/300-450 202-300/350-520	3.8/2.2 3.9/2.25	G1/2"-F	61 64	22.5
PVS25M1	50 60	14.7 17.6	85	0.80 1.00	1350 1600	230 +/-10%	6.4 7.2	G3/4"-F	62 67	29
PVS25T3	50 60	14.7 17.6	85	0.75 0.90	1430 1690	190-255/330-440 190-290/330-500	3.9-4.85/2.25-2.8 4.65-4.25/2.7-2.45	G3/4"-F	62 67	29
PVS40M1	50 60	23.5 28.2	85	1.10	1350 1620	230 +/-10%	7.6 7.3	G3/4"-F	67 72	41
PVS40T3	50 60	23.5 28.2	85	1.25 1.50	1430 1680	190-255/330-440 190-290/330-500	5.2-6.2/3.0-3.6 6.9-5.7/4.0-3.3	G3/4"-F	67 72	41
PVS55T3	50 60	32.4 38.8	90	2.2 2.6	1440 1705	Δ230/Y400	8.2/4.8 9.0/5.2	G1"-F	71 73	76
PVS100T3	50 60	57.7 65.9	90	3.0 3.6	1445 1705	Δ230/Y400	12.1/7.0 12.7/7.4	G1" 1/2-F	75 77	100

Version M1: Single phase (1~)
Version T3: Three-phase (3~)

Specifications

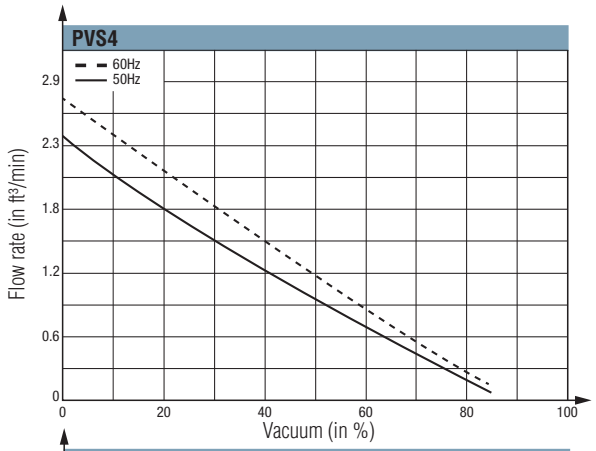
Electrical protection level	PVS4 to 40 : IP54 PVS55 and 100 : IP55
Protection class	ISO F
Materials	Steel, aluminium, polyethylene, carbone
Ambient temperature:	From 41°F to 113°F

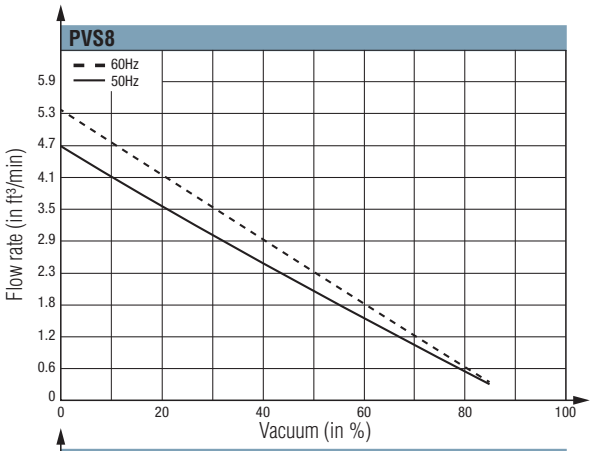
PVS

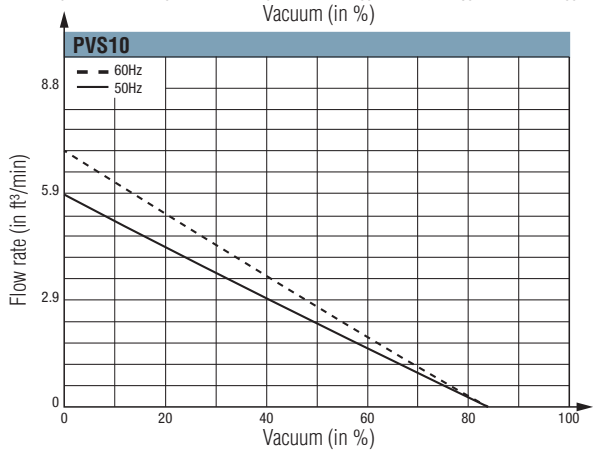
Dry vane vacuum pumps

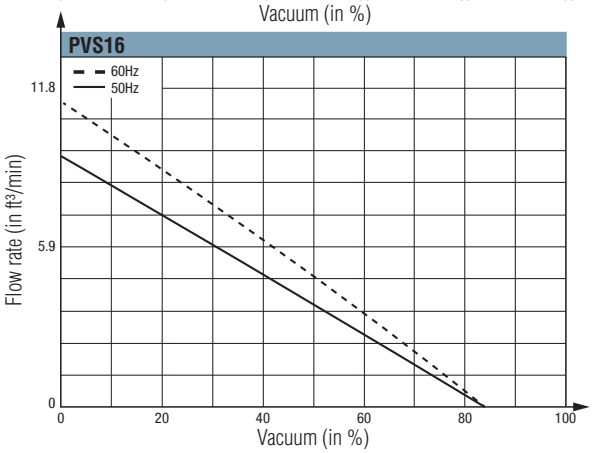
Curves

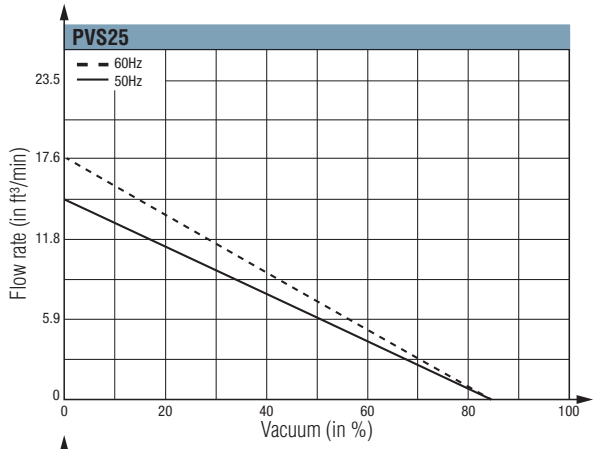
Flow rate (ft³/min) / Vacuum (%)

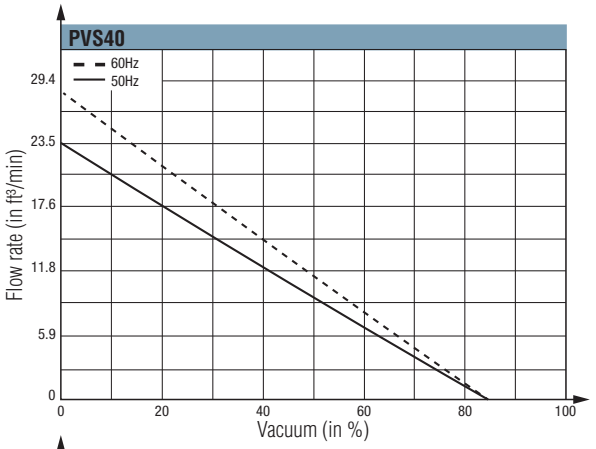


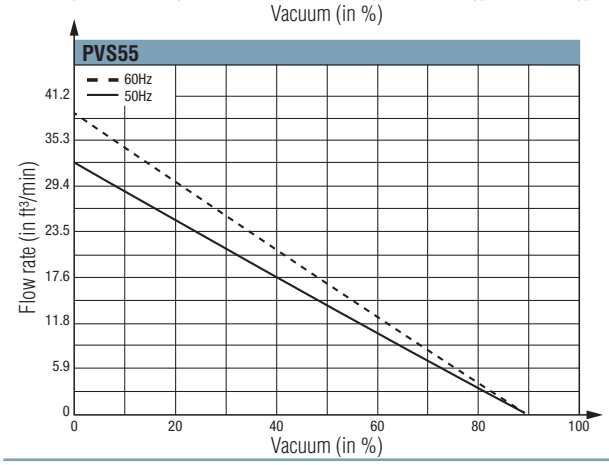


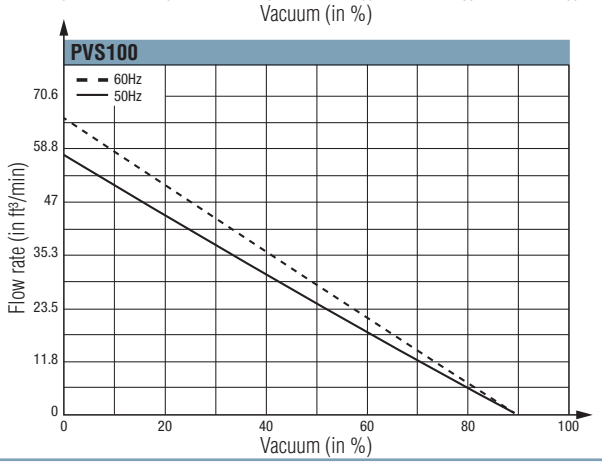








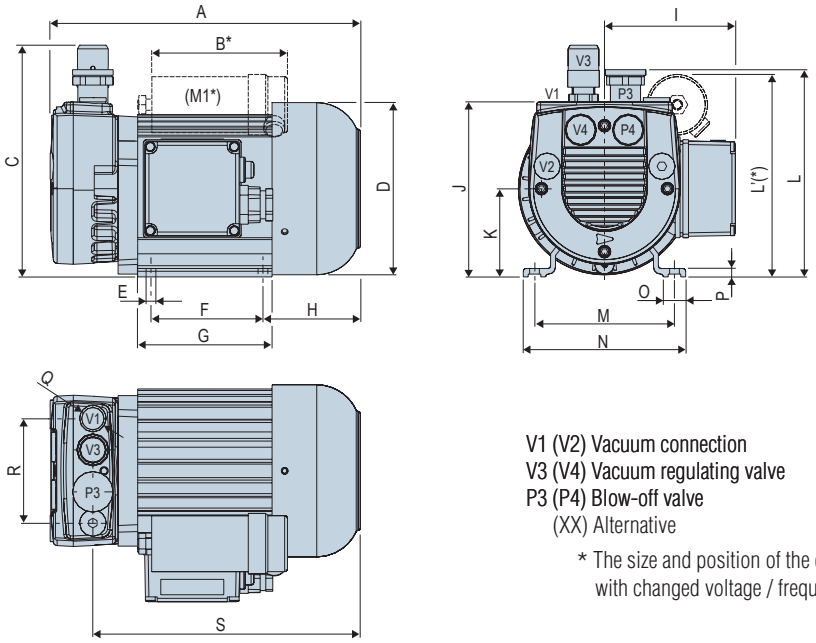




PVS

Dry vane vacuum pumps

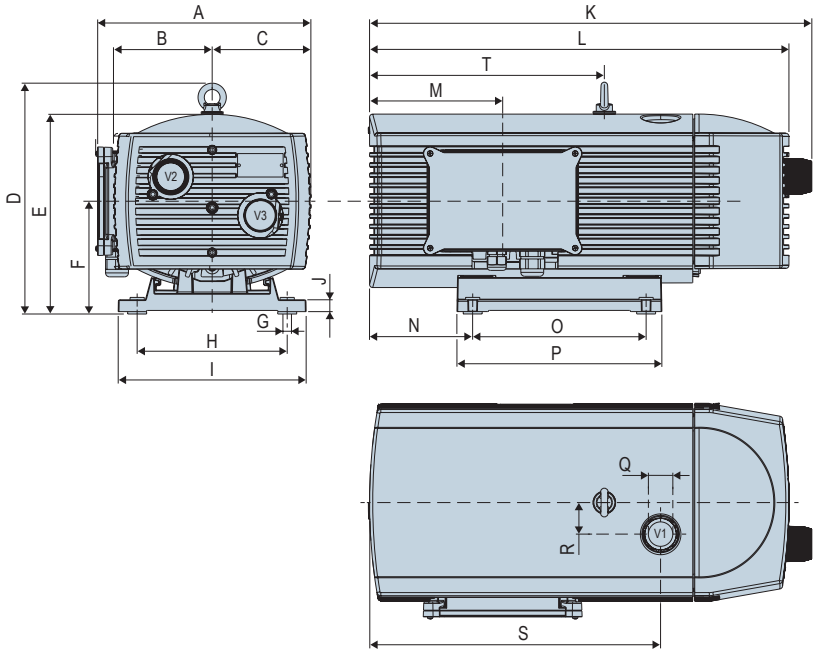
Dimensions



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

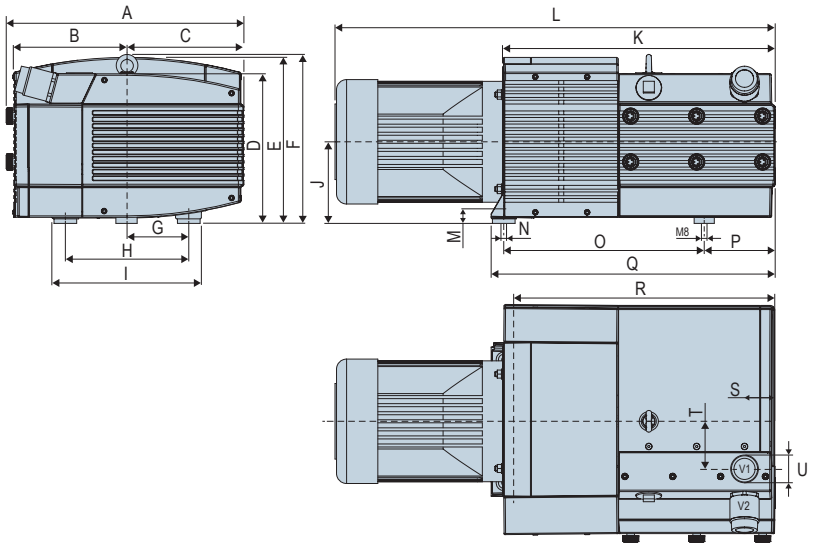
Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
PVS10	206	90	90	-	189	107	7	112	142	15	429	387	123	106	160	200	G1/2"-F	35	257	-
PVS16	231	102.5	102.5	-	205	113	7	125	155	15	452	416	151.5	73	202	242	G1/2"-F	35	291.5	263
PVS25	260	125	125	293	253	143	7	190	238	15	505	465	161.5	96	220	260	G3/4"-F	40	302	263
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

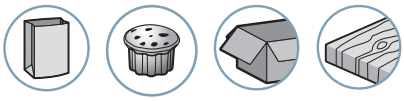
Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
PVS55T3	353	195	141	289	312	328	95	190	250	162	415	704	30	12	326	96	448	397	46	85	G1”-F
PVS100T3	470	223	230	297	330	336	122.5	245	295	162	539	843	30	12	398	140	563	501	60	95	G1/2”-F

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]	(g)
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

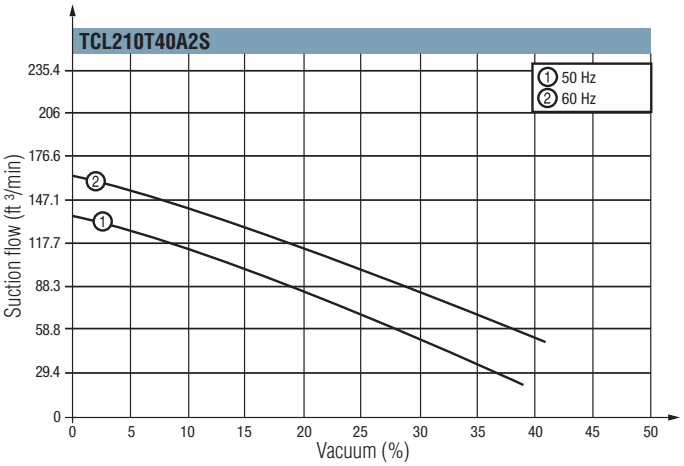
Specify the part number: TCL210T40A2S
Please refer to the characteristics table above

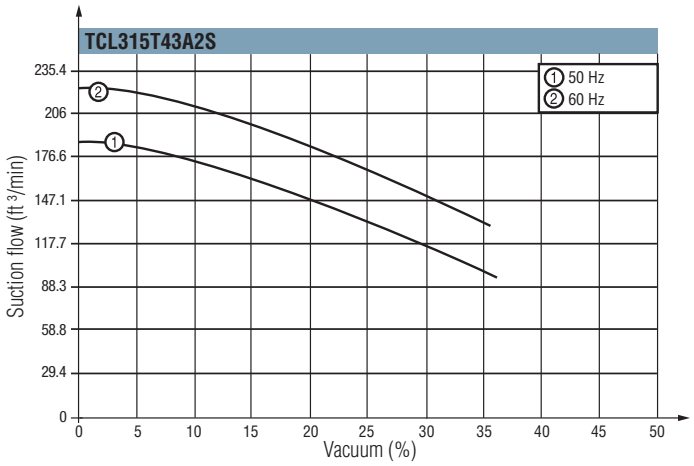
Accessories on demand:
- Safety valve
- Reversing valve
- Sound proofingbox

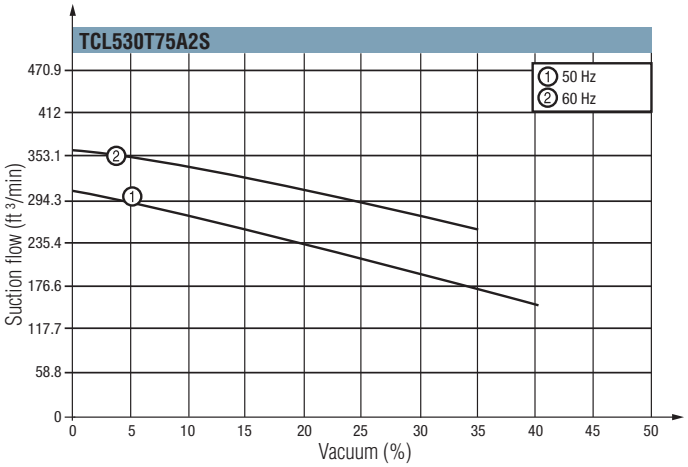
Side-channel Blowers, single-stage and two-stage

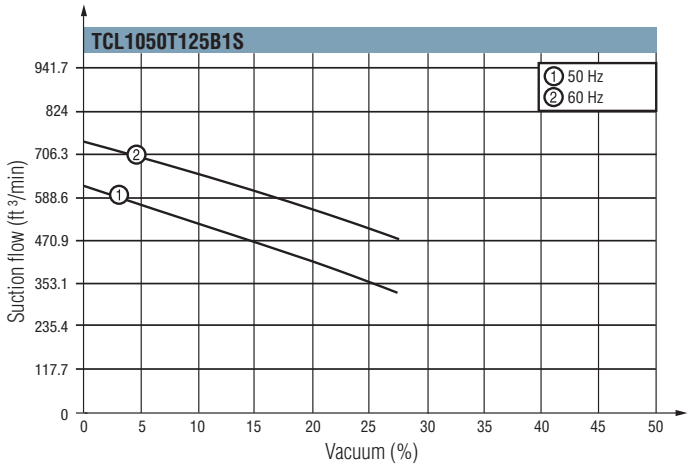
Curves

Suction flow (m³/h) / Vacuum (%)





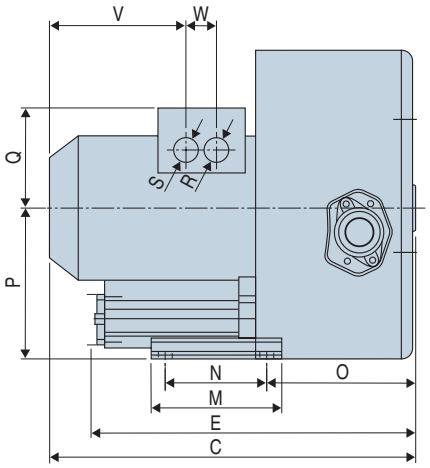


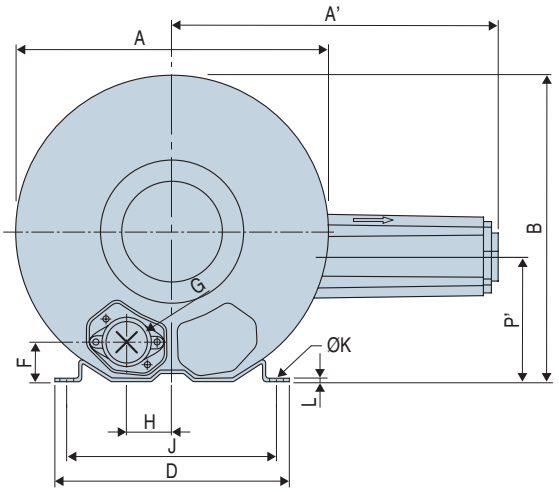


Curves are valid for continuous operation; medium: air at 59°F, measured at inlet port and atmospheric back pressure of 1013 hPa (mbar abs.), Tolerance: ± 10%; ambient temperature : -77°F to +104°F

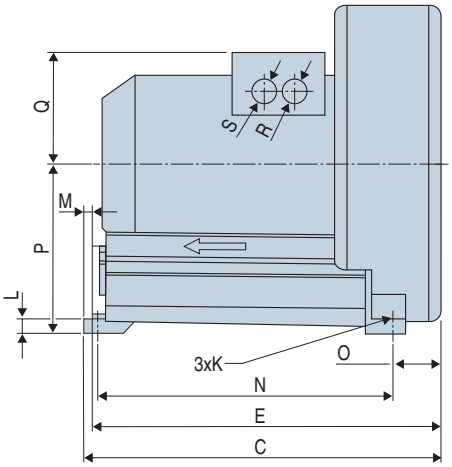
Side-channel Blowers, single-stage and two-stage

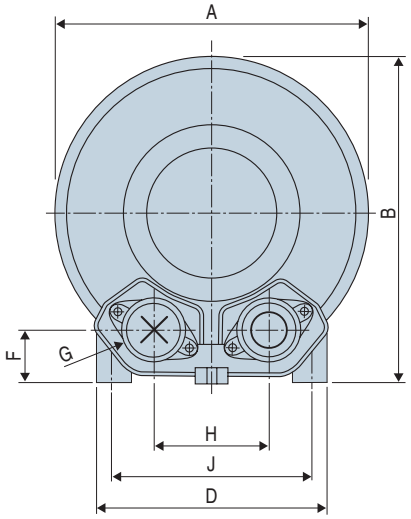
Dimensions





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

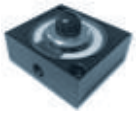
FVUM FVUG

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.

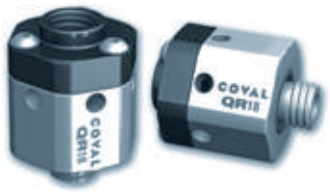
Advantages

- 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

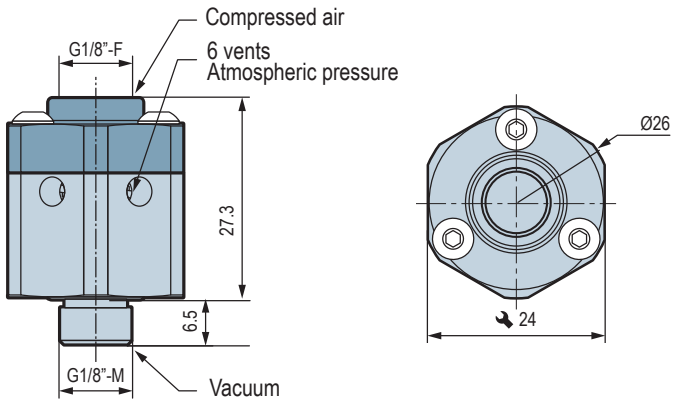
Specifications

Model	Fitting	(g)
QR18	G1/8"	35

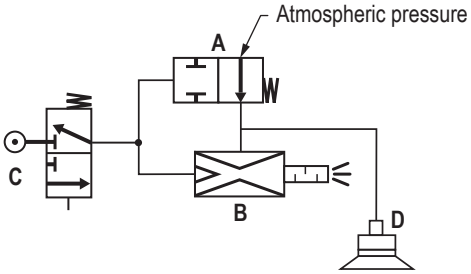
- Pressure connection by G1/8" female fitting
- Connection to vacuum network by G1/8" male thread
- Operating pressure: 2 to 7 bar
- Release rate to atmosphere: about 5.30 SCFM
- Nominal diameter : 4mm
- Materials : aluminium, nitrile (NBR), brass, steel
- Operating temperature : 32 to122°F



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

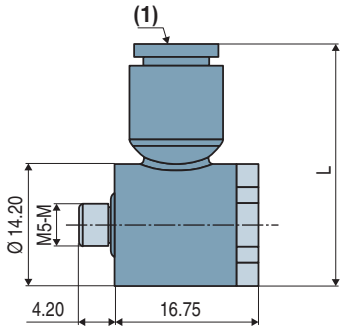
- Allows blow-off on VR or any other M5 fitting
- Reduces cycle times
- Avoids using a vacuum-proof distributor.

Technical Characteristics

Model	Push fitting	L
MS2M5	Ø 2.7x4	25.8
MS4M5	Ø 4x6	28.10

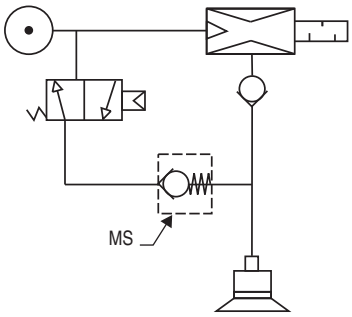
- Pressure connection by push fitting for Ø 4x6 or 2.7x4 tube
- Connection to the vacuum network by M5 male threaded fitting
- Blow-off flow rate at 5 bar: 3.53 SCFM
- Materials: polyamide PA 6.6 + brass (CuZn) + nitrile (NBR)

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.

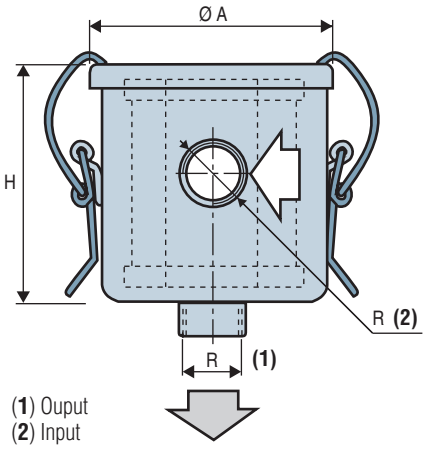
Important: These filters are designed for vacuum. They cannot withstand pressure greater than atmospheric pressure.

Filter cartridge available in 3 versions: paper, polyester and stainless steel.

Characteristics

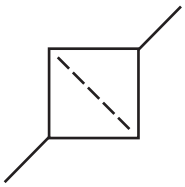
Models	A	H	R	Flow rate (SCFM)	Weight (g)
FVI 38	79	76	G3/8"-F	14.13	270
FVI 12	101	86	G1/2"-F	21.19	600
FVI 34	101	86	G3/4"-F	21.19	600
FVI 114	135	96	G1"1/4-F	49.44	1050
FVI 114 G	173	156	G1"1/4-F	84,75	1850
FVI 2	201	258	G2"-F	176.6	3900

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



FVI

11

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)

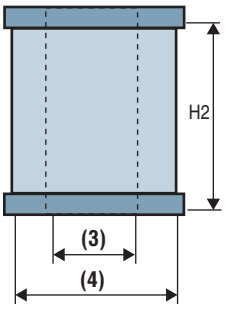
Accessories

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

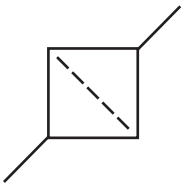
Note: all dimensions are shown in (mm)

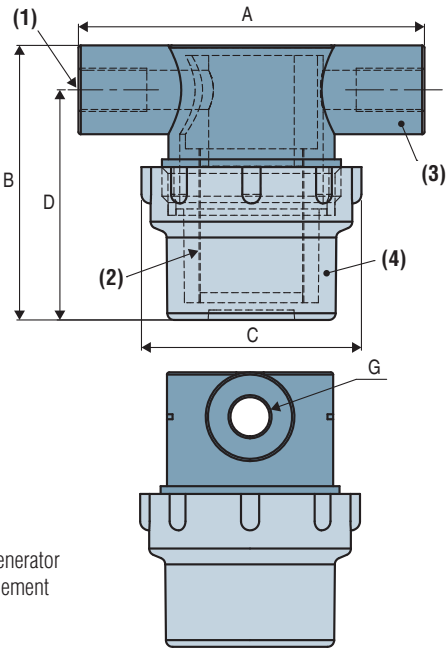
Operating range

■ - 1 to 10 bar

Specifications

Body material	High: nylon 6.6 Tank: transparent polyamide
Filtration	Two options available: 50 micron stainless steel grill 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		

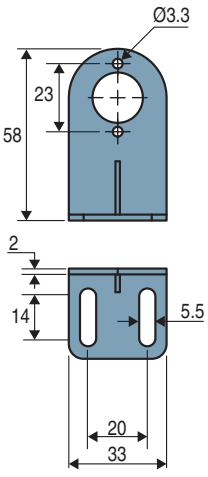
To order a replacement filtering element, please specify:
e.g. : FVUM12E

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)

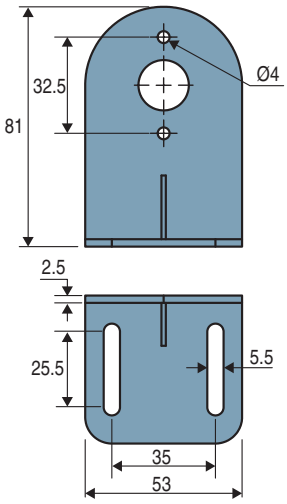
Mounting bracket for vacuum filter

Model	Designation	Material
FVUFIXM	Mounting bracket for filter FVUM	Stainless steel
FVUFIXG	Mounting bracket for filter FVUG	Stainless steel

FVUFIXM

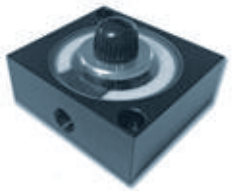


FVUFIXG



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

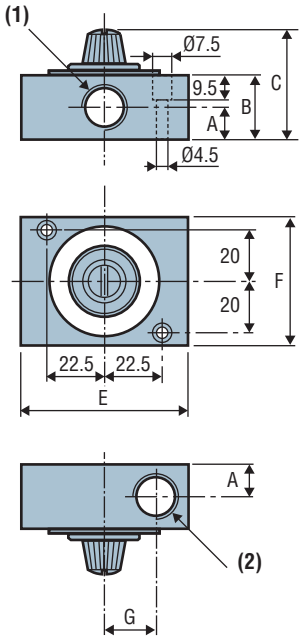
Models	Vacuum pumps
FVG 3	GVP 10 - VR 07 - VR 09
FVG 5	GVP 12 and 14
FVG 6	GVP 20

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)

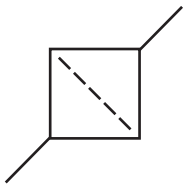
FVG 3/5/6



(**1**) D1 (input)
(**2**) DE (Output)

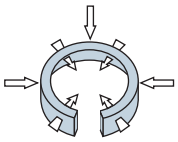
Specifications

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 Hood : Polycarbonate Seal : Nitrile (NBR) Screws / large washers : Polyethylene and plated steel Filter : Porex



Accessories

Replacement cartridges: interchangeable filtration element.
Add E to the filter model reference to order the replacement cartridge.



Filtration angle 300°

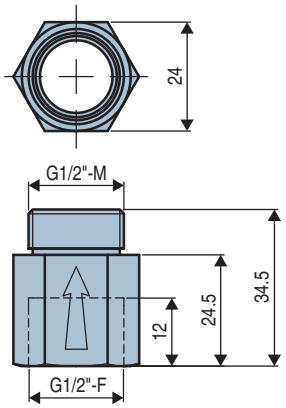
For all orders, please specify:
Model + Type + Filter or Cartridge
e.g.: FVG5

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 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)

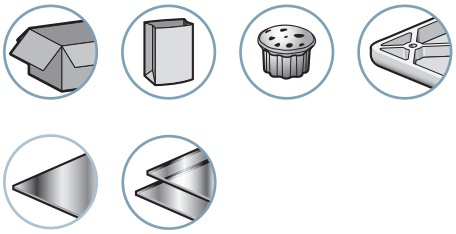
For all orders, please specify: FVL12

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

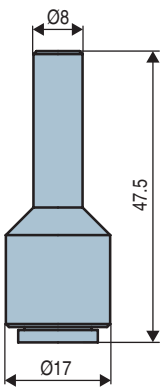


Applications

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 Grille: 400 micron stainless steel 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.

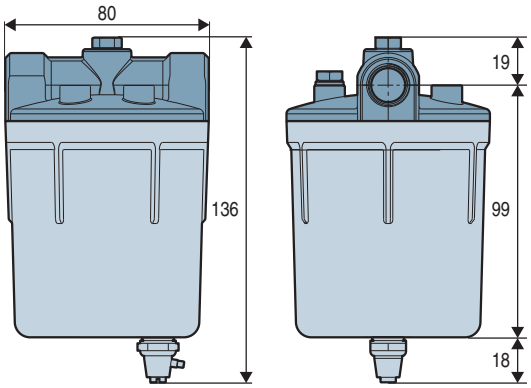
Advantages

- 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 Tank:transparent polycarbonate Filter cartridge: stainless steel Accessories: stainless steel, brass and nickel-plated brass Seal: nitrile
Filtering	Two options available: 50 microns
Operating range	-1 to 2 bar
Pressure max.	2 bar
Temperature	32 to 122°F

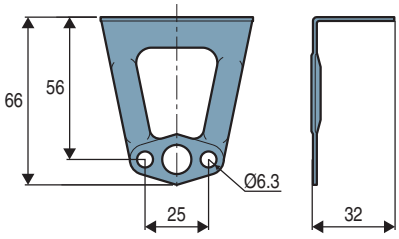
For all orders, please specify:
- **For complete filter: FSLI38X50**
- **For a replacement filtering element: FVUM12E**

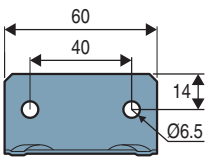
Mounting bracket for FSLI series liquid separator filter

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

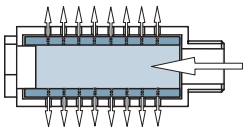
Note: all dimensions are shown in (mm)

SIL GV. SIL K -- C

Diffuser Type Silencers, Through-type Silencers

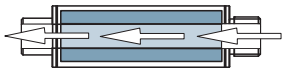
From when it was founded, COVAL has always given particular attention to reducing the noise of vacuum pumps and improving their performance.

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.

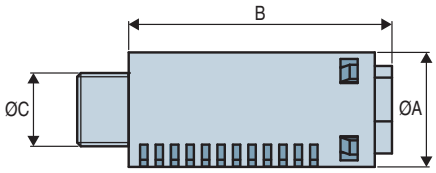
SIL GV series diffuser-type silencers

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

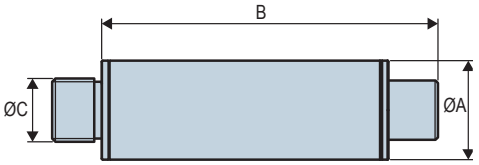
SIL K -- C series through-type silencers

- 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) 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 configurable digital outputs
- NO or NC ouputs
- Adjustable hysteresis
- IP 65
- The PSA100 C electronic vacuum switch is the most efficient vacuum measuring component in the COVAL range.
- It can be easily installed on all machines and robots, etc. thanks to its compact lightweight design.

P 12/4

PSD 100

Vacuum Switch with 3-colour Display

- 1 to 5 VDC analog output
- Response time: < 5ms
- 2 vacuum fittings available
- M8 connection
- The compact PSD100 electronic vacuum switch is used to check the exact level of vacuum in the system.
- Analog output

P 12/5

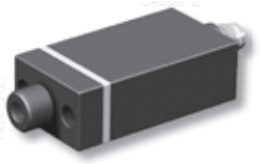
PSP 100

Electronic Vacuum Switch

- 1 configurable digital output
- Response time: < 5ms
- 3 vacuum fittings available
- 2 electric fittings available
- 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

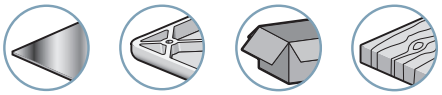
PSK
Mini Vacuum Switch

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) Storage: -4 ~ 158°F (-20 ~ 70°C) (No condensation or freezing)
Ambient humidity range	Operation/Storage: 35 85% RH (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)

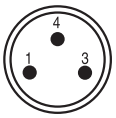
Advantages

- 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

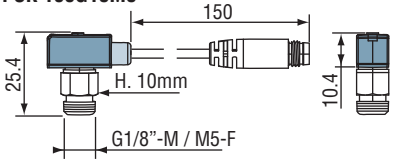


1 = + (Brown)
3 = - (Blue)
4 = out (Black)

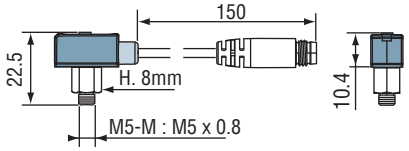
- Ø6mm stem for one-touch push fitting, Male M5 or G1/8"-M.

Dimensions

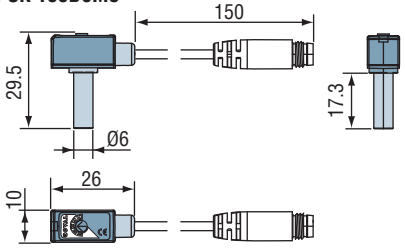
PSK 100G18M8



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		

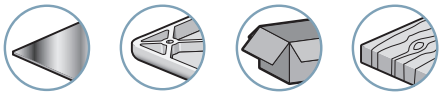
PSA 100 C
Electronic Vacuum Switch with Display

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

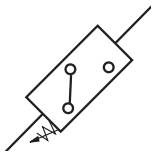


Specifications

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



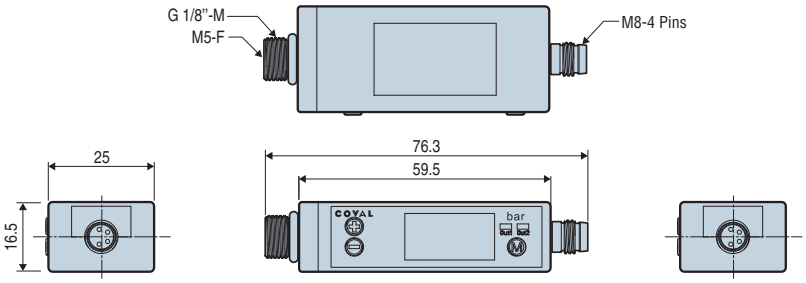
Additional Information

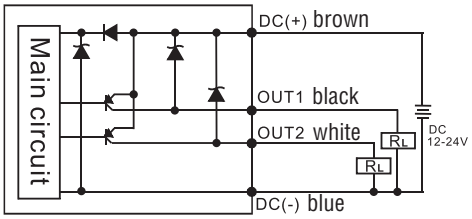
Electrical connections

- 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)

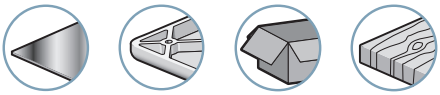
For all orders, please specify: PSA 100 C

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



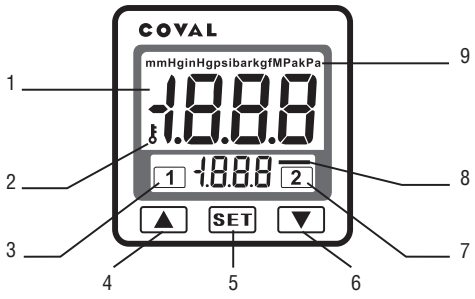
Specifications

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 0.1	MPa /	kgf/cm² 0.001	bar 0.001	psi 0.01	inHg 0.1	mmHg 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) Max. load current: 125 mA Max. supply voltage: 24 VDC 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 (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 (no condensation or freezing)						
	Ambient humidity	Operation / Storage: 35-85% RH (no condensation)						
	Permissible voltage	1000 V AC in 1-min (between case and lead wire)						
	Insulation resistance	50 M Ohm min. (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 1 analog output
PSD100LPNP2	2 m cable	2 digital outputs PNP

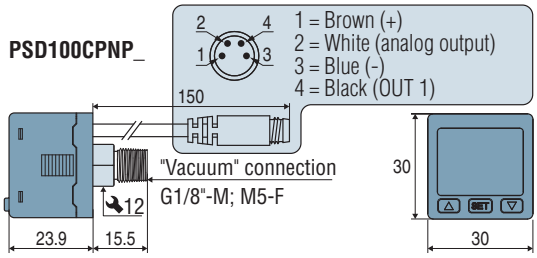
Accessories

- 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.

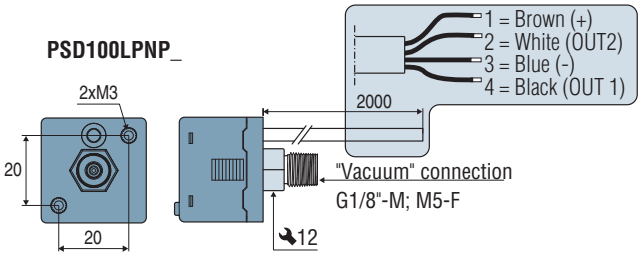
PSD 100
Vacuum Switch with 3-color Display

Electrical connections - Dimensions

■ M8 Connector-4 poles

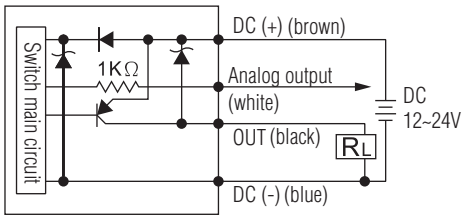


■ 2 m. cable

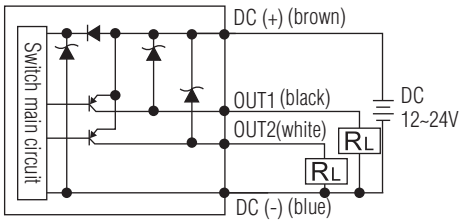


Electrical Diagrams

PSD100_PNP



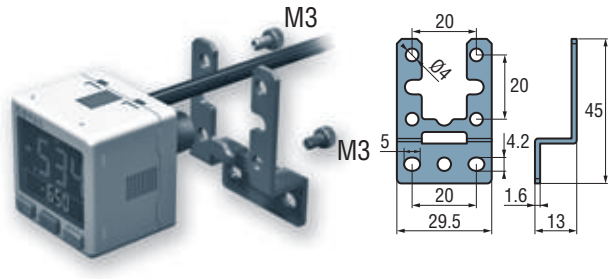
PSD100_PNP2



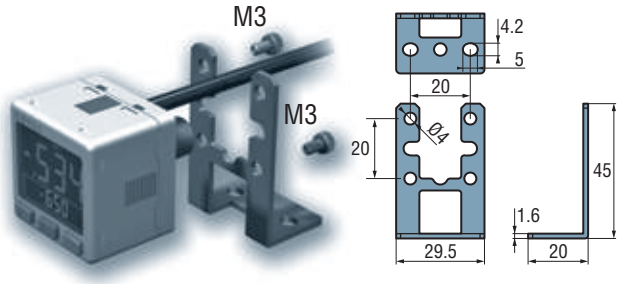
Mounting Solutions

Mounting brackets

■ **PSDFIXA**, vertical attachment.



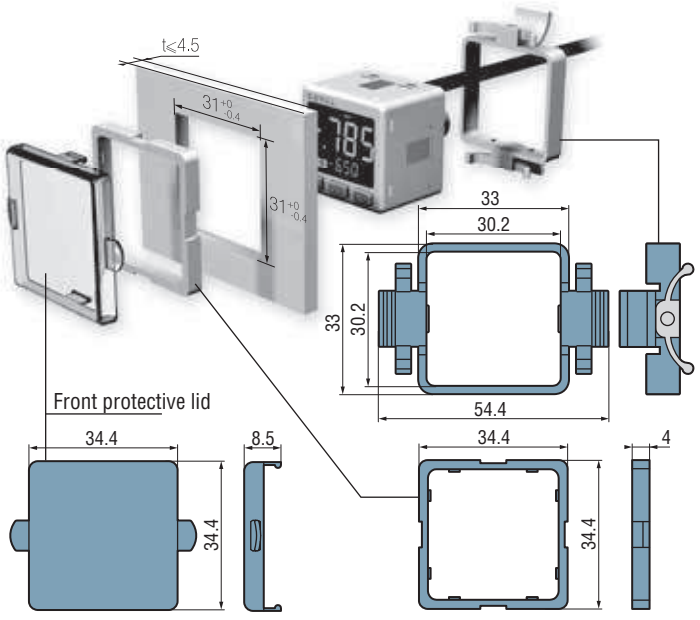
■ **PSDFIXB**, horizontal attachment.



Panel mounting kits

■ **PSDFIXC**: front attachment kit.

■ **PSDFIXD**: front attachment kit + front protective lid

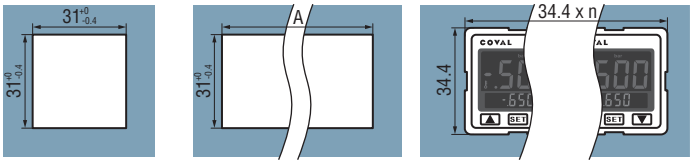


Panel opening (max. thickness: 4.5 mm)

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

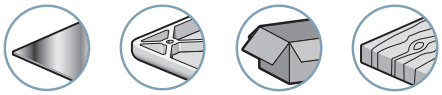


Note: all dimensions shown in (mm)

PSP 100
Electronic Vacuum Switch

PSP series electronic vacuum switches have integrated threshold and hysteresis adjustment as standard. 3 vacuum fittings (G1/8" Male, M5 female or M5 F Base) and 2 electrical connections (2 meter cable and M8 connector) make up the standard range.

Industry-specific applications

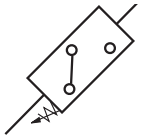


Specifications

Models	PSP 100 L	PSP 100 LM5	PSP 100 C	PSP 100 CM5
Compatible fluids	All non-corrosive, filtered, non-lubricated gases			
Supply	Regulated 18-30 V DC, polarity inversion protection			
Current consumed	< 20 mA			
Transistor output	NO 125 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 30% adjustment by 3/4 turn potentiometer			
EMC	Industrial standard class B			
Materials	PA 66 and brass	PA 66 and Alu.	PA 66 and brass	PA 66 and Alu.
Temperature	Operation: 32 to 122 °F Storage: 14 to 140 °F			
Protection	IP 50			
Electrical connection	PVC cable (length 2m)		M8 connector (4 poles)	
Pneumatic connection	G1/8"-M or M5-F	Base M5-F	G1/8"-M or M5-F	Base M5-F
Weight	62 g	67 g	22 g	27 g
Adjustment range	0 to –1 bar			

Advantages

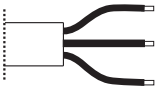
- 1 configurable digital output
- Adjustable hysteresis
- Measuring range: 0 / -1 bar
- Overpressure: +3 bar
- PNP



Additional Information

Electrical connections

- PVC cable (length 2m)

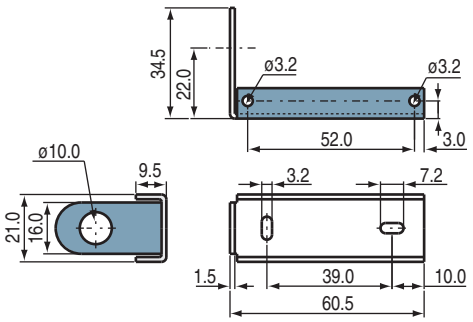


Brown (+24 V)
Blue (0 V)
Black (Contact)

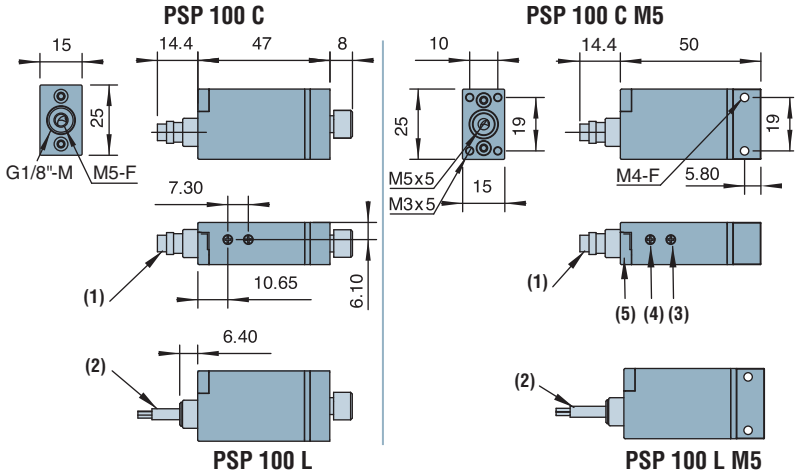
- M8 connector

1 = + 24 V - Brown
2 = -
3 = 0 V - Blue
4 = Contact - Black

Vacuum switch attachment - Clip Part No: PSE.F



Dimensions



(**1**) M8 4 pole connector version
(**2**) PVC cable version (2 m)
(**3**) Hysteresis adjustment
(**4**) Threshold adjustment
(**5**) Threshold display LED

Note: all dimensions shown in (mm)

Accessories

- Straight or angled connector, see page 11/12.
- Mounting on vacuum pump:
  - GVP series: GVO PSP 100 C
    GVO PSP 100 L
  - GEMP series: VB option

For all orders, please specify:
Model + Electrical connection + Vacuum connection.
Example: PSP100C

1: Model	2: Electrical connection		3: Vacuum connection	
PSP 100	L	2 m cable	-	G1/8"-M or M5-F
	C	M8 connector	M5	Base M5-F

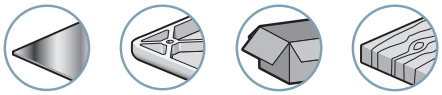
COVAL vacuum managers

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 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

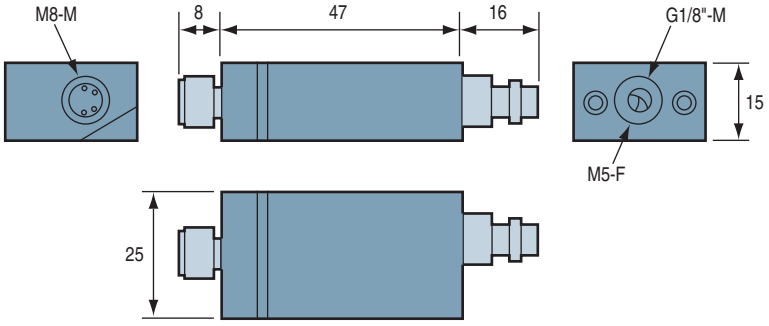
- 1 analog output from 1 to 5 VDC
- Measuring range: 0 / -1 bar
- Overpressure: +3 bar max.
- PNP

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

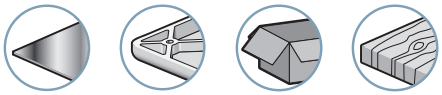
- Straight or elbow connector, see page 11/12.

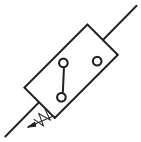
For all orders, please specify: PSP 100 ANA

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



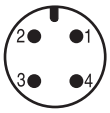


Specifications

Models	**Two versions: PSE 100 E and PSE 100 EC**
Compatible fluids	All non-corrosive gases
Switching power	250 V - 5 A with cable 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

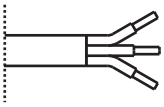
Electrical connections

M12 connector



1 : Common
2 : NO Contact
3 : -
4 : NC Contact

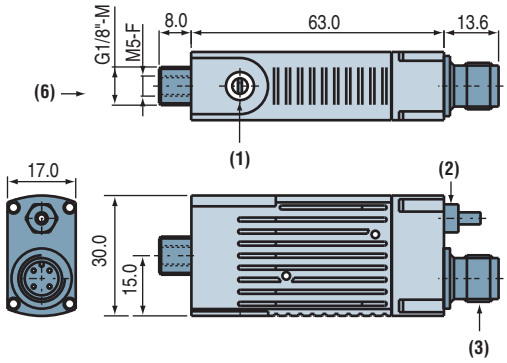
PVC cable (length 2m)

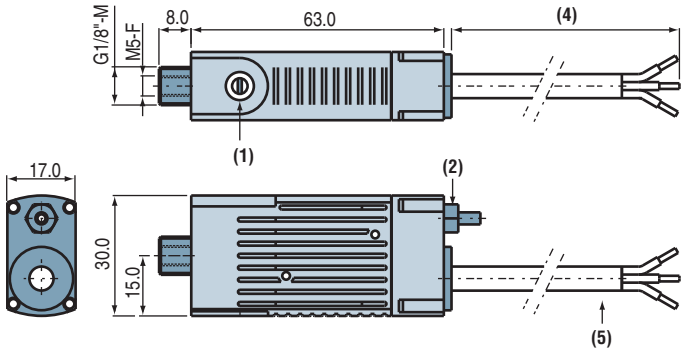


Brown: Common
White: NO Contact
Black: NC Contact

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

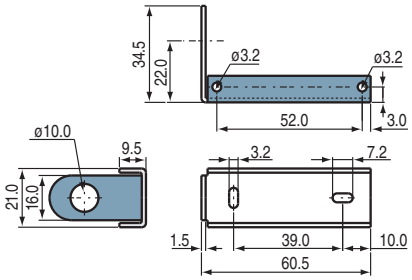




(**1**) Adjustment screw
(**2**) Atmospheric pressure hollow shaft fitting for tube, inside Ø 2.7mm
(**3**) M12 male connector
(**4**) Approx. 2 meters
(**5**) Cable, 3 conductors
(**6**) Vacuum

Additional Information

Vacuum switch attachment - Clip Part No: PSE.F

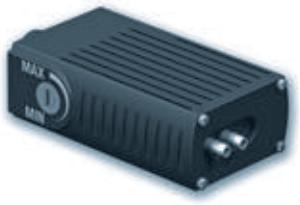


For all orders, please specify: Model + Version.
Example: PSE100EC

1: Model	2: Version	
PSE 100 E	-	PVC cable, length 2m
	C	M12 connector

Note: all dimensions shown in (mm)

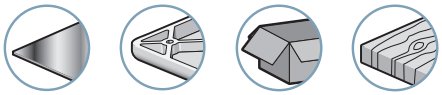
PSE 100 P
Pneumatic Vacuum Switch

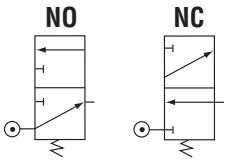


The PSE 100 P series vacuum switch with pneumatic output allows the vacuum level in the system to be checked by means of a patented system

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

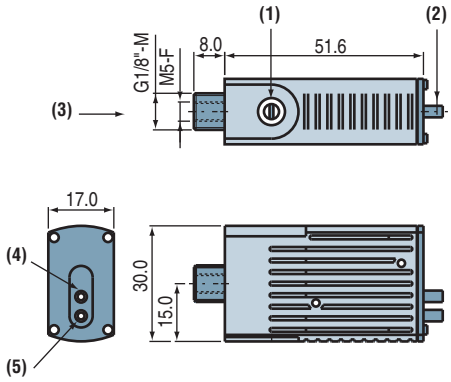




Specifications

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

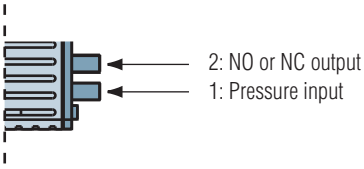


(**1**) Vacuum threshold - Adjustment screw
(**2**) Hollow shaft for tube, inside Ø 2.7 mm
(**3**) Vacuum
(**4**) NO or NC output
(**5**) Pressure input

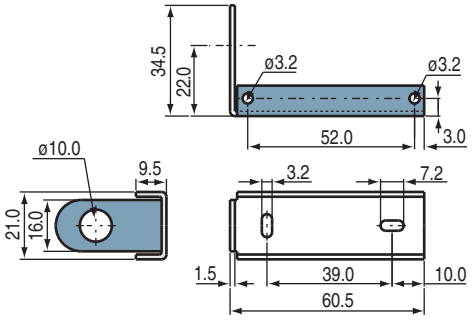
Additional Information

■ 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)

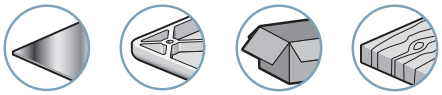
PSE 100 PK
Pneumatic Vacuum Switch

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.

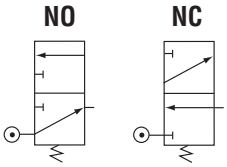
This vacuum switch exists in two versions: NO version recommended for the "air saving" function on a venturi and NC version for the "safety" function (object detected, etc.) and "SFC signal".

Industry-specific applications

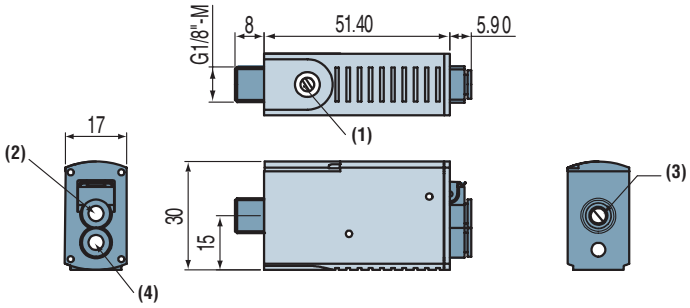


Specifications

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

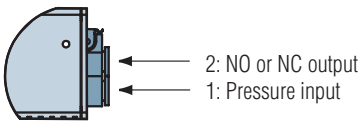


(**1**) Vacuum threshold adjustment
(**2**) Signal output, NC or NO tube
(**3**) M5 Vacuum input
(**4**) Pressure input Ø4 tube

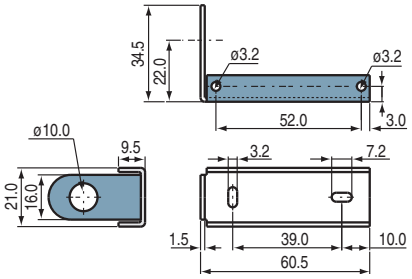
Additional Information

■ 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)

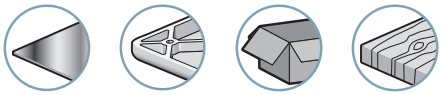
VAF 111
Vacuum Gauge

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

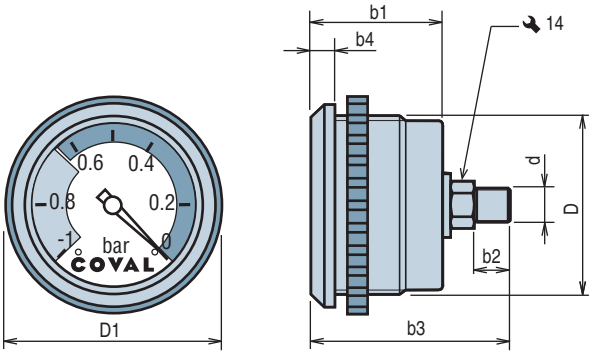
Models	D (1)	D1	b1	b2	b3	b4	d
VAF 111 40	40	43	32.5	12	52	4	G1/8"-M
VAF 111 50	50	54	32.5	12	52	4	G1/4"-M
VAF 111 63	63	68	32.5	12	52	4	G1/4"-M

(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

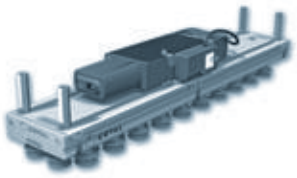
CVGC

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.

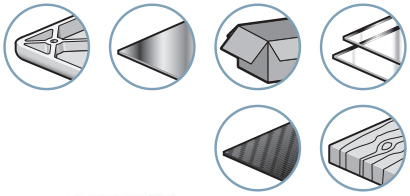
The **CVGC** series is composed of:

- 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.

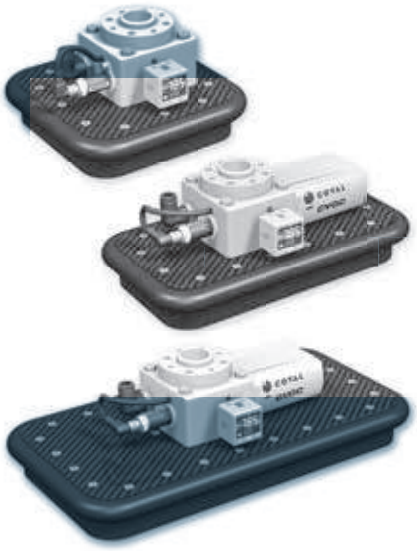
The three standard formats allow you to choose your **CVGC** and ensure the handling of your loads: corrugate, plastics, metal/glass plates, etc.

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:

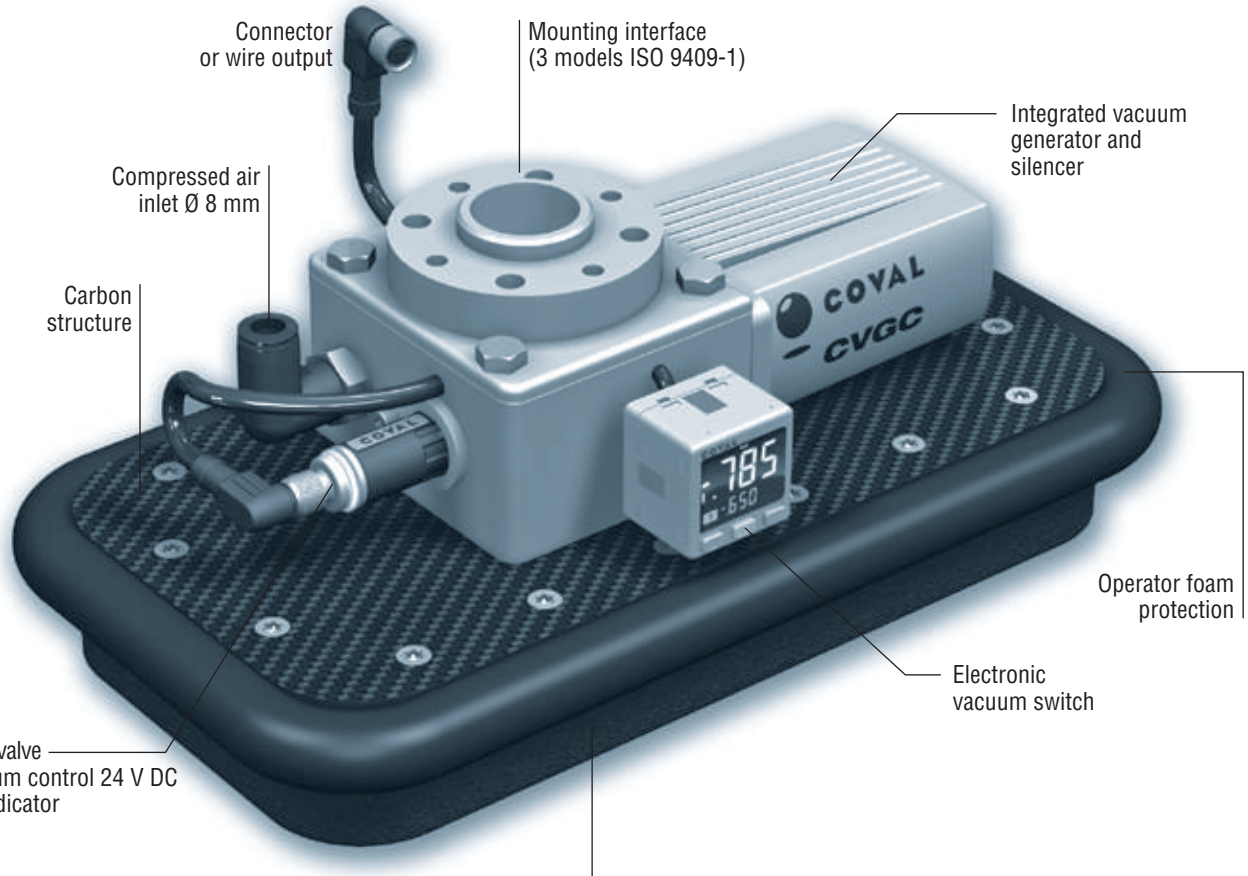
- Packaging
- Plastics
- Metal
- Glass
- Composite
- Wood

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

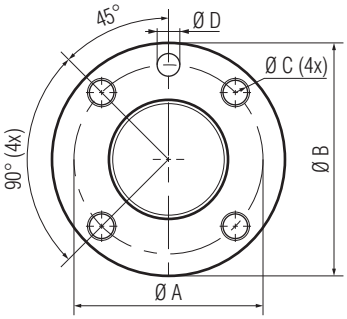
DIMENSIONS	
150 x 150 mm	150X150
240 x 120 mm	240X120
320 x 160 mm	320X160

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

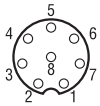
Version	Standard	Ø A (mm)	Ø B (mm)	Ø C (mm)	Ø D (mm)	
A31	ISO 9409-1-31.5-4-M5	31.5	40	M5 (4 screws)	5	Fanuc CR-4, CR-7, CR-7 A/L, CR-14 A/L
A50	ISO 9409-1-50-4-M6	50	63	M6 (4 screws)	6	Universal Robots UR3, UR5, UR10, UR16 + e-Series Omron/Techman TM5, TM12, TM14 Doosan Robotics A0509, A0509S, A0912, A0912S, M0609, M0617, M1013, M1509, H2017, H2515 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

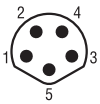


1	"Vacuum level" signal analogic 1 to 5 V DC
2	–*
3	–*
4	"Gripped product" switching output 24 V DC PNP/NPN NO or NC
5	+24V DC permanent
6	–*
7	Vacuum Control 24 V DC PNP/NPN
8	0 V - GND

** not used in this configuration*

■ **C2**: M8 connector - male 5-pins elbow, cable length 150 mm

Omron/Techman TM5, TM12, TM14

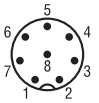


1	+24V DC permanent
2	"Gripped product" switching output 24 V DC PNP/NPN NO or NC
3	Vacuum Control 24 V DC PNP/NPN
4	"Vacuum level" signal analogic 1 to 5 V DC
5	0 V - GND

■ **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*

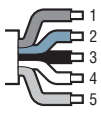


1	"Gripped product" switching output 24 V DC PNP/NPN NO or NC
2	Vacuum Control 24 V DC PNP/NPN
3	–*
4	–*
5	+24V DC permanent
6	–*
7	–*
8	0 V - GND

** not used in this configuration*

■ **C4 / C5**: 5-wire output, cable length 2 m (C4) or 5 m (C5)

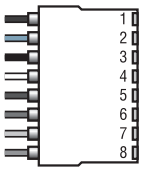
Fanuc CR-4, CR-7, CR-7, CR-7 A/L, CR-14 A/L + any application requiring cables to be routed outside the robot arm + any robot whose housing connection does not match C1/C2/C3/C6.



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*

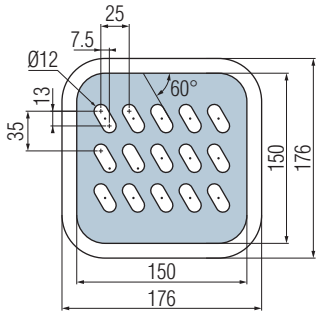
CVGC

Carbon Vacuum Grippers

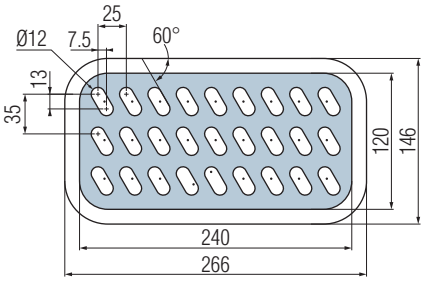
Dimensions and Characteristics

Dimensions

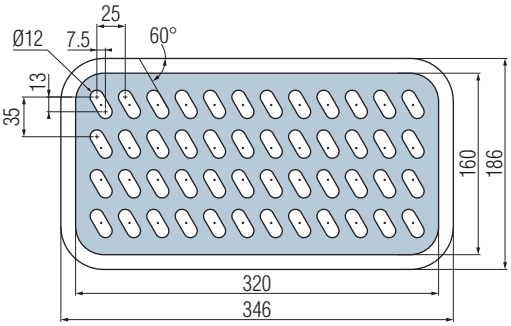
CVGC150X150A____



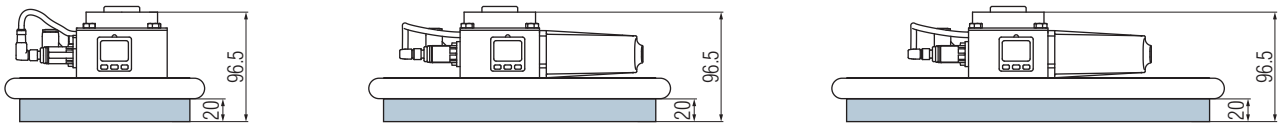
CVGC240X120A____



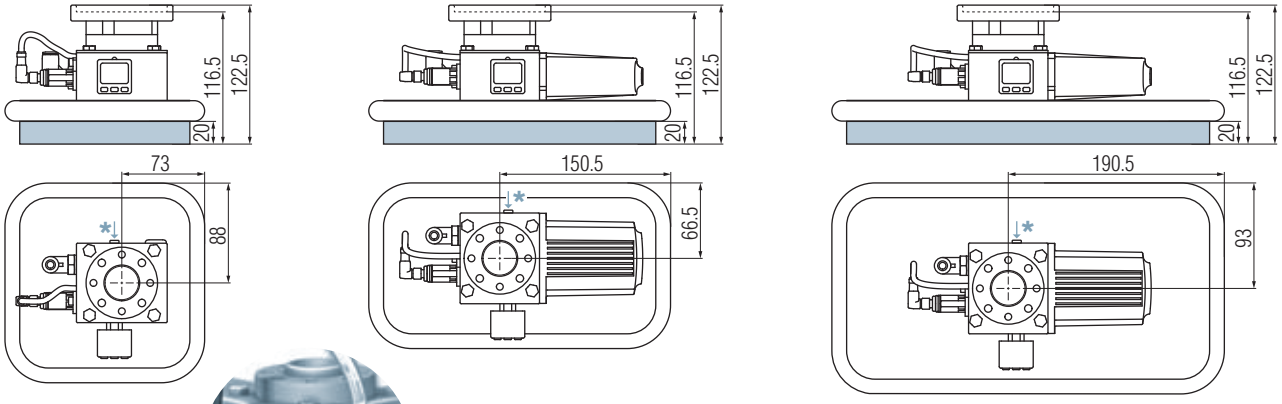
CVGC320X160A____



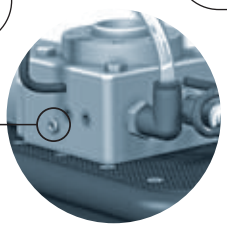
Mounting interfaces A31 or A50



Mounting interface A63

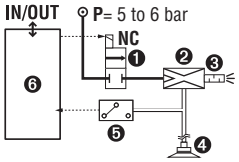


* M5 connection for external blow-off (M5 connector)



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

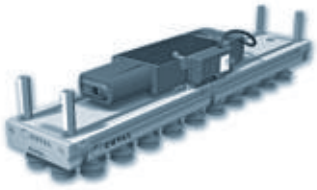
- Supply: non-lubricated air, 5 microns filtered, according to ISO 8573-1:2010 [4:5:4].
- Operating pressure: from 5 to 6 bar
- Optimal pressure:
  - CVGC 150x150 : 5.5 bar
  - CVGC 240x120 : 6 bar
  - CVGC 320x160 : 6.4 bar
- Maximum vacuum: 85%.
- Vacuum command light: orange LED
- Electric protection 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

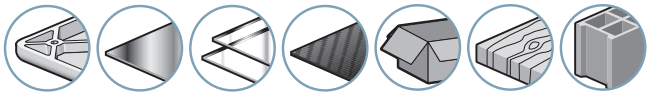


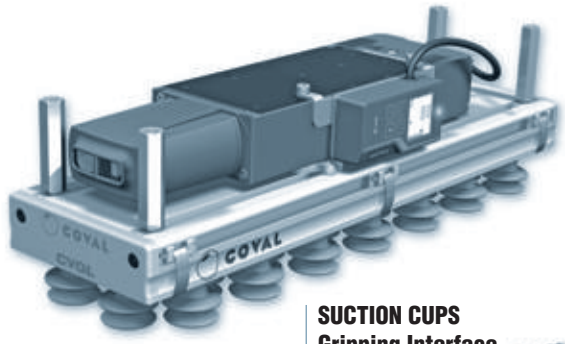
With the CVGL series, COVAL introduces a universal solution to the vacuum gripper that is flexible, simple, and economical.

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

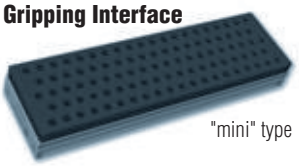
2 control versions (vacuum and blow-off)

2 solutions for vacuum display

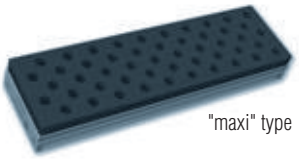
+ The Vacuum Manager experience of COVAL

= YOUR CVGL SOLUTION

FOAM
Gripping Interface

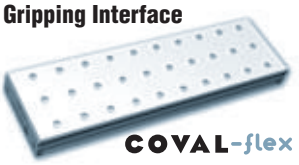


"mini" type

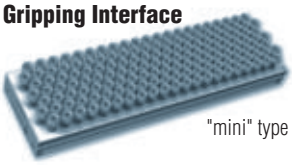


"maxi" type

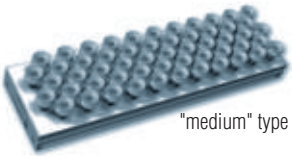
"COVAL-flex"
Gripping Interface



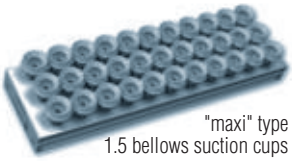
SUCTION CUPS
Gripping Interface



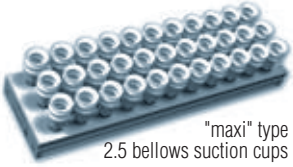
"mini" type



"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:

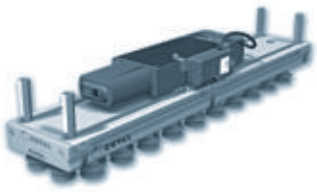
- Packaging
- Plastics
- Metal
- Glass
- Concrete/stone
- Composites
- Wood

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

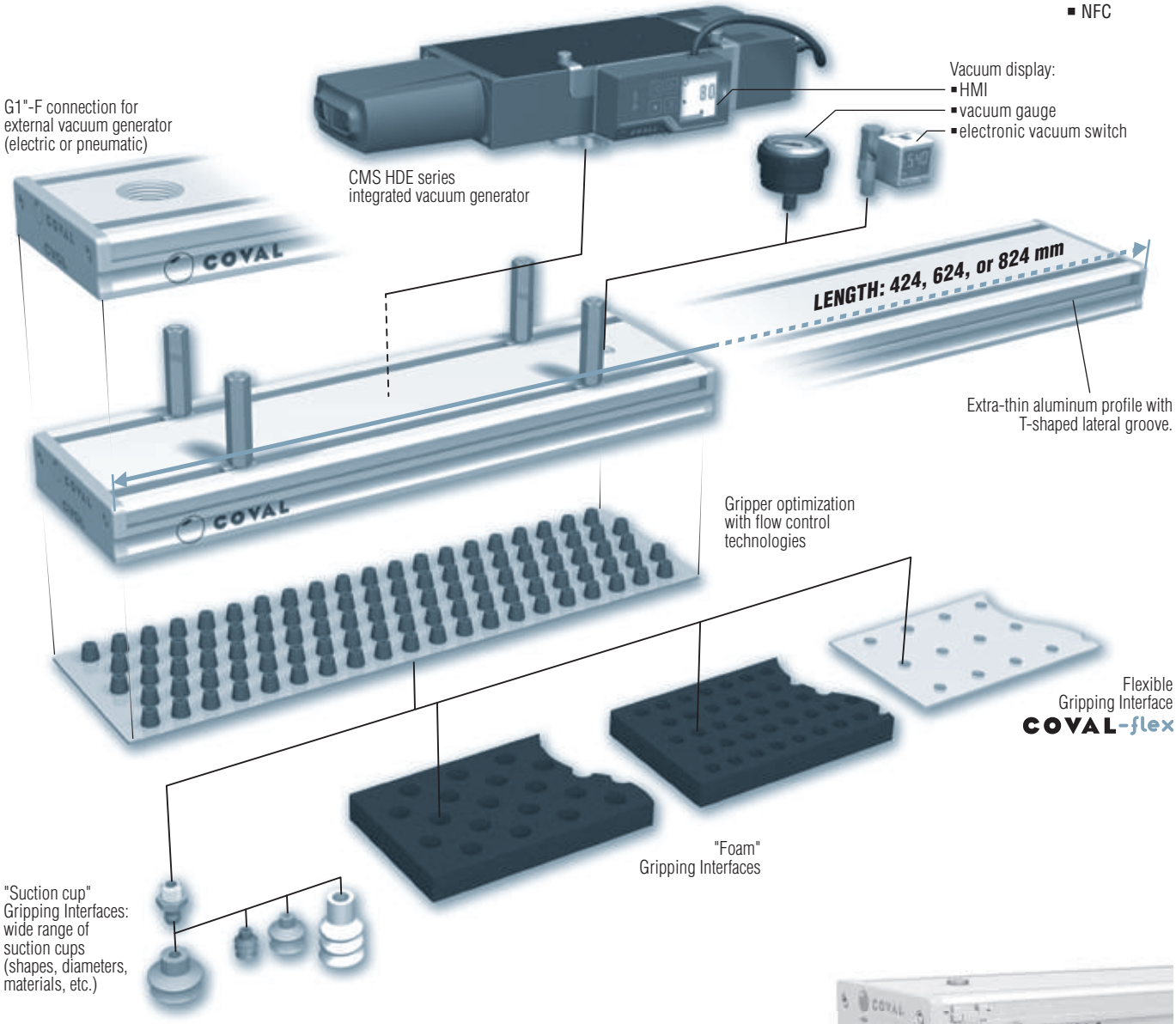
External or integrated vacuum generation

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

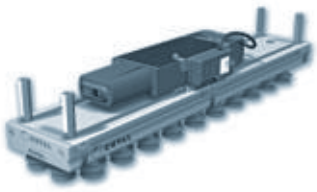


Gripper interface quick change system, ref: CVGL ____C__

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

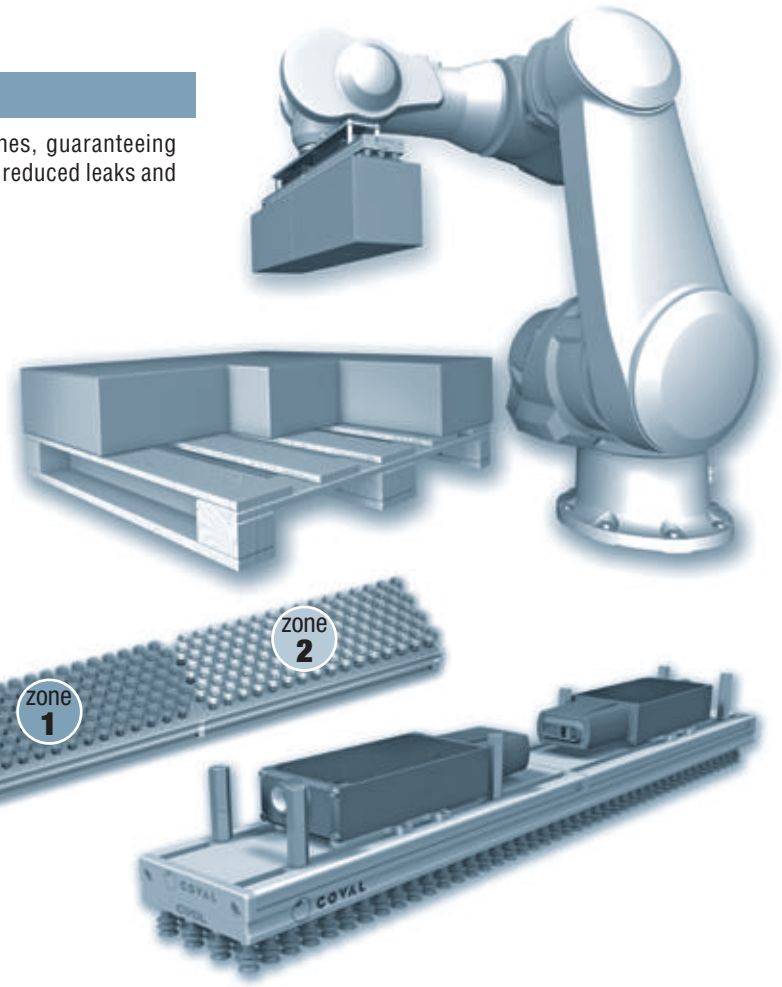


Multi-zone

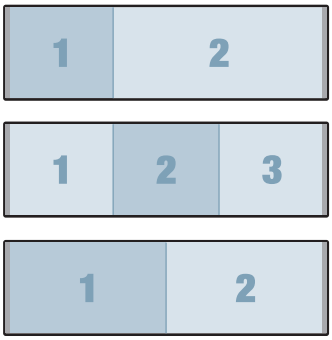
CVGL vacuum grippers can create independent gripping zones, guaranteeing optimization of vacuum management (increased vacuum level, reduced leaks and energy consumption).

- ➔ 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

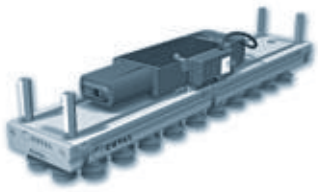
GRIPPING INTERFACE	Length (mm)	Vacuum gripper without vacuum generator (G0)	Vacuum gripper with 1 CMSHDE__50_ vacuum generator (D1)		Vacuum gripper with 1 CMSHDE__100_ vacuum generator (D2)		Vacuum gripper with 2 CMSHDE__100_ vacuum generators (D3)
			without control	with control	without control	with 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.

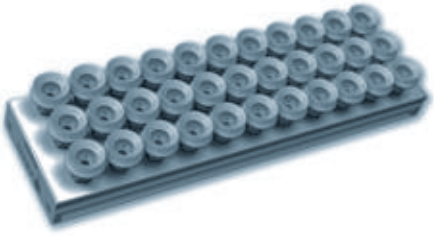
"SUCTION CUP" Interface

- 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

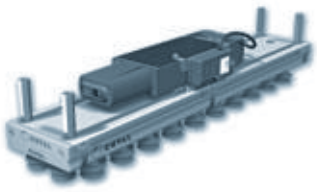
Part number	Total length of the vacuum gripper (mm)	Force at 80% vacuum (lbf)*	Force at 45% vacuum (lbf)*
CVGL 424_ _ _ _	424	232.6	134.9
CVGL 624_ _ _ _	624	348.4	202.3
CVGL 824_ _ _ _	824	465.3	269.8

** 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

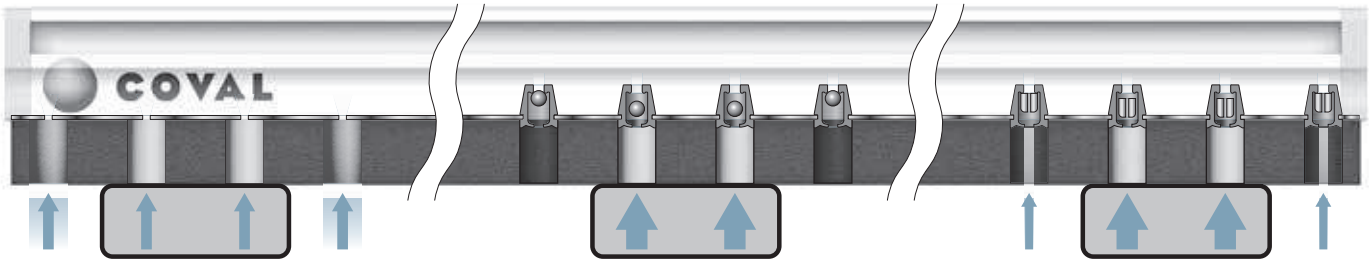
Integrated Technologies



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.

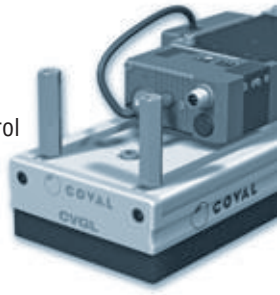
Vacuum Generation

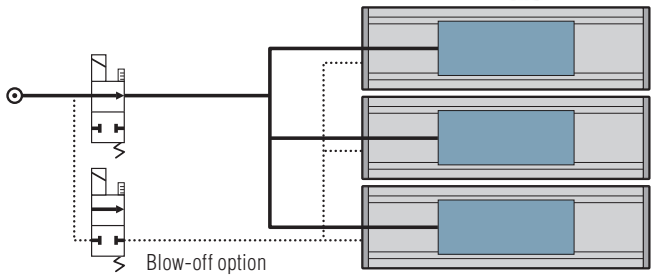
Integrated vacuum generator, CMS HDE Series

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.



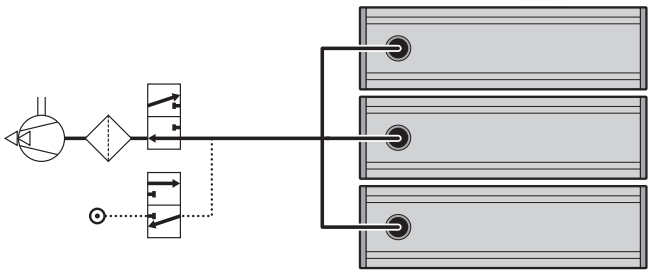


External vacuum generator

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

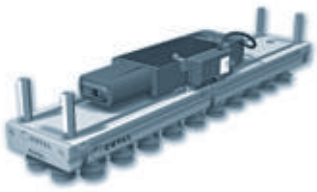
Generator configurations by vacuum gripper length

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

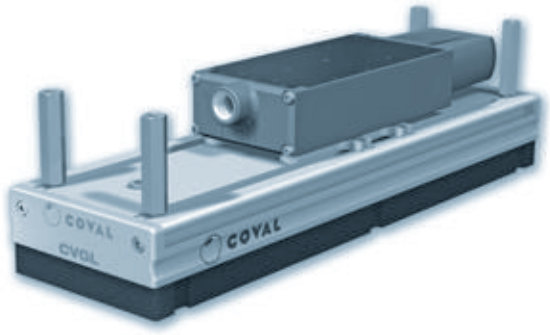


The CVGL vacuum grippers have a wide range of configurations with the CMS HDE Series multi-stage vacuum pumps, allowing for a specialized solution for each application.

CVGL__D_NOK

CMSHDE_**NVO**G4K multi-stage vacuum pump

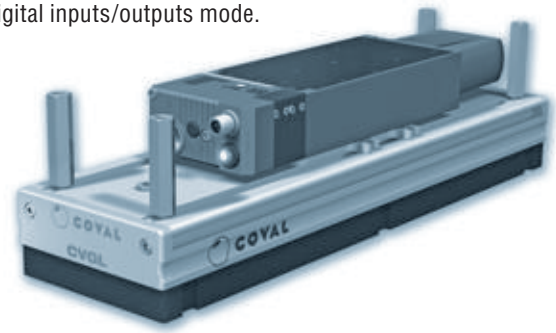
- Without control.



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.

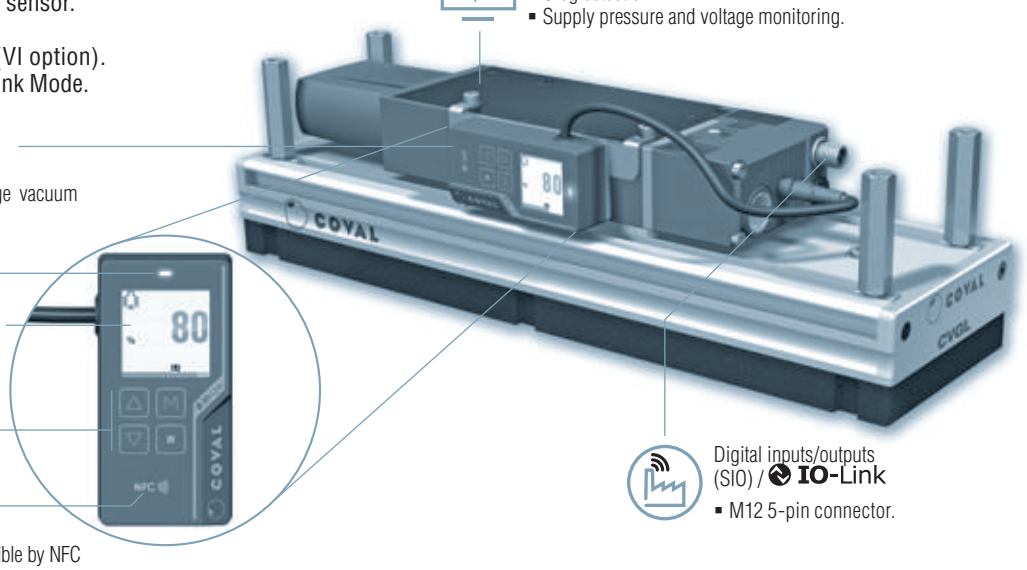
Onboard installation and diagnostic tools:
- Clog detection.
- Supply pressure and voltage monitoring.

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.



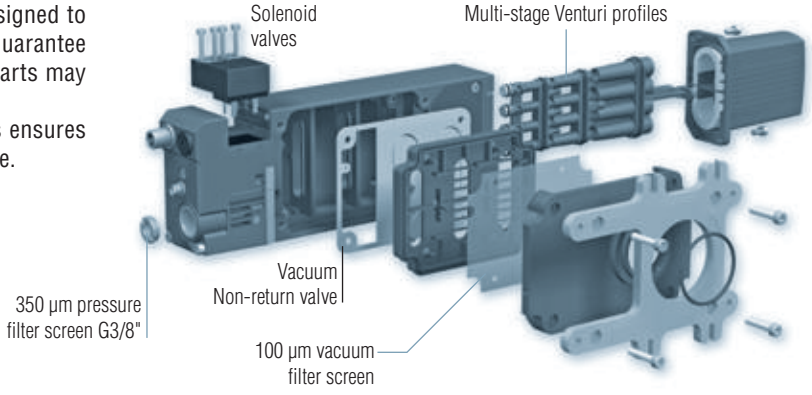
NFC

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

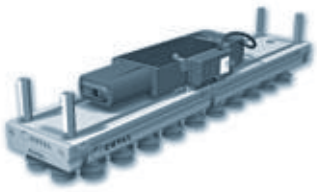
The CMS HDE multi-stage vacuum pumps have been designed to withstand the demands from all your applications and to guarantee a high level of performance. However, handling certain parts may require replacement or cleaning.
The modular design of the CMS HDE multi-stage pumps ensures easy maintenance as 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

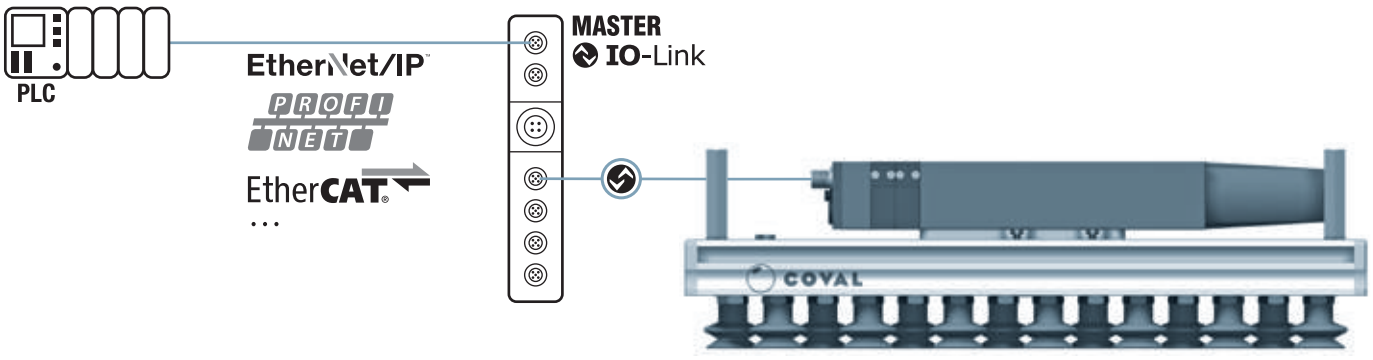
- Instantaneous vacuum level.
- Object gripped and object lost information.
- Alarms (high/low pressure, high/low voltage).
- Instantaneous pressure.

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:

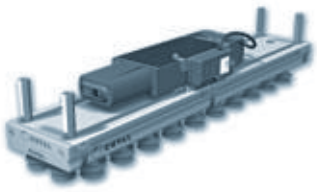
- Straightforward wiring, installation, and setup
- Availability of diagnostic status data
- Simpler preventive maintenance and vacuum pump replacement without manual setup, and more
- Onboard installation and diagnostic tools



CVGL

Compact and Light Vacuum Grippers

Straightforward Communication



Mounted or Remote HMI

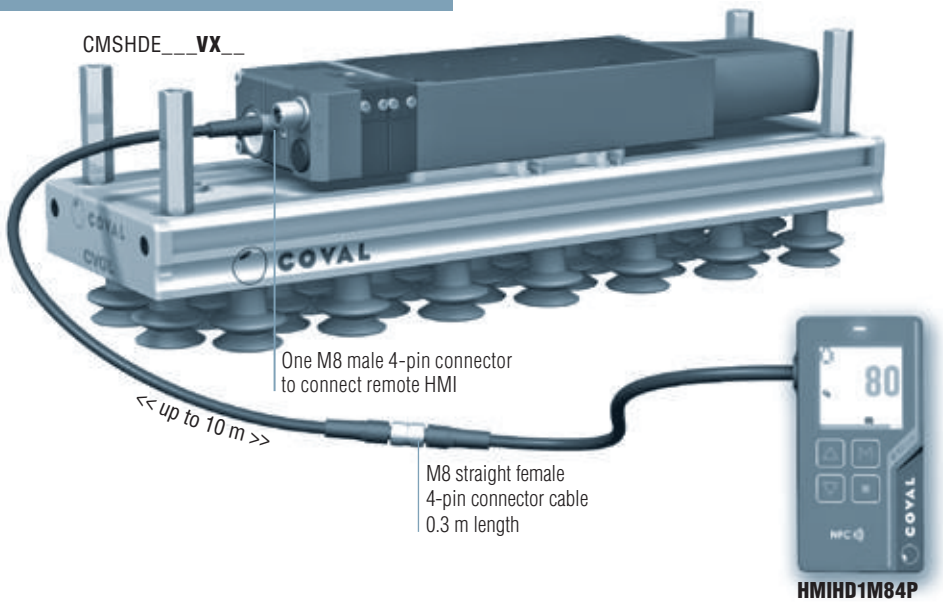
To facilitate the use and configuration of the vacuum generator, the CVGL range has an HMI that can be mounted on the generator or used remotely.

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.

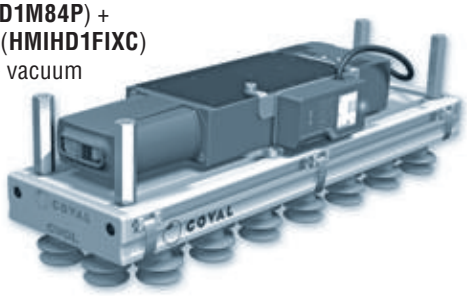
CVGL vacuum generators compatible with HMI:

➔ CVGL__**S2** / **V2**___ versions with M8 connector.



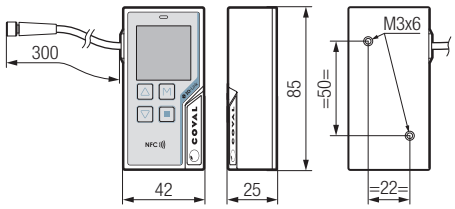
CVGL____**VI** version:

- HMI (ref: **HMIHD1M84P**) + mounting plate (**HMIHD1FIXC**) mounted on the vacuum generator.



- Accessory: Remote HMI
- Ref: **HMIHD1M84P**

(see accessories for HMI page 13/14).

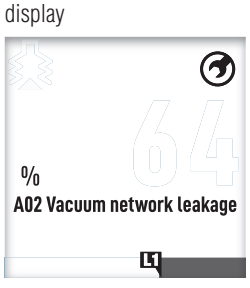


Note: all dimensions are in mm.

Remote HMI Dialog Front Panel

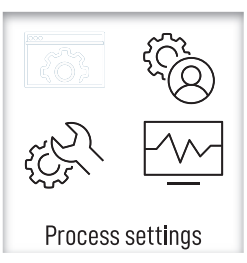
Gripping status indicator light:
- Green: object gripped
- Red: object lost

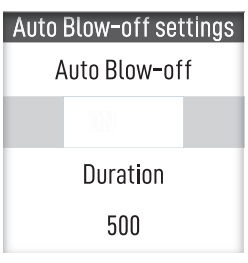
1.54" high-visibility color LCD display



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



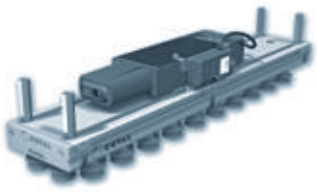


Multilingual EN FR DE IT ES

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.

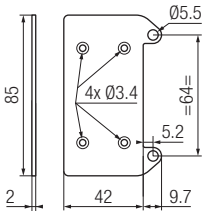
GET IT ON Google Play

Download on the App Store

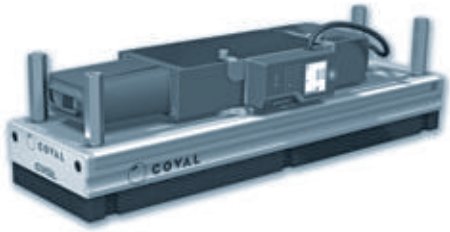
NFC APP: COVAL Vacuum Manager
Available for Android and iOS

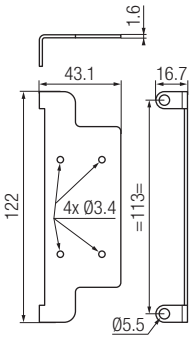
Accessories for HMI

Front mounting plate
+ 2 x M3x6 TORX
+ 2 x M5x50 CHC
Part No.: **HMIHD1FIXA**

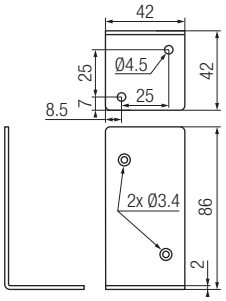


Side mounting plate
+ 2 x M3x6 TORX
+ 2 x M5x50 CHC
Part No.: **HMIHD1FIXC**





90° angled mounting plate
+ 2 x M3x6 TORX
Part No.: **HMIHD1FIXB**



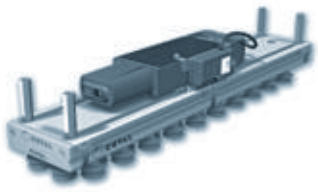
Connecting cable
M8 4-pin, female / M8 4-pin, male, compatible with cable chain
- 2 m length: Part No. **CDM8MF4PL2**
- 5 m length: Part No. **CDM8MF4PL5**
- Other lengths available upon request.

Note: all dimensions are in mm.

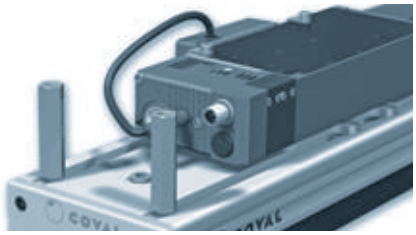
CVGL

Compact and Light Vacuum Grippers

Selection guide



Multi-stage Vacuum Control

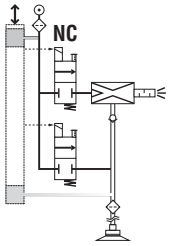


When necessary, the CVGL series vacuum grippers with integrated vacuum generator (versions D1 and D2) can be equipped with a vacuum and/or blow-off control valve to optimize product release. This also enables cleaning of the vacuum network, flow control nozzles, check valves, or airtight valves.
A vacuum 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.

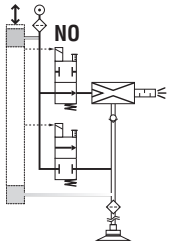
- NC blow-off and vacuum control: solenoid valves
- Choice of blow-off settings (only on CVGL__**S2**_ models):
  - controlled by external signal
  - automatic timer from 50 to 9999 ms (advantage: saves one controller output)



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.

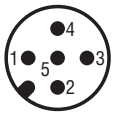
- NO vacuum control solenoid valve
- NC blow-off control solenoid valve
- Blow-off controlled by external signal



Electrical Connections

CVGL _ S1 / V1:

- One M12 5-pin male connector



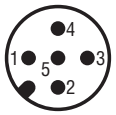
1	/
2	24 V DC suction command (1)
3	0 V - GND
4	24 V DC blow-off command
5	/

: 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

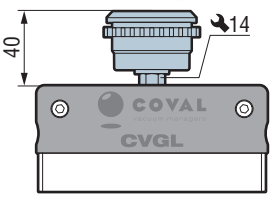
When required, CVGL series grippers can incorporate a vacuum level display with an electronic vacuum switch or vacuum gauge:

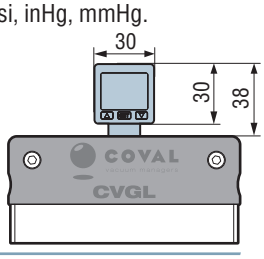
■ **Option VA - electronic vacuum switch with 3-color display** (PSD100CPNP):
CVGL _ _ _ _ _ X _ _ **VA**

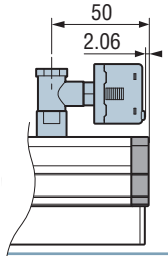
- Pressure rating range: 0 ~ -101.3 kPa.
- Pressure setting range: 10 ~ -101.3 kPa.
- Max. pressure: 300 kPa.
- Fluid: Air, non-corrosive/non-flammable gas.
- Hysteresis: adjustable.
- Response time: ≤ 2.5ms, with anti-vibration function.
- 7 segment LCD display: 2 color (red/green) main display, orange 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





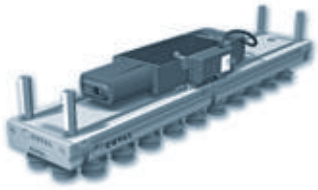


Note: all dimensions are in mm.

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.

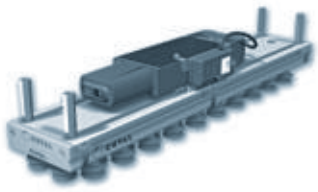
SPECIAL VERSIONS

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



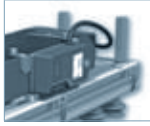
D1	S		1		K		VA

VERSION WITHOUT VACUUM GENERATOR		GENERATOR CONTROL		GENERATOR CONFIGURATION		EXHAUST	
Without vacuum generator	G0	N	Without	0	Without	X	Without

VERSIONS WITH VACUUM GENERATOR*		GENERATOR CONTROL		GENERATOR CONFIGURATION		EXHAUST	
1 x **CMSHDE_50** multi-stage vacuum pump Flow rate: 24.72 SCFM	D1	N	Without	0	Without	K	Through-type silencer
1 x **CMSHDE_100** multi-stage vacuum pump Flow rate: 38.85 SCFM	D2	S*	**CMSHDE__S_** Vacuum pump with **NC** vacuum control and **NC** blow-off control. Choice of blow-off settings (only on CVGL__**S2**_models): ▪ Controlled by external signal ▪ Automatic timer from 50 to 9999 ms (advantage: saves one controller output).	1	**CMSHDE___VOC15P_** Multi-stage vacuum pump without vacuum switch and HMI ▪ One M12 5-pin male PNP ▪ Digital inputs/ outputs mode (SIO)		
2 x **CMSHDE_100** multi-stage vacuum pump Flow rate: 77.69 SCFM	D3	V*	**CMSHDE__V_** Vacuum pump with **NO** vacuum control and **NC** blow-off control. ▪ Blow-off controlled by external signal	2	**CMSHDE___VXC15X_** Multi-stage vacuum pump with integrated vacuum switch and pressure sensor, without HMI ▪ One M12 5-pin male configurable as PNP or NPN ▪ One M8 4-pin male for remote HMI ▪ Electronic vacuum switch ▪ Digital Output DO1 "object gripped" 24 V DC / NO ▪ Digital input/ outputs mode (SIO) / IO-Link ▪ Compatible with HMI (for VI option)		

* See p.13/10 table of possible configurations

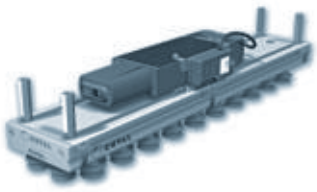
* Only for D1 and D2.

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

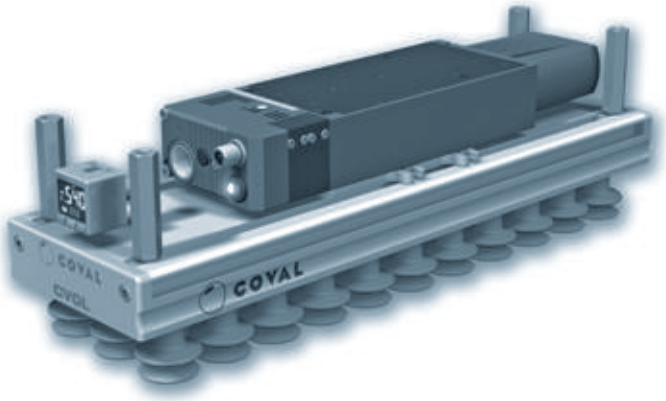
Compact and Light Vacuum Grippers

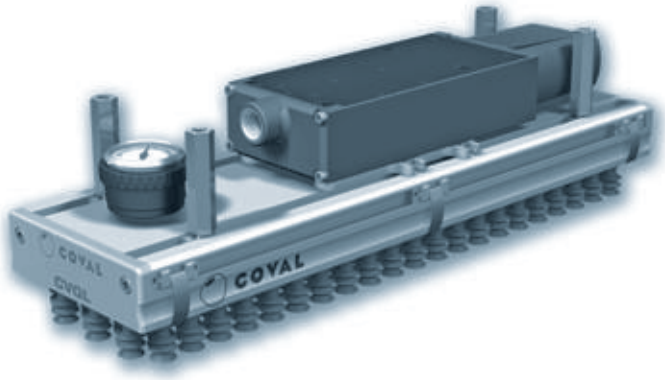
Examples of Composed Part Numbers



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.



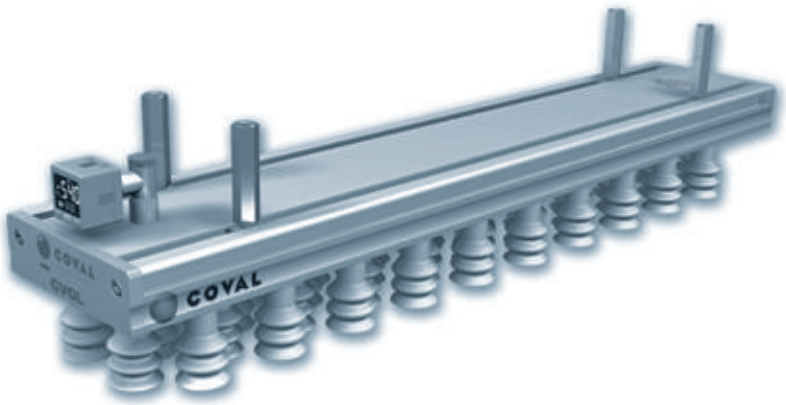


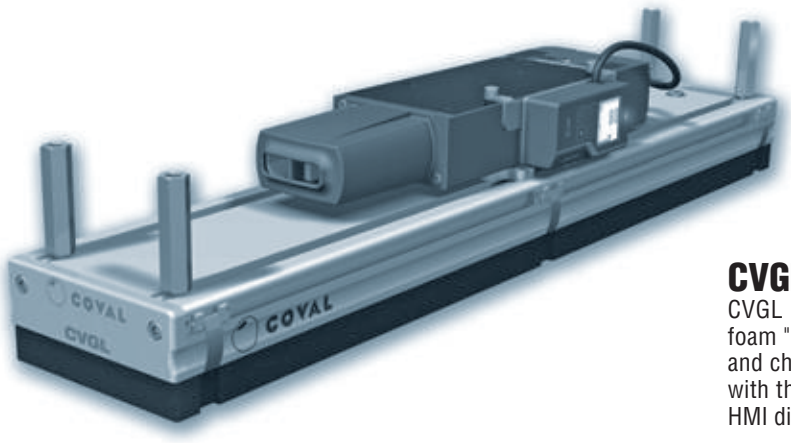
CVGL424QVSP14BFXHCD1N0KVF

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.





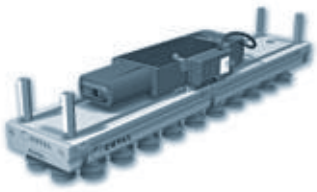
CVGL624QF2BFVD2S2KVI

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

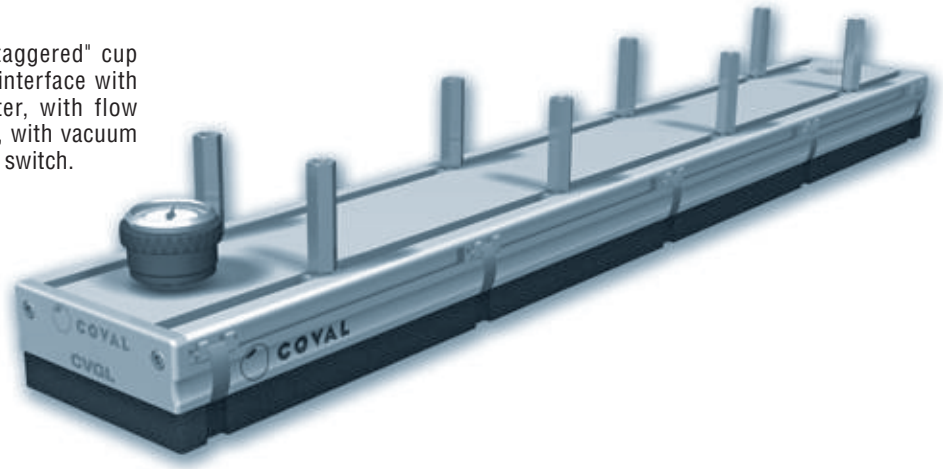
Compact and Light Vacuum Grippers

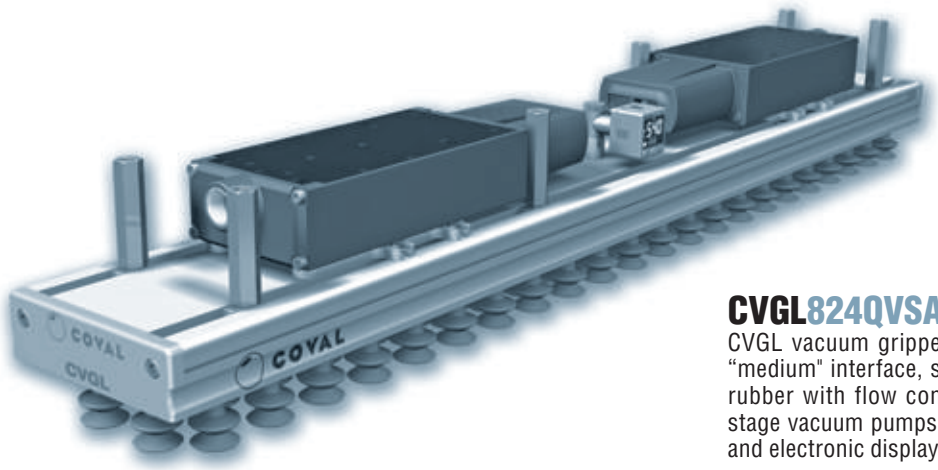
Examples of Composed Part Numbers



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**.

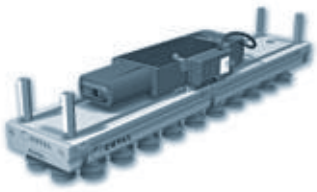
Thanks to their modularity, the MVG vacuum grippers offer the optimal handling solution for various sizes, shapes, and weights.

- 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

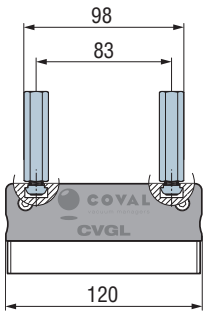
(with external vacuum generator).

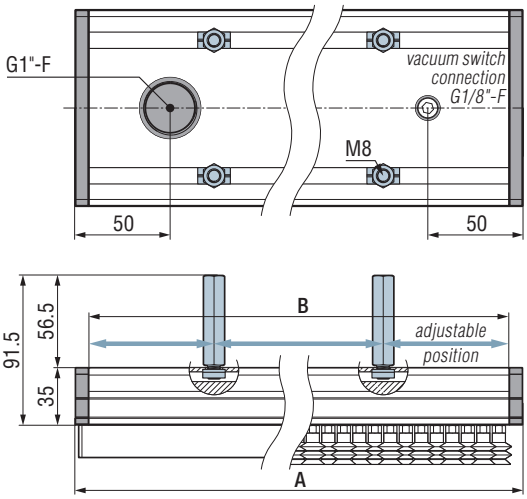
The COVAL CVGL series vacuum grippers G0 version (with external vacuum generator), can be mounted on all types of automated or robotic systems, via M8 spacers, sliding in the grooves of the aluminum profile.

- 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

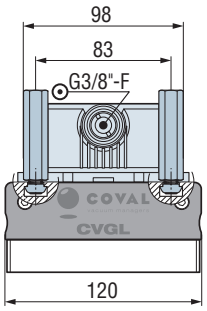
(1 integrated vacuum generator, CMS HDE series).

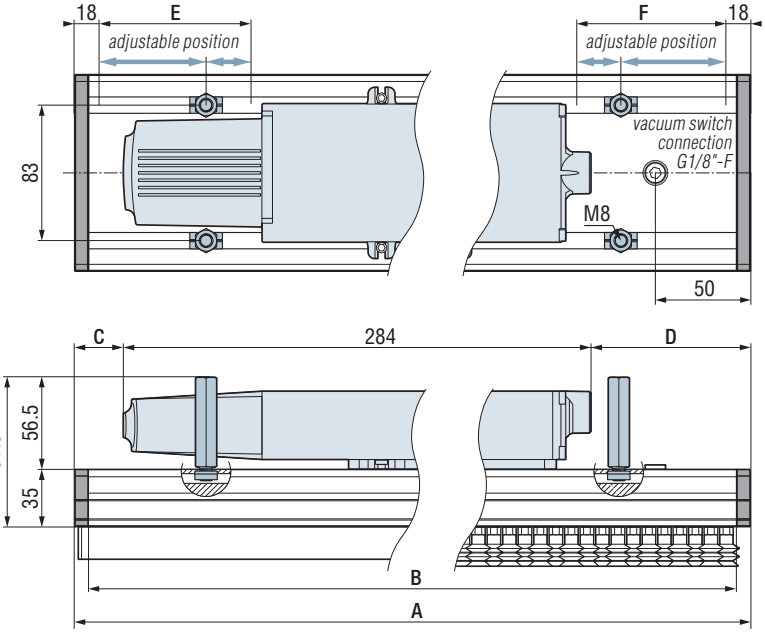
The COVAL CVGL series vacuum grippers, D1 and D2 versions, are mounted on all types of automated systems via M8 spacers pre-installed on sliding nuts.

- 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

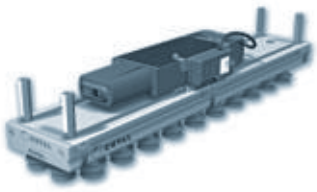
www.coval.com

Note: all dimensions are in mm.

CVGL

Compact and Light Vacuum Grippers

Dimensions and Mounting Options

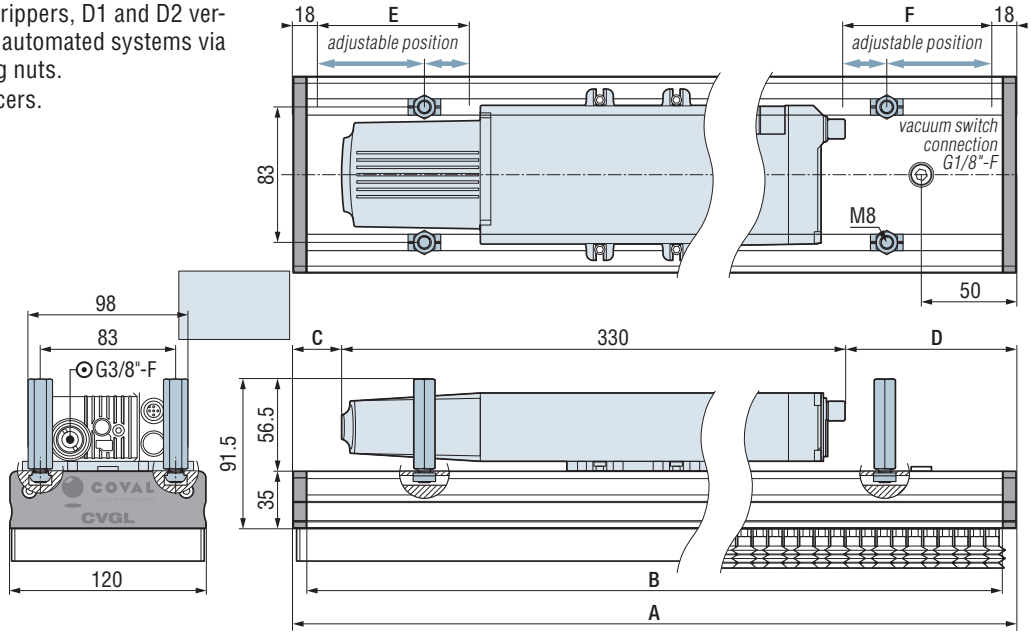


D1 or D2 versions, with control

(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

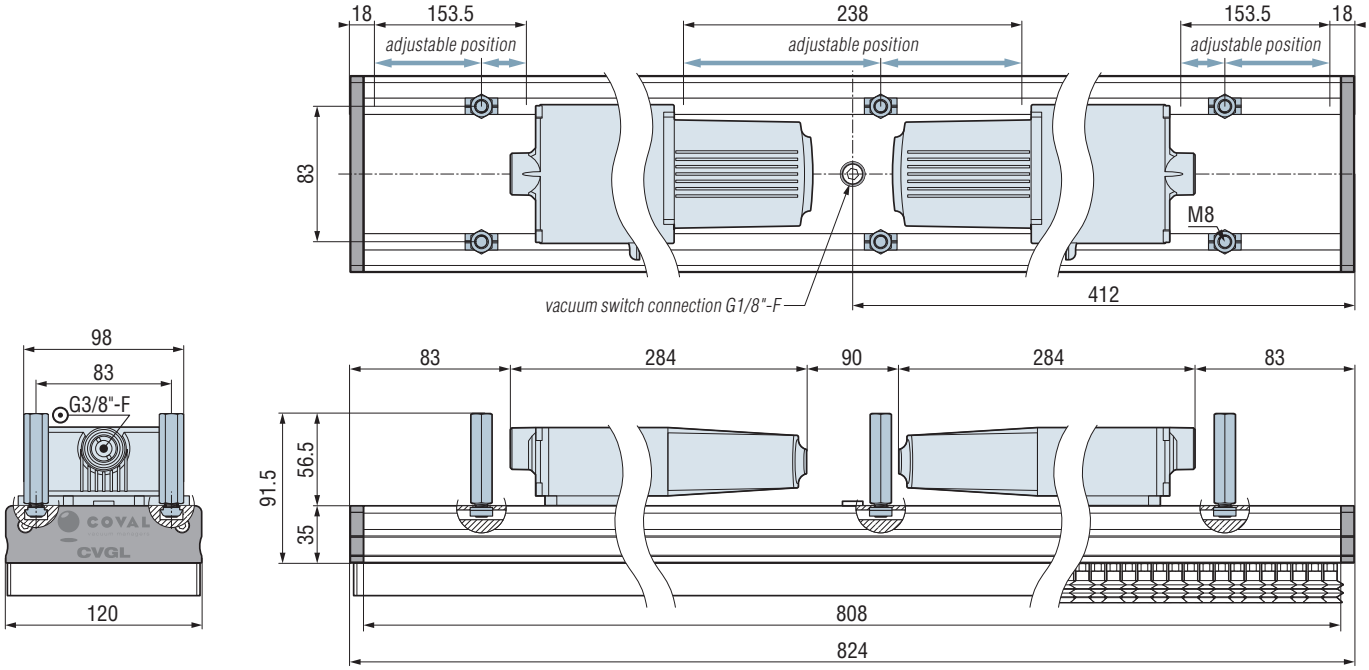
	CVGL424	CVGL624	CVGL824
A	424	624	824
B	408	608	808
C	15	134	234
D	78	160	260
E	76	194	294
F	47	129	229

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.

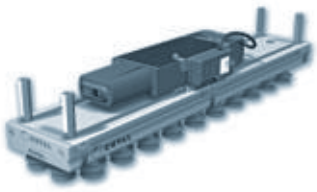


Note: all dimensions are in mm.

CVGL

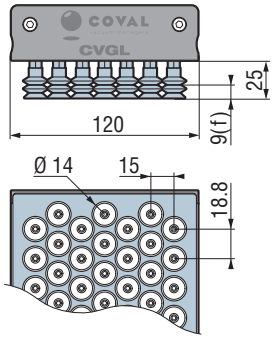
Compact and Light Vacuum Grippers

Gripping Interfaces and Characteristics

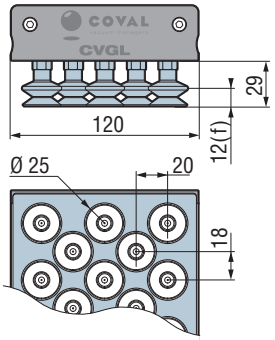


CVGL Series with Suction Cup Gripping Interface

"MINI" type suction cup gripping interface



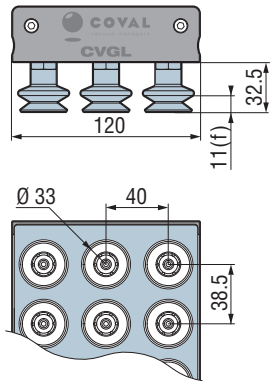
"MEDIUM" type suction cup gripping interface



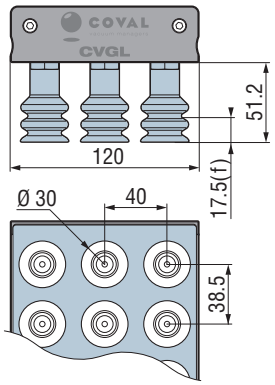
f: suction cup deflection

"MAXI" type suction cup gripping interface, STRAIGHT PATTERN

model VSA33

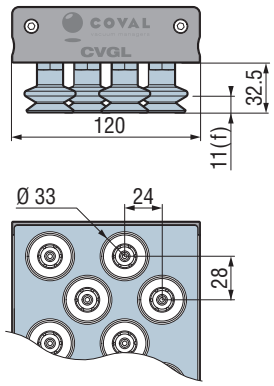


model MVS30

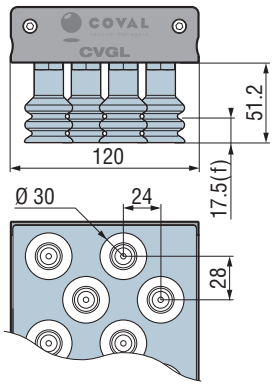


"MAXI" type suction cup gripping interface, STAGGERED PATTERN

model VSA33



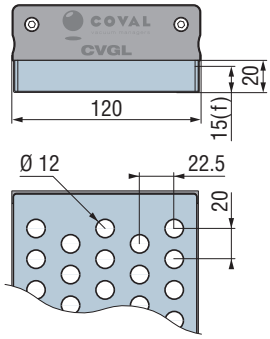
model MVS30



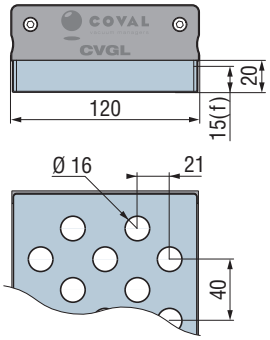
NUMBER OF SUCTION CUPS PER GRIPPING INTERFACE	CVGL424	CVGL624	CVGL824
"Mini" type suction cup Ø14 mm (Ø16 mm max.)	150	220	297
"Medium" type suction cup Ø25 mm (Ø18 to 25 mm)	55	83	113
"Maxi" type, STRAIGHT pattern Ø30 or Ø33 mm suction cups (Ø36 mm max.)	33	48	63
"Maxi" type, STAGGERED pattern Ø30 or 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

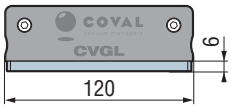


f: foam compression

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

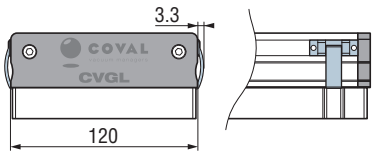
CVGL Series with "COVAL-flex" Gripping Interface

COVAL-flex



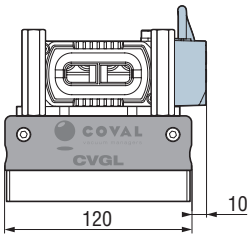
Option: quick installation of the interface

Option: CVGL ____**C**__
quick installation of the interface via spring clips



Option: HMI mounted on the vacuum generator

Option: CVGL ____**VI**

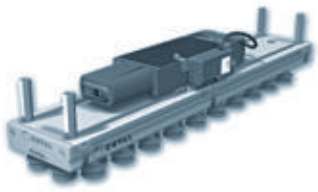


Note: all dimensions are in mm.

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

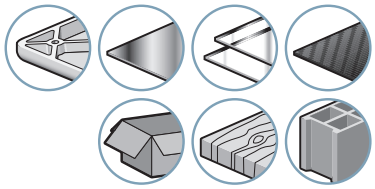
COVAL's MVG series vacuum grippers fully meet integrator and end user expectations in terms of power, robustness, communication, and ease of setup and use, while they remain compact and lightweight for easier integration in a smart factory.

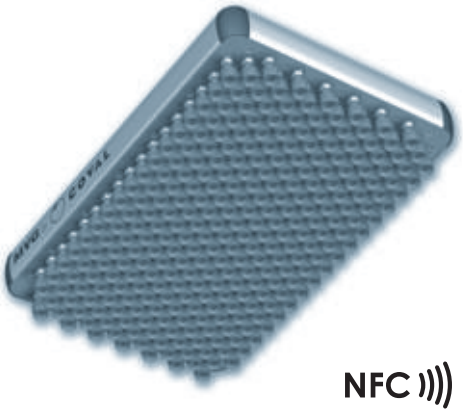
Their highly modular and flexible design makes them an optimal solution for handling objects of various sizes, shapes, and weights.

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





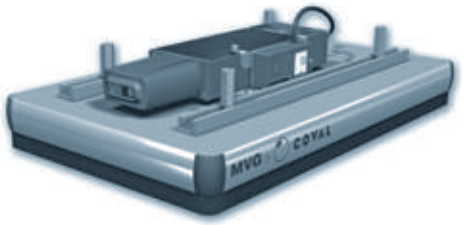
Custom Made by Design

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



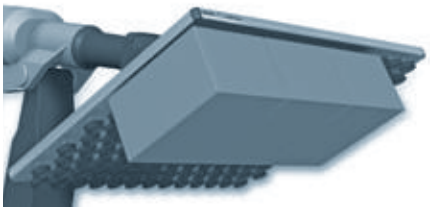
Advantages

- 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



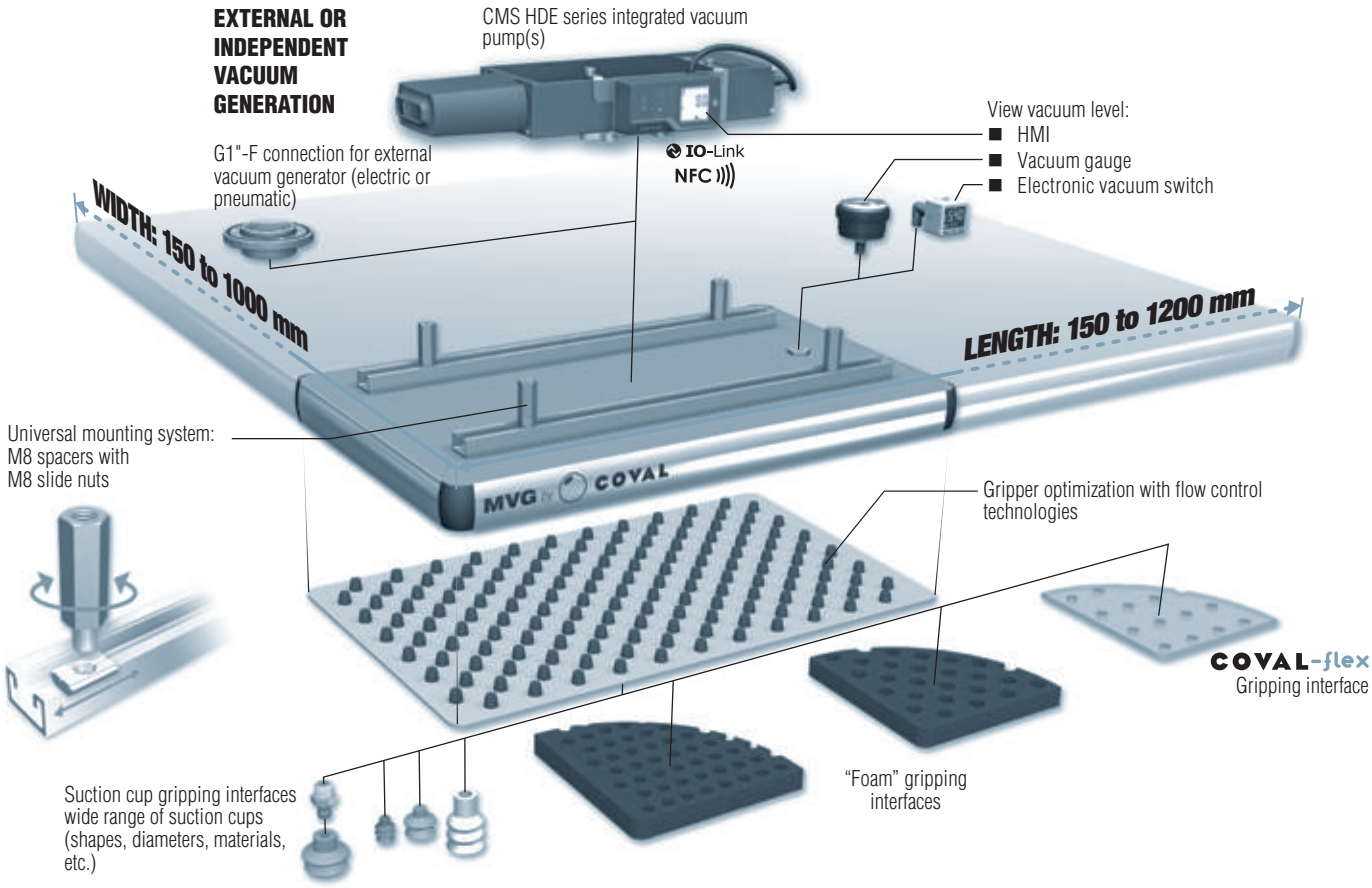
MVG
Modular Vacuum Grippers
General Information

Custom sizes
From 150 x 150 to 1200 x 1000 mm

Ultra-lightweight
Reduced payload weight

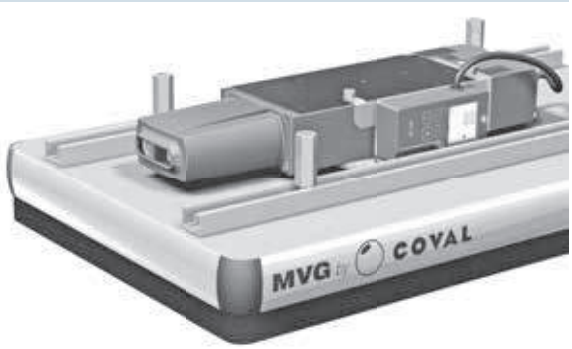
Configurable gripping interface
depending on the products to be handled

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

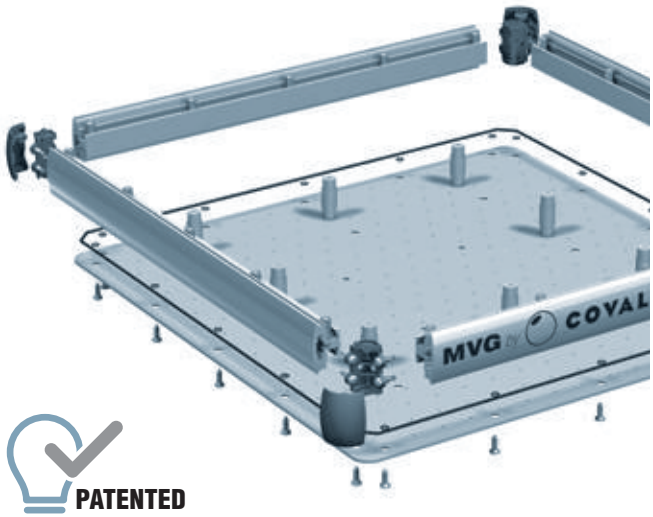
Ultra-Lightweight and Multi-Zone Design

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.



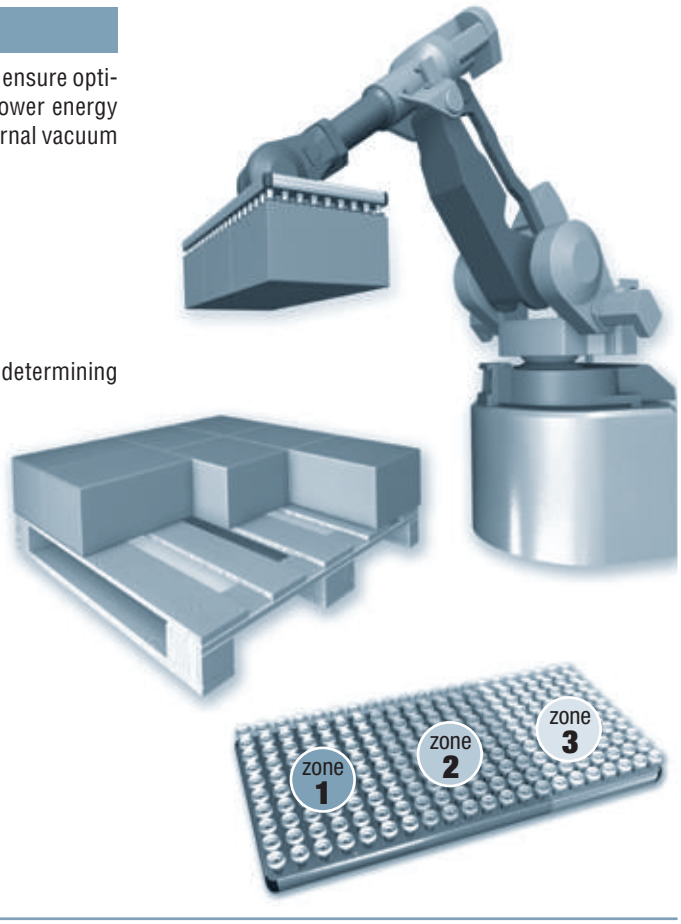
PATENTED TECHNOLOGY

Multi-Zone

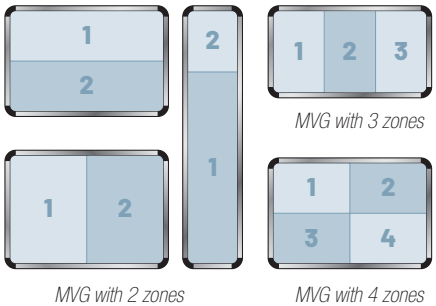
Independent gripping zones can be created on MVG vacuum grippers to ensure optimized vacuum management (higher vacuum levels, fewer leaks, and lower energy consumption). To achieve this, each zone has its own integrated or external vacuum generator.

- ➔ 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.

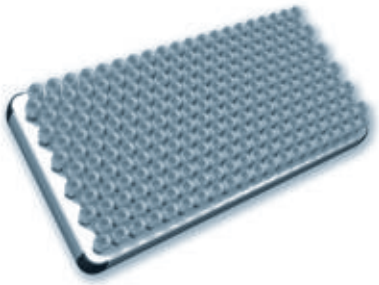
Choice of Gripping Interface

"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



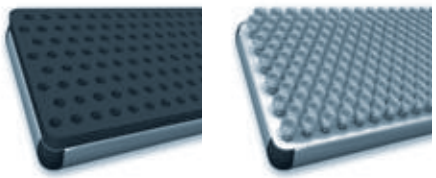
"COVAL-flex" Interface

- 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

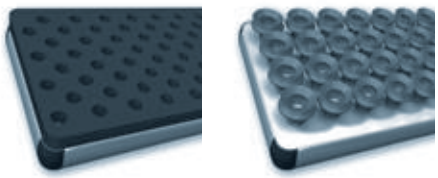


"MEDIUM"

- 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

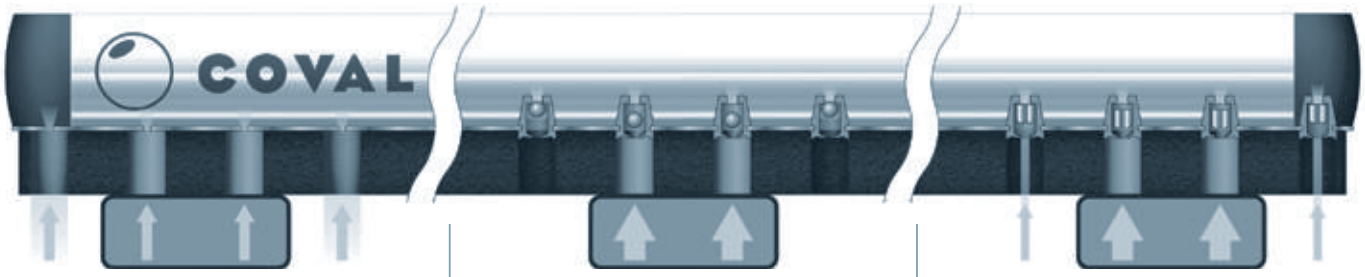


MVG
Modular Vacuum Grippers
Integrated Technologies

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

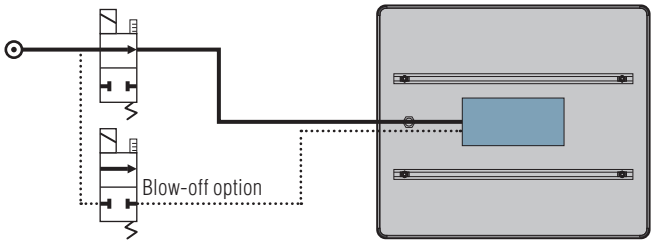
Check valves *(COVAL patent)*
- Limits the leakage rate in uncovered areas
- Instant gripping
- Highly versatile applications
- Quick release with blow-off
- Horizontal handling

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.

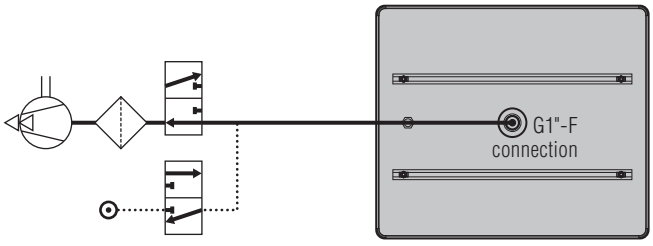
Advantages:
- A comprehensive solution
- 3 levels of suction power
- Option: vacuum and blow-off control
- Option: vacuum level display
- Option: IO-Link communication interface



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

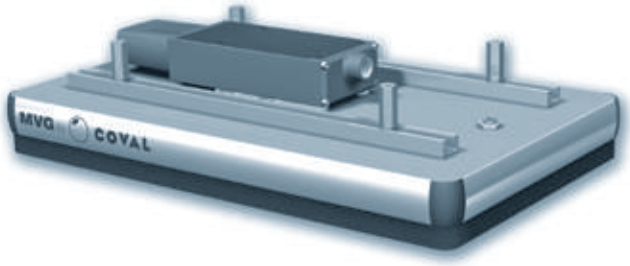
Integrated vacuum pump	Version	Min. gripper dimensions*
CMSHDE__50 (Version D1)	Without control (version NVO)	450 x 260 mm
	With control (versions VOC15P and VXC15P)	500 x 260 mm
CMSHDE__100 (Version D2)	Without control (version NVO)	450 x 260 mm
	With control (versions VOC15P and VXC15P)	500 x 260 mm
2xCMSHDE__100 (Version D2)	Without control (version NVO)	900 x 260 mm

** Dimensions are indicative and may change depending on selected options.*

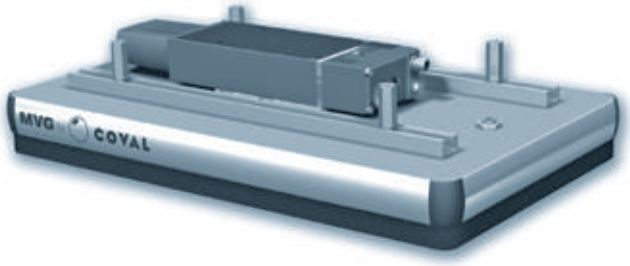
MVG
Modular Vacuum Grippers
Integrated Multi-Stage Vacuum Pumps

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

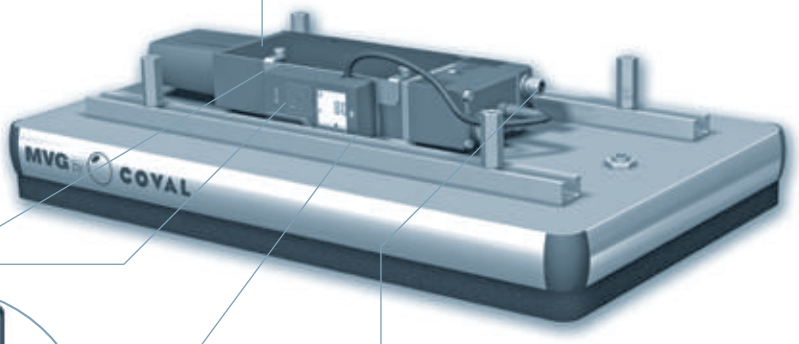


MVG__D_S1 / V1K
CMSHDE__**VOC15P**G4K multi-stage vacuum pump
- With vacuum and blow-off control
- Without vacuum switch
- One M12-5-pin connector
- Visual vacuum/blow-off indicators
- Digital inputs/outputs mode



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

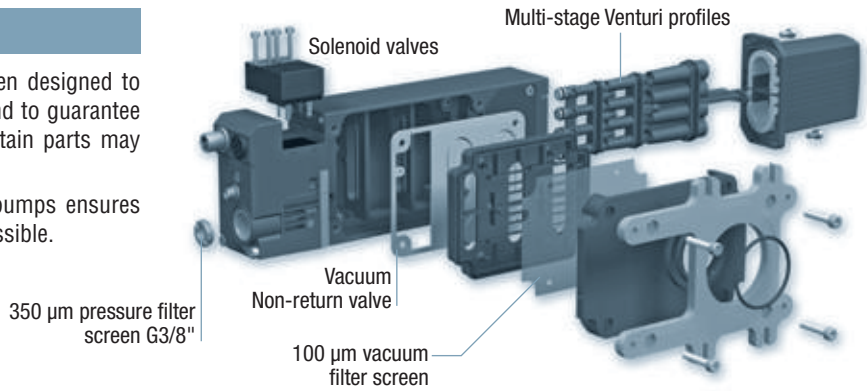
NFC

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

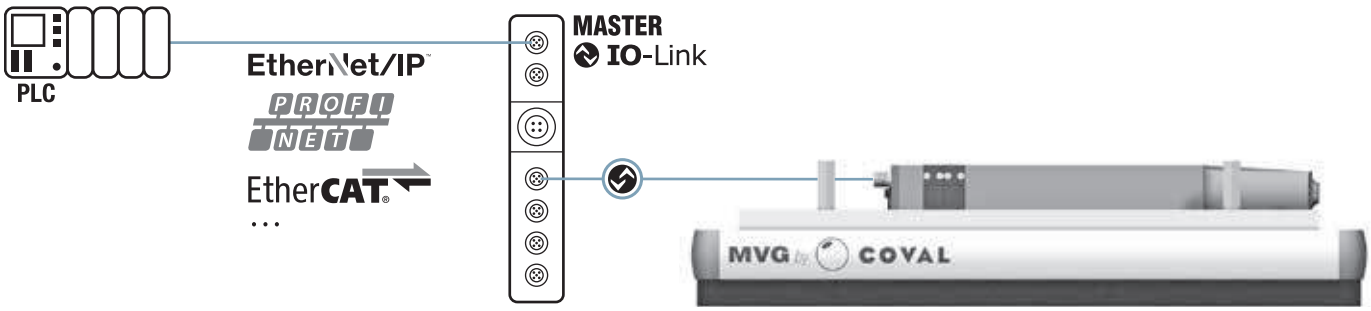
- Instantaneous vacuum level
- Object gripped and object lost information
- Alarms (high/low pressure, high/low voltage)
- Instantaneous pressure level

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

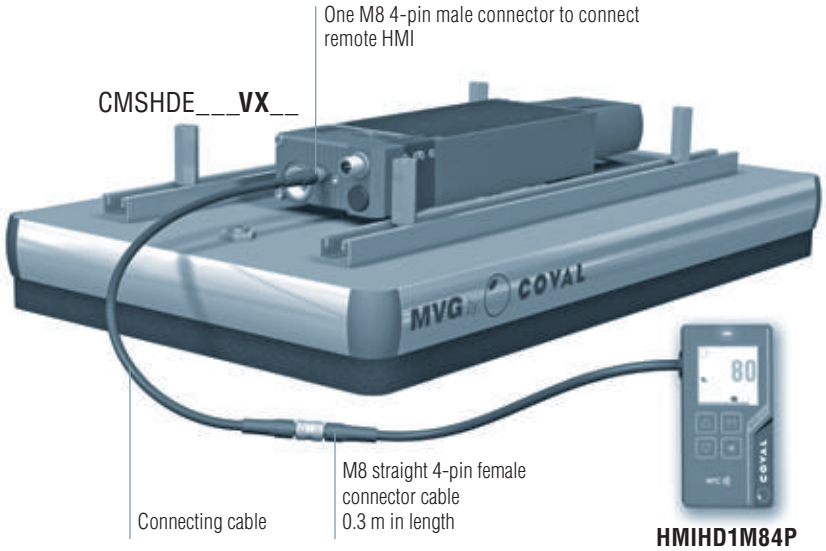
Mounted or Remote HMI

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

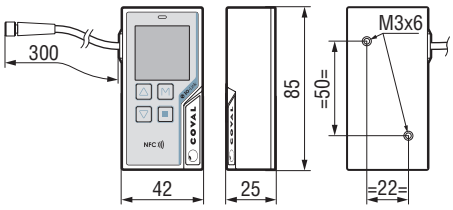
MVG vacuum grippers compatible with the HMI:

➔ 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.

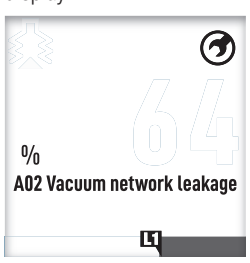


Note: all dimensions are in mm.

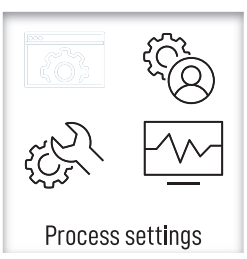
HMI Dialog Front Panel

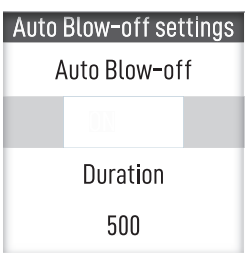
Gripping status indicator light:
- Green: object gripped
- Red: object lost

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
- 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.

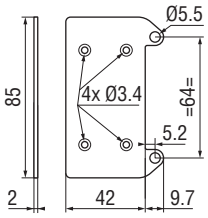
GET IT ON Google Play

Download on the App Store

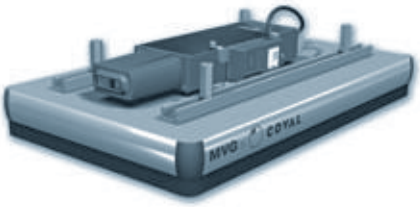
NFC APP: COVAL Vacuum Manager
Available for Android and iOS

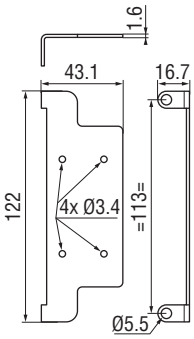
Accessories for Remote HMI

Front mounting plate
+ 2 x TORX M3x6
+ 2 x CHC M5x50
Part no.: **HMIHD1FIXA**

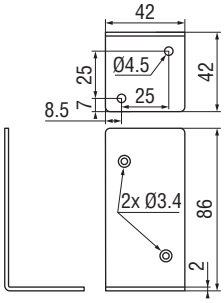


Side mounting plate
+ 2 x TORX M3x6
+ 2 x CHC M5x50
Part no.: **HMIHD1FIXC**





90° angled mounting plate
+ 2 x TORX M3x6
Part no.: **HMIHD1FIXB**

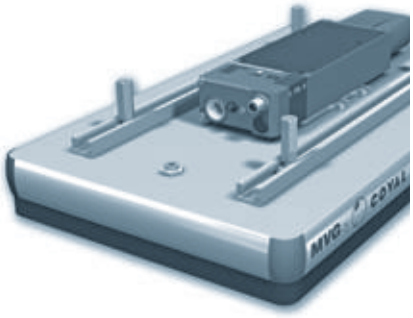


Connecting cable
M8 4-pin female/M8 4-pin male, compatible with cable chain

- 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



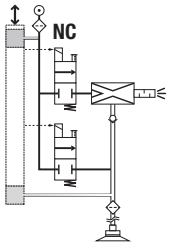
Multi-Stage Vacuum Pump Control

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

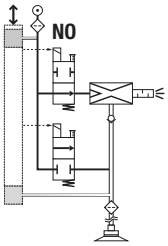
Model MVG__**S**_: vacuum gripper featuring a vacuum pump with **NC** vacuum control and **NC** blow-off control.
In the event of power failure, vacuum is no longer generated. In the event of compressed air failure, the vacuum is no longer maintained.



- 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*

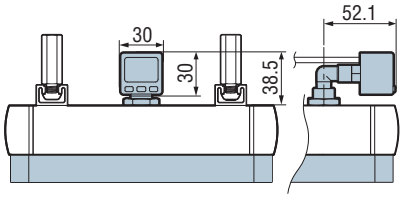
: connections for **IO**-Link

MVG
Modular Vacuum Grippers
Options, Dimensions, and Mounting Options

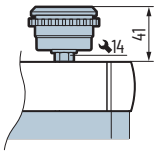
Vacuum Level Display

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



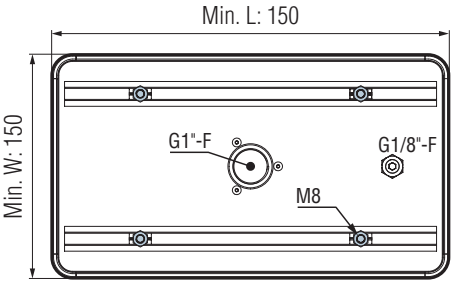
- **Option VF – vacuum gauge (VAF11140): MVG_____X__VF**
  - Damping: by silicone movement (patented)
  - Measuring: Bourdon tube in CuSn
  - Precision: cl. 2.5 (+/- 2.5% of max. scale value)
  - Enclosure: black ABS

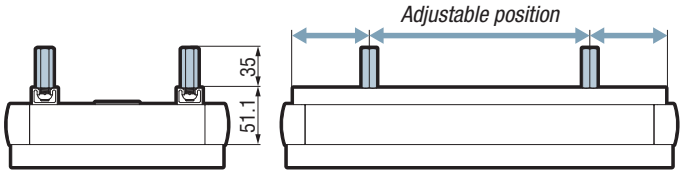


- **Option VI - IHM : MVG_____X__VI**

Version G0

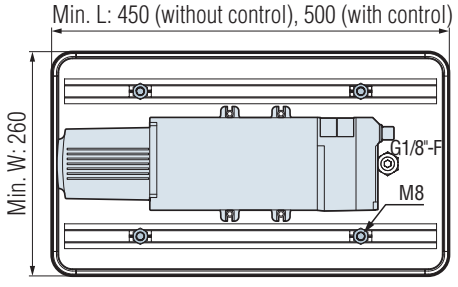
The G0 version of COVAL MVG series vacuum grippers (with external vacuum generator) can be mounted on all types of automated or robotic systems, using M8 spacers that slide in the grooves on the aluminum profile (fastened using M8 screws).
The number of M8 spacers used depends on the vacuum gripper's size.

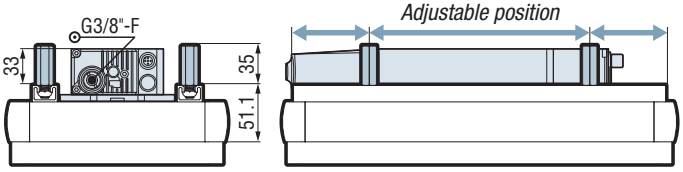




Version D1 or D2

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.





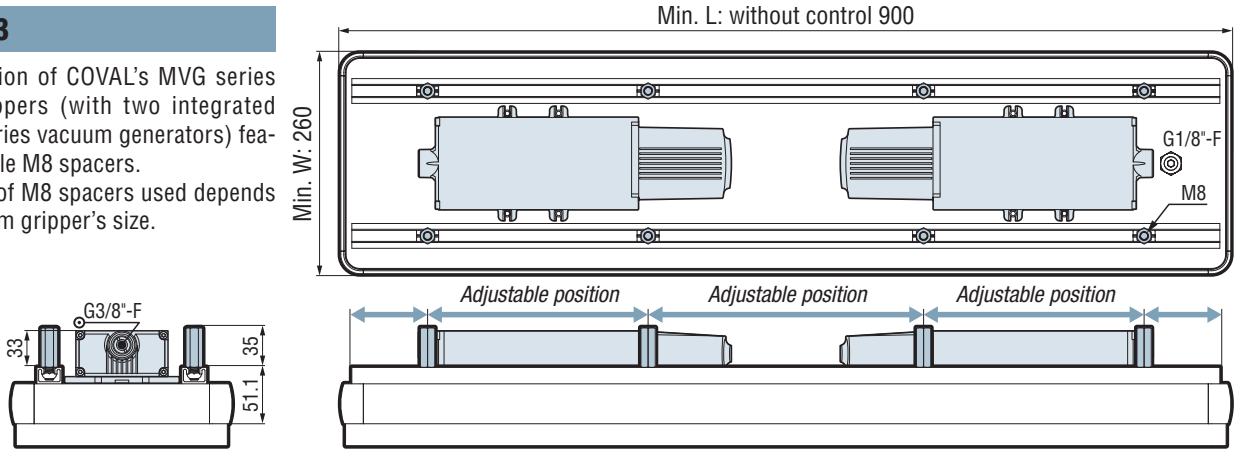
3D COVAL Data — You can access 3D files of all COVAL products in formats compatible with the main CAD software on COVAL's website **www.coval.com**

Note: all dimensions are in mm. Dimensions are indicative and may change depending on selected options.

MVG
Modular Vacuum Grippers
Dimensions and Mounting Options

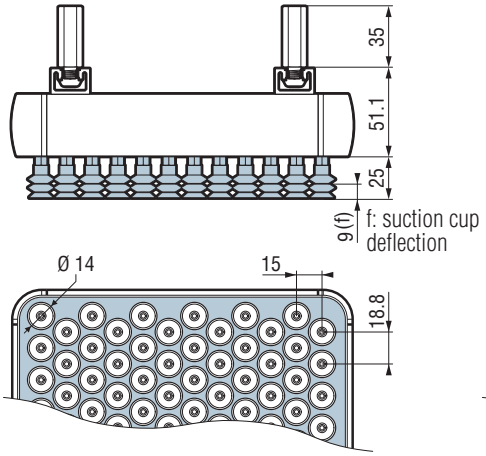
Version D3

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.

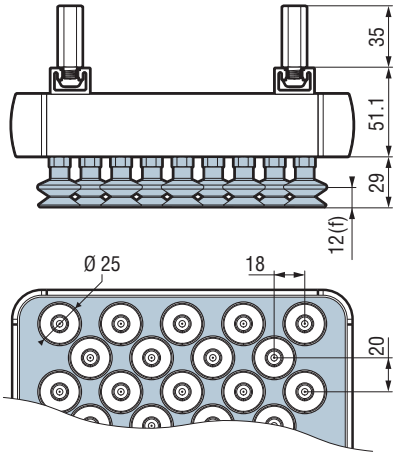


MVG Series with Suction Cup Gripping Interface

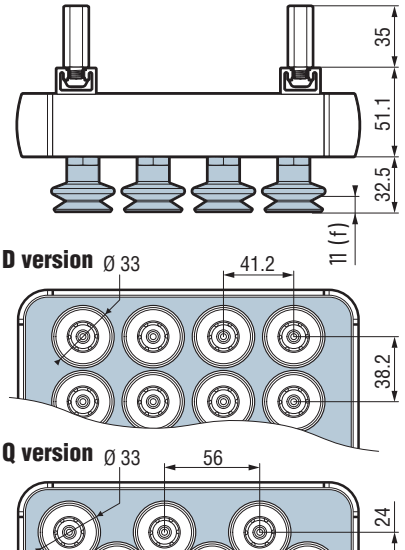
"Mini" suction cup interface



"Medium" suction cup interface

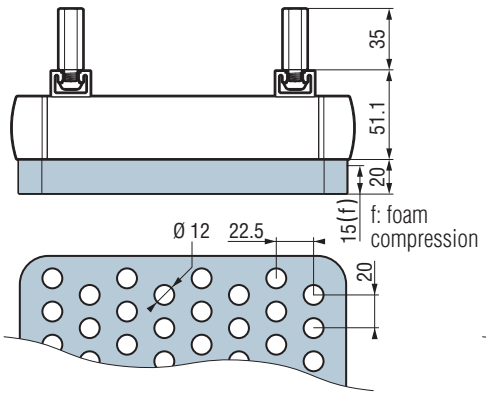


"Max" suction cup interface

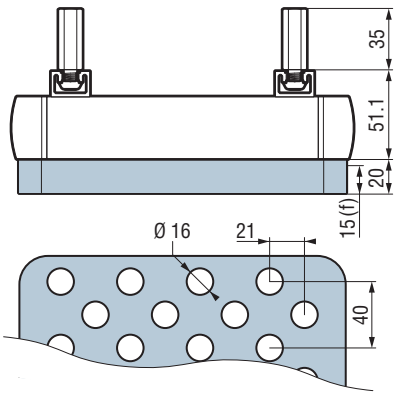


MVG Series with Foam Gripping Interface

"Mini" foam interface



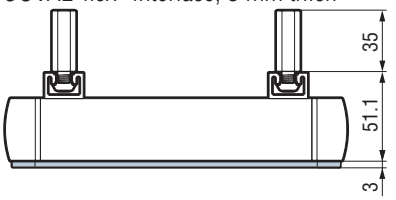
"Max" foam interface



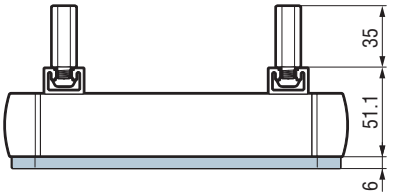
"COVAL-flex" Gripping Interface

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 → ...

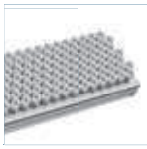
WIDTH

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

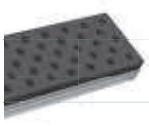
"Mini" interface: 2.5 bellows suction cups Ø 14 mm made of 35 Shore silicone with flow control nozzles.	VSP14BF
"Medium" interface: 1.5 bellow suction cups Ø 25 mm made of natural rubber with flow control nozzles.	VSA25JI
"Max" interface: 1.5 bellow suction cups Ø 33 mm made of natural rubber with flow 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	**D2**

** See table: "Vacuum pump configurations by gripper length".*

GENERATOR CONTROL

N	Without
S*	**CMSHDE__S_** Multi-stage vacuum pump with **NC** vacuum control and **NC** blow-off control. Choice of blow-off settings (only on MVG__**S2**_ models): ▪ Controlled by external signal ▪ Automatic timer from 50 to 9999 ms (advantage: saves one controller output)
V*	**CMSHDE__V_** Multi-stage vacuum pump with **NO** vacuum control and **NC**. ▪ Blow-off controlled by external signal

** Only for D1 and D2.*

GENERATOR CONFIGURATION

0	Without
1	**CMSHDE____VOC15P_** Controlled multi-stage vacuum pump without vacuum switch or HM ▪ One M12 5-pin male PNP ▪ Digital inputs/ outputs mode (SIO)
2	**CMSHDE____VXC15X_** ▪ Controlled multi-stage vacuum pump with integrated vacuum switch and pressure sensor, without HMI ▪ One M12 5-pin configurable as PNP/NPN ▪ One M8 4-pin male for remote HMI ▪ Electronic vacuum switch ▪ Digital Output DO1"object gripped" 24 V DC/NO ▪ Digital inputs/ outputs mode (SIO)/ IO-Link ▪ Compatible with HMI (for option **VI**)

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

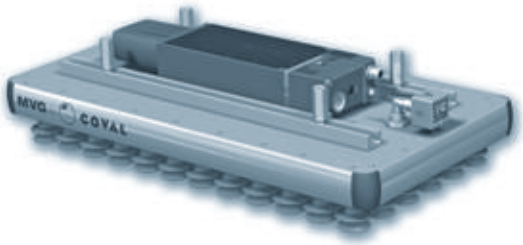
MVG vacuum gripper, 200 x 200 mm, “staggered” grip pattern layout, “max” EPDM foam gripping interface with filter, nozzles, and no integrated vacuum generator.

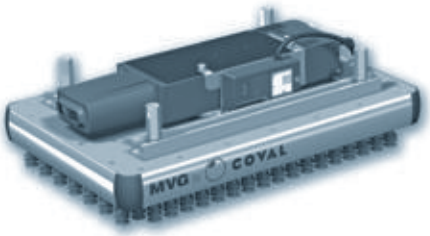
1.6 kg.

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

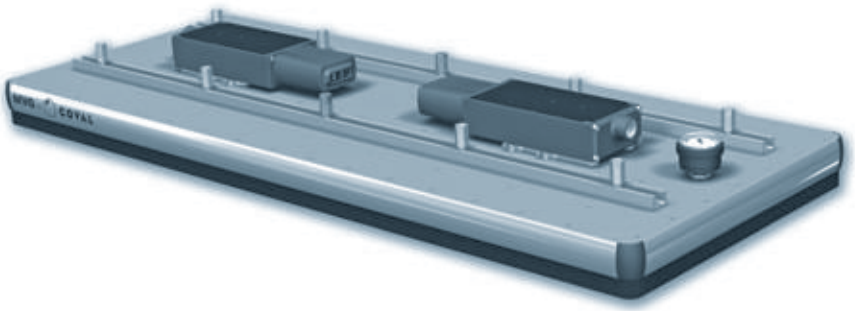
MVG vacuum gripper, 380 x 250 mm, “staggered” grip pattern layout, “mini” gripping interface, 2.5 bellows suction cups Ø 14 mm made of 35 Shore silicone with flow control nozzles, a CMSHDE_100_ multi-stage vacuum pump with NO vacuum control and NC blow-off control, vacuum switch, pressure sensor, and 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.

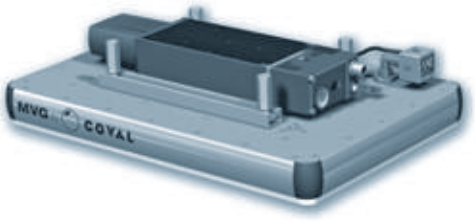


MVG
Modular Vacuum Grippers
Examples of Customized Versions

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

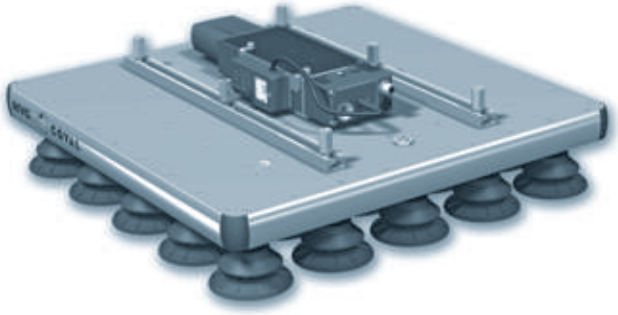
MVG vacuum gripper, 410 x 280 mm, “straight” grip pattern layout, 6 mm-thick COVAL-flex gripping interface with nozzles, a CMSHDE_100 multi-stage vacuum pump with NC vacuum and blow-off control, electronic vacuum switch with display for vacuum level display, and 4 through-holes for customer’s fitting requirements.

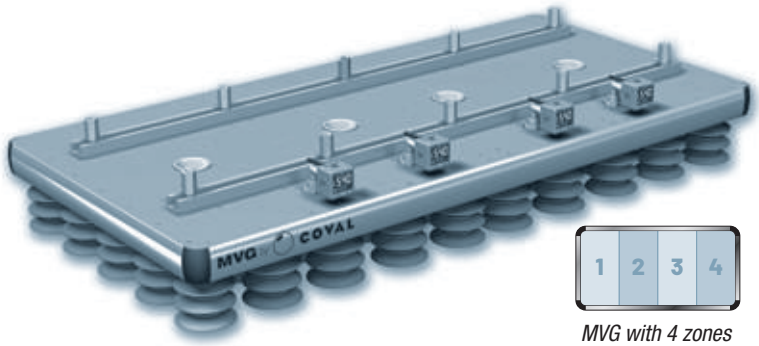
5 kg.

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

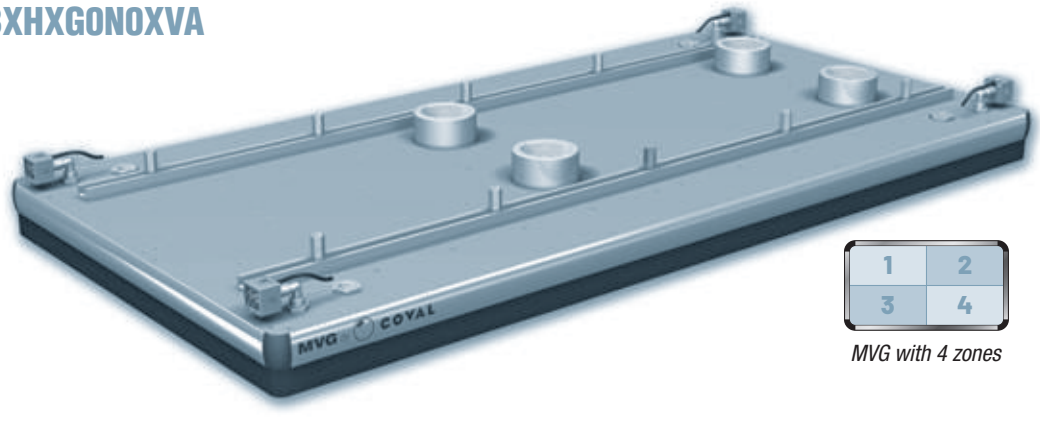
MVG vacuum gripper, 800 x 400 mm, “straight” grip pattern layout, gripping interface with VS series 2.5 bellows suction cups Ø 62 mm made of natural rubber with flow control nozzles, 4 independent zones equipped with an electronic vacuum switch with display, and no integrated vacuum generator.

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

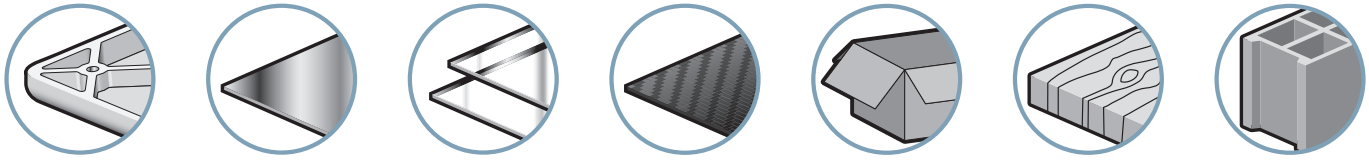
- Revision: 1.1
- Transmission rate: COM3 – 230.4 kbit/s
- Min. cycle time: 1 ms
- SIO mode: Yes
- Process Data Input (PDI): 6 bytes
- Process Data Output (PDO): 1 byte
- IO device description file (IODD) available for download

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

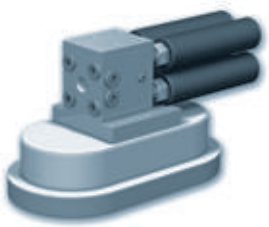
Industry-specific applications



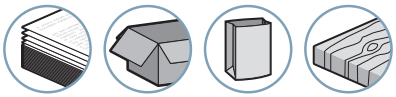
CSGS

Bags/sacks Gripping System

General Information



Industry-specific

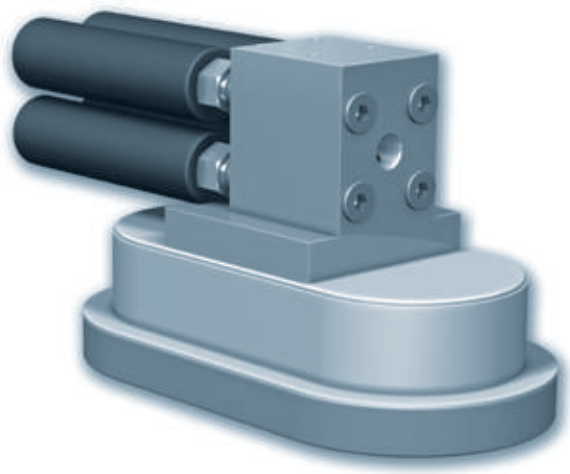


The CSGS system is a comprehensive package that includes a specific suction pad and an optimized vacuum generator and guarantees high reliability for handling plastic or paper bags from 25 to 60 kg, used for packing powder and/or granulated products.

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

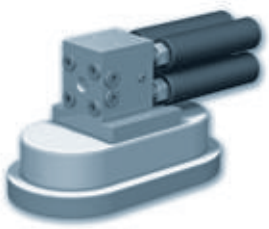
Feed pressure	Non-lubricated filtered air 2 to 6 bar
Optimal pressure	4 bar
Weight	From 7 to 8.3 kg, depending on model
Materials	NR, aluminum, CuZn, steel
Temperature	From 50 to 122 °F

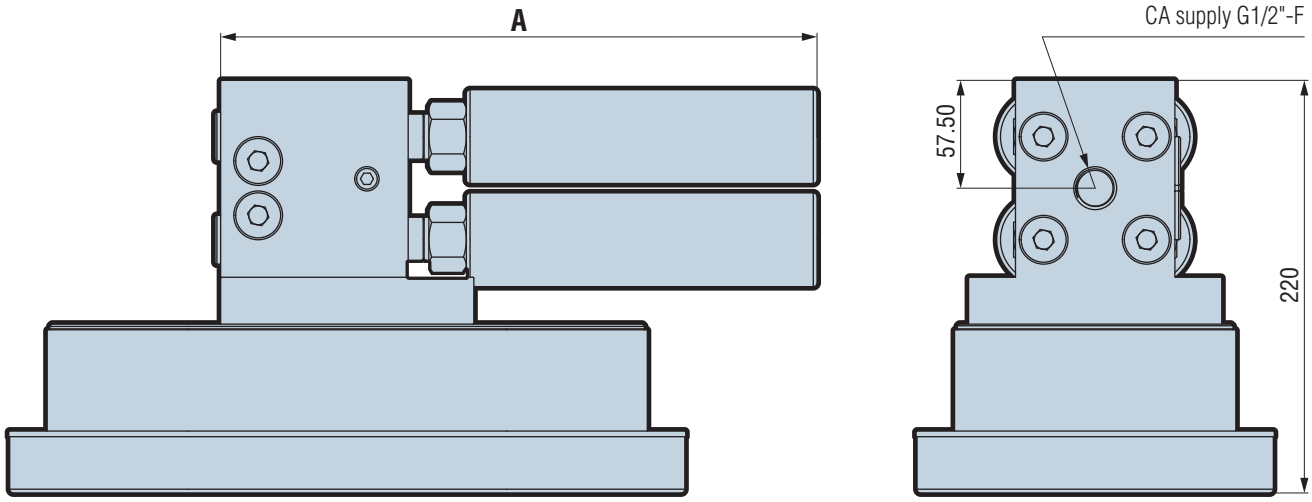
Characteristics

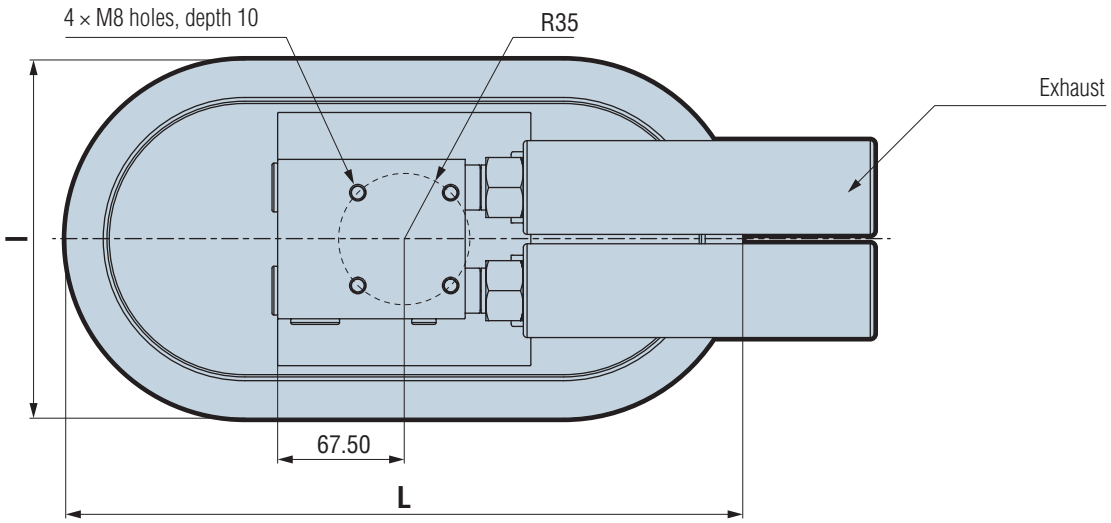
Model	Air consumed (SCFM)			Maximum vacuum (%)	Air drawn (SCFM)
	4 bar	5 bar	6 bar		
CSGS4X15X35	14.13	16.95	19.78	75	25.43
CSGS4X20X35	25.73	30.51	35.60	75	35.31
CSGS4X25X60	38.14	45.77	53.40	84	50.85
CSGS4X30X60	56.50	67.80	79.10	84	63.57

Please specify model, e.g.: CSGS4X15X35
Refer to characteristics table above

CSGS
Bags/sacks Gripping System
Dimensions







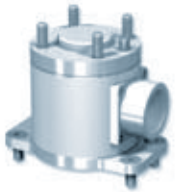
Model	L	I	A	Silencer
CSGS4X15X35	250	150	229	SILK12C
CSGS4X20X35	250	150	229	SILK12C
CSGS4X25X60	360	190	318	SILK34C
CSGS4X30X60	360	190	390	SILK34C

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

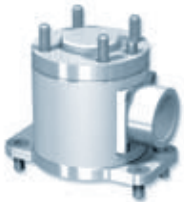
PA

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 14/9

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

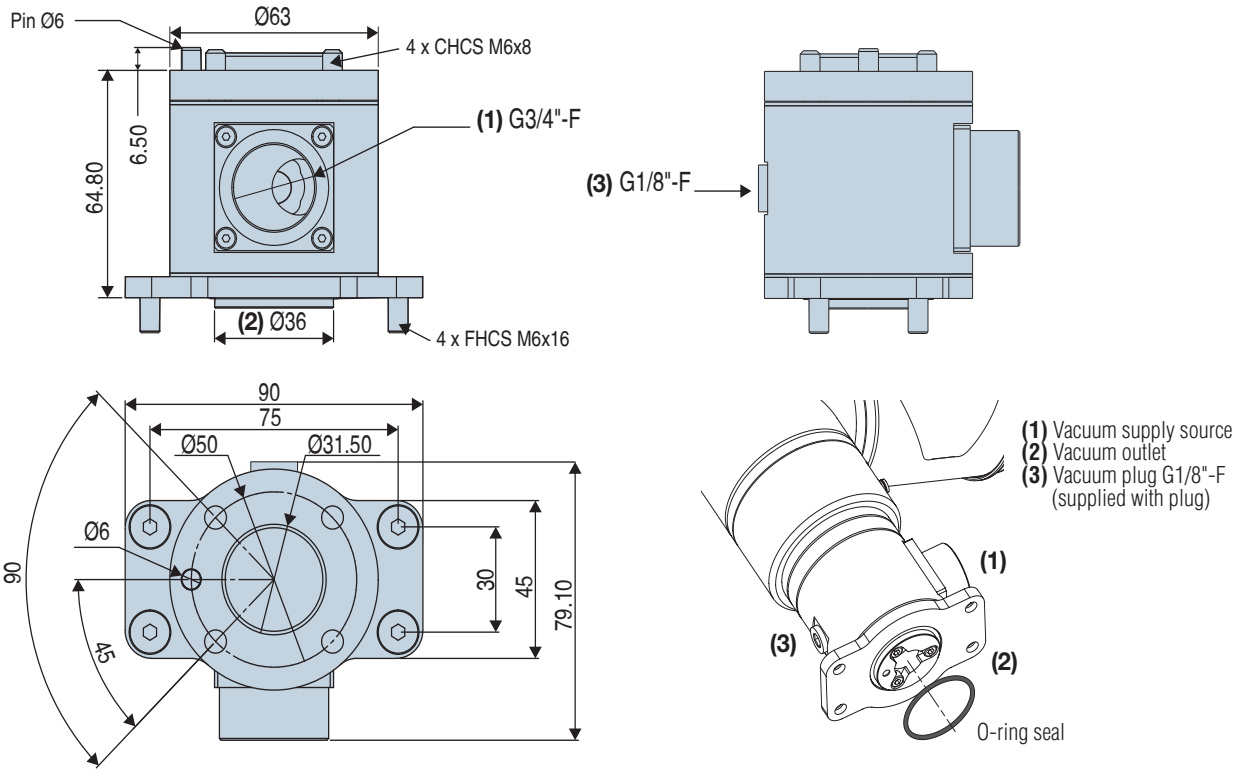
Characteristics

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

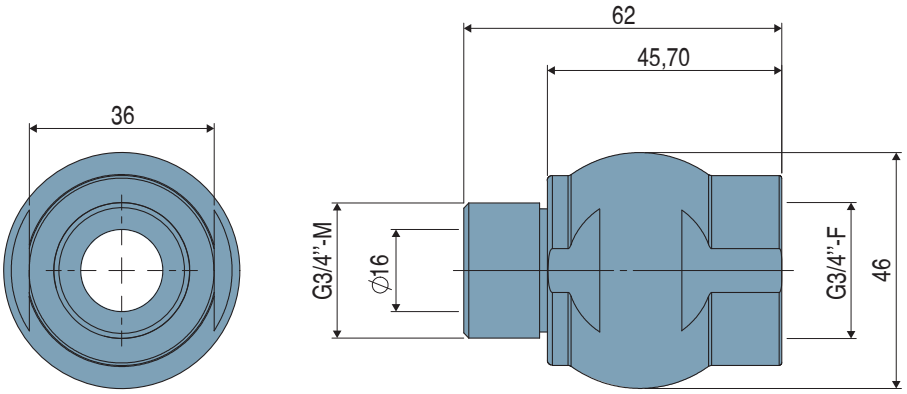
Characteristics

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

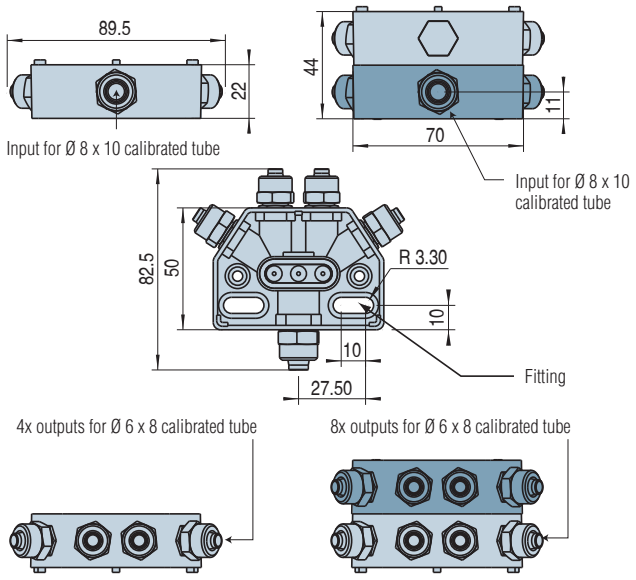
The NVS and NVR series vacuum feeders enable distribution of the vacuum in 4 to 8 channels by a simple unit. The 8/10 inputs and 4 or 8 6/8 outputs eliminate pressure loss.

Characteristics

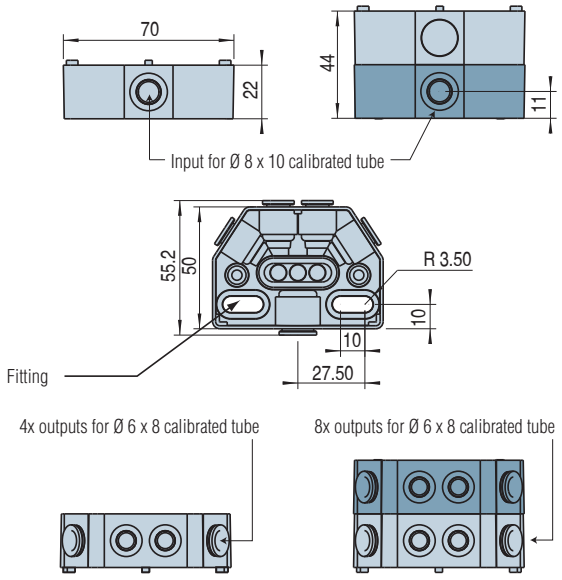
		Screwed vacuum fittings		Push fittings		Threaded
Models		**NVS 4**	**NVS 8**	**NVR 4**	**NVR 8**	**NVA 4**
Material	Body	PA 6.6 – 30 % fiber glass, black, ULVO94				Aluminium 2014 A
	fitting	Nickel-plated brass		PA		
For tube		calibrated polyamide or polyurethane (PUR)				4 x G1/4"-F and 1 x G3/8"-F
Vacuum		■ ++	■ ++	■	■	■ ++
Pressure (up to 10 bar max.)		-	-	■	■	■

■ ++ Recommended for vacuum networks with regulation

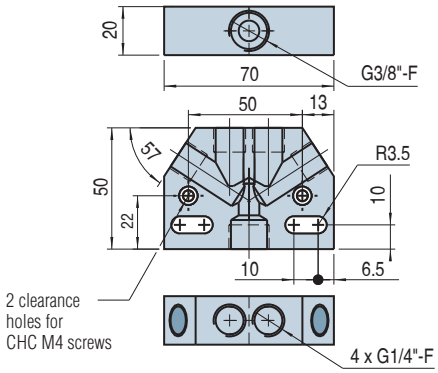
NVS 4 / NVS 8



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

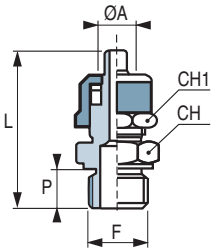
Range of special vacuum-tight fittings, fitted with O-ring (blue).

- 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

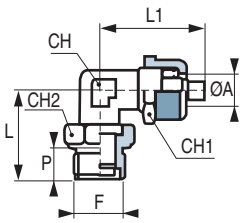
* 6/8 fittings are 5.5/8 compatible.



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

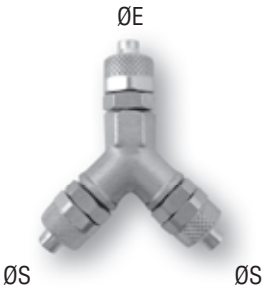
* 6/8 fittings are 5.5/8 compatible.



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

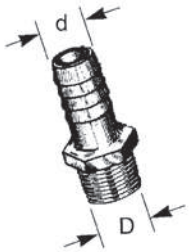
Fittings RVM, RVF, RVT

Barbed fittings used to connect the vacuum source to the vacuum tube to guarantee a rigid connection.

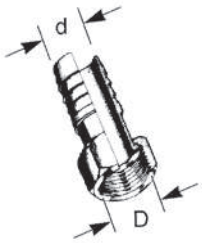
Material: **brass**

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

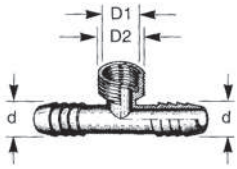
(*) Inside diameter of the suitable pipe



RVM



RVF



RVT

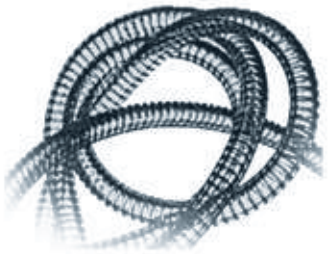
Vacuum Tubes TVR

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

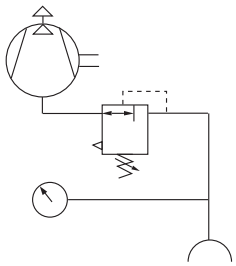
When connected to an electric vacuum pump, the REV series vacuum regulator ensures a precise, stable vacuum. The user can obtain very fine adjustment thanks to the adjustment knob.

Characteristics

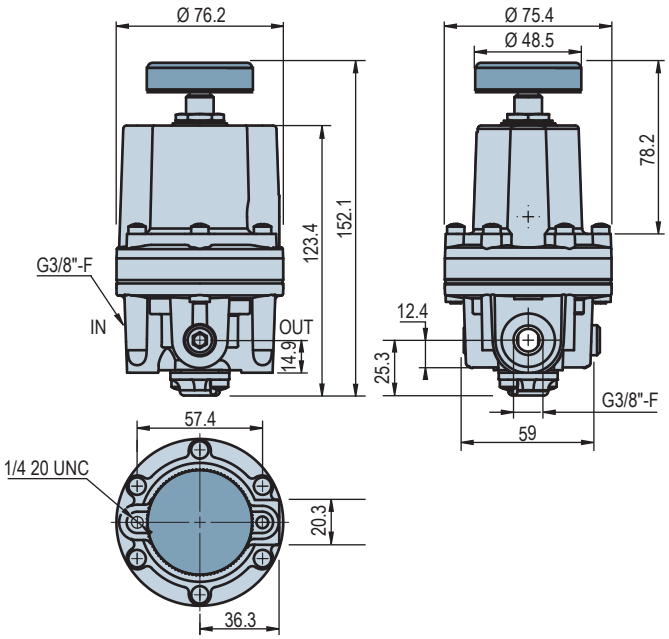
- Vacuum supply (Max): -1013 mbar
- Adjustment precision: 3.4 mbar
- Through flow: 3 SCFM to -846 mbar
- Operating temperature : 40 to 194°F

Specifications	
Adjustment	By threaded pin

Material:
Body: **Aluminum**
Internal system: **brass, zinc-plated steel**
Elastomer: **Nitrile**



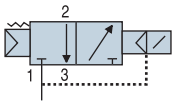
Dimensions



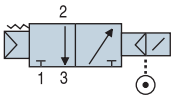
For all orders, please specify: REV 38

AG
Vacuum Valves, 3 channels

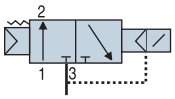
NC vacuum supplied servo
3: Exhaust
2: Use
1: Pump



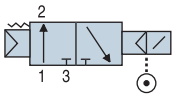
NC C.A. supplied servo
3: Exhaust
2: Use
1: Pump



NO vacuum supplied servo
3: Exhaust
2: Use
1: Pump



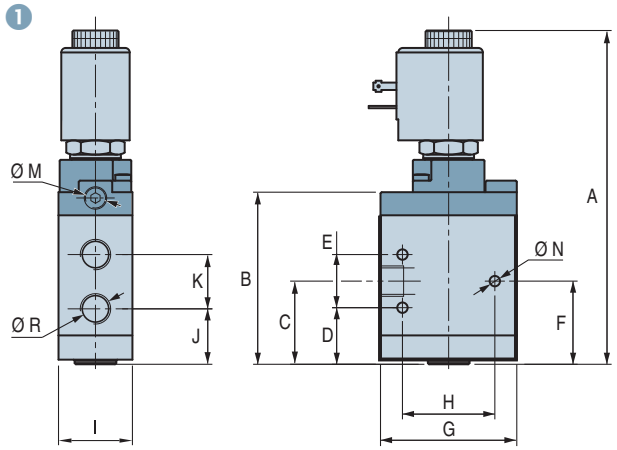
NO C.A. supplied servo
3: Exhaust
2: Use
1: Pump



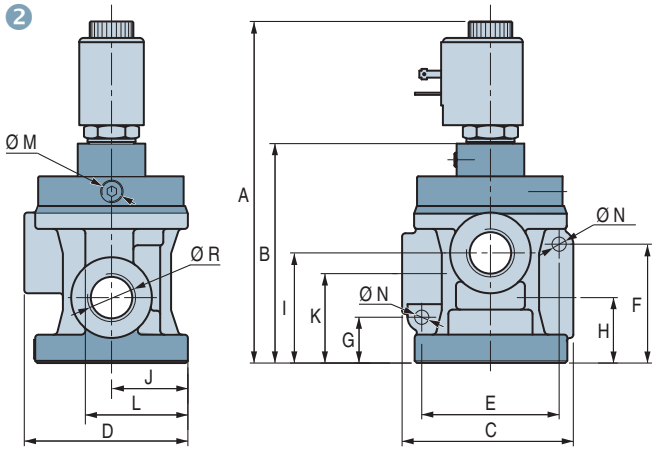
Characteristics and Dimensions

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	102	48.5	16	5.3	-	15.8	36	28	25	7	17.5	-	M5-F	4.5
AG 3010	AG 3009	AG 3211	AG 3210	G1/4"-F	1	140.5	74	36	24.5	23	35.5	59	40	32	24	22.5	-	G1/8"-F	4.5
AG 3012	AG 3011	AG 3215	AG 3214	G3/8"-F	1	140.5	74	36	24.5	23	35.5	59	40	32	24	22.5	-	G1/8"-F	4.5
AG 3021	AG 3020	AG 3223	AG 3222	G1/2"-F	2	154	100	78.5	75	63	54.5	21	30	50.5	35	41	47	G1/8"-F	6.4
AG 3041	AG 3040	AG 3233	AG 3232	G3/4"-F	2	154	100	78.5	75	63	54.5	21	30	50.5	35	41	47	G1/8"-F	6.4
AG 3051	AG 3050	AG 3243	AG 3242	G1"-F	2	175	115	101	89	76	62.5	25.5	38	64	40	51	55	G1/8"-F	8.4
AG 3063	AG 3062	AG 3257	AG 3256	G1"1/2-F	2	245.5	150	158	138	113.5	113	34	68	96	59	68	85	G1/8"-F	11

❶



❷



Specifications

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 %	-

Flow Rate

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 [m^3/h]	1.5	4	10	20	35	90	180
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

(1) with monostable electrical control

Note: All dimensions are in mm

Voltage code

Code	E1	E2	E3	E4	E5	E7
Voltage	24 VDC	220 VAC	24 VAC	110 VAC	48 VAC	12 VDC

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		

Alphabetical index

A

AG
Vacuum Valves, 3 channels 14/8

B

BM
Foam Strips 4/14

C

C
High-performance Suction Cups 2/59

CBP
Pilot Control Cartridge 6/16

CC
Screw-type Electrical Connectors M8 and M12 11/12

CD
Screw-type Electrical Connectors M8 and M12 11/12

CMS HD
Heavy Duty Multi-stage Vacuum Pumps 8/65

COV
Collars 14/6

CSGS
Bags/sacks Gripping System 13/42

CSP
Piloted Safety Valves 4/13

CTC
High-Performance Bell-type Suction Cups 2/63

CVGC
Carbon Vacuum Grippers for Collaborative Robots 13/2

CVGL
Compact and Light Vacuum Grippers 13/6

CVP
Vacuum Cartridges 6/8

CVPC
Controlled Vacuum Cartridges 6/12

F

Flow Control Fittings 4/10

FPC
FlowPack Suction Cups 3/4

FSLI
Liquid Separator Vacuum Filters 11/10

FVG
Mini Vacuum Filters 11/8

FVI
Vacuum Filters 11/5

FVL 12
In-line Filter 11/9

FVL 68
In-line Vacuum Filter 11/9

FVUG
In-line Filters 11/7

FVUM
In-line Filters 11/7

G

GEMP
Simple Vacuum Pumps with ASR 7/8

GVEC
“Easy Clean” Vacuum Pumps 7/11

GVMAX HD
Heavy Duty Communicating Vacuum Pumps 8/51

GVP
Vacuum Pumps 7/2

GVR 09, 10, 12, 14
Micro Ejectors 6/6

I

IMU
Axial Ball-joints 4/12

L

L
Mounting Extensions 4/8

LEM
Integrated Mini-Vacuum Pumps with "ASR" 8/3

LEM+
Compact, High Flow Vacuum Pumps with "ASR" 8/39

LEMAX
Integrated Mini Vacuum Pumps with "ASC" 8/11

LEMAX IO
Mini Vacuum Pumps with Communication IO-Link 8/19

LEMAX+
Compact, High Flow Vacuum Pumps with "ASC" 8/45

LEMCOM
1st Mini Vacuum Pump on Industrial Fieldbus 8/27

LEMP
Mini Vacuum Pumps without control with ASR 7/14

M

M--C
Air Amplifiers 9/2

MD
Air amplifiers 9/5

MS
Quick Release Devices 11/4

MVG
Modular Vacuum Grippers 13/24

MVP
Suction Cups with 4.5 Bellows 3/10

Alphabetical index

MVS
Soft Suction Cups for High Speed Applications 3/7

N

NVA
Vacuum Feeders 14/4

NVR
Vacuum Feeders 14/4

NVS
Vacuum Feeders 14/4

P

PA
Angular Jaw Clamps 14/9

PMG2
Mechanical Feelers 4/11

PSA 100 C
Electronic Vacuum Switch with Display 12/4

PSD 100
Vacuum Switch with 3-colour Display 12/5

PSE 100 E
Electric Vacuum Switch 12/9

PSE 100 P
Pneumatic Vacuum Switch 12/10

PSE 100 PK
Pneumatic Vacuum Switch 12/11

PSK
Mini Vacuum Switch 12/3

PSP 100
Electronic Vacuum Switch 12/7

PSP 100 ANA
Electronic Vacuum Switch Analogue Output 12/8

PVS
Dry vane vacuum pumps 10/2

Q

QR
Diffuser-type Silencers 11/3

R

RCOV
Screwed Vacuum Fittings with O-ring 14/5

RDV
Screwed Vacuum Fittings with O-ring 14/5

REV 38
Vacuum Regulator 14/7

RSC
Multi-Compensator Systems 4/5

RVF
Fittings 14/6

RVM
Fittings 14/6

RVT
Fittings 14/6

S

SIL GV
Diffuser Type Silencer 11/11

SIL K--C
Through-type Silencer 11/11

SPL
Heavy Load Suction Cups 3/37

STEEL
Steel Suction Cups with Bonded Seal 3/38

T

TCL
Side-channel Blowers, single-stage and two-stage 10/6

TS
Level Compensators 4/4, 4/5

TS 11
Level Compensators 4/3

TSOG
Anti-Rotation Level Compensators 4/7

TSOP
Anti-Rotation Level Compensators 4/6

TVM
Pipes for Air Amplifiers 9/6

TVR
Vacuum Tubes 14/6

V

VAF 111
Vacuum Gauge 12/12

VBO
Suction Cup for Bottle Handling via the Punt 3/27

VP
Flat Suction Cups Ø 8 to 75 mm 2/3

VPA
Suction Cups for Paper Applications 3/29

VPAG
Rounded Suction Cups 3/34

VPAL
Suction Cups for Labels 3/31

VPBO
Coupler Plates for gripping bottles by the punt 3/28

VPF
Flat Suction Cups with Cleats Ø 15 to 50 mm 2/20

VPG
Extra-Flat Suction Cups Ø 2 to 200 mm 2/9

Alphabetical index

VPO
Oblong Flat Suction Cups 2/23

VPR
Suction Cups for Mailing Applications 3/33

VPSC
Ultra-Flat, Non-Marking Suction Cups 3/35

VPU
Flat Suction Cups Ø 6 to 50 mm 2/17

VPYR
Radial Ball-joint Suction Cups 3/36

VR 05, 07, 09
Heavy-duty In-line Ejectors 6/2

VR 10, 12, 14
Ejector Fittings 6/4

VRS
Vacuum Rotary Connection 14/3

VRU
Vacuum Rotary Union 14/2

VS
Suction Cups with 2.5 Bellows Ø 5 to 88 mm 2/47

VSA
Suction Cups with 1.5 Bellows Ø 5 to 78 mm 2/27

VSAB
Suction Cups with 1.5 Bellows Ø 5 to 50 mm 2/33

VSAF
Suction Cup for Cheese 3/13

VSAG
Suction Cups with 1.5 Bellows Ø 10 to 150 mm 2/37

VSAJ
Suction Cups with 1.5 Bellows Ø 15 to 30 mm 2/43

VSAOF
Oblong Suction Cup for Cheese 3/14

VSAPL
Suction Cups with 1.5 Bellows for Labels 3/32

VSA-VS BM
Suction Cups with Foam Ring Seals 2/65

VSA-VS-BM-SIF
Suction Cups with Foam Ring Seals 2/67

VSBM
Foam Rings 2/68

VSBO, VSBO+
Suction Cups for Bottle Handling 3/18

VSBO LM/BM
Suction Cups for Bottle Handling 3/24

VSD
Long Stroke Suction Cups 2/55

Suction Cups for Bakery Applications 3/15

VSE
Suction Cups for Bakery Applications 3/15

VSG
Suction Cups with 2.5 Bellows Ø 5 and 7 mm 2/53

VSO
Suction Cups for Egg-handling 3/17

VSP
Suction Cups for Bakery Applications 3/15

Y

Y
Screwed Vacuum Fittings with O-ring 14/5

Learning Material

Test Case

Vacuokit 1
Standard
More information

Vacuokit 3
Food Industry
More information

COVAL
vacuum managers

A TECHNOLOGICAL PARTNER ON A GLOBAL SCALE

Located in the southeast region of France, COVAL conceives, manufactures and globally distributes high performance, advanced vacuum automation components and systems for industrial applications in all branches.

COVAL is an ISO 9001:V2015 certified company which offers innovative solutions integrating reliable and optimized components with intelligent functionalities. The focus is to provide the most personalized and economic solution to a given application while assuring a significant improvement in the productivity and the safety for the vacuum users around the world.

COVAL has an ambition for technical excellence and innovation. As a specialist in vacuum automation, COVAL is reputed for offering reliable, personalized, cost effective and productive solutions.

The references of COVAL can be found in several industrial sectors (Packaging, Food Industry, Automotive, Plastics, Aeronautics...) where vacuum handling is important for high efficiency and productivity.

COVAL markets its products and services all over Europe, in the United States and South America through its subsidiaries and authorized distribution network. COVAL strives to provide customer driven solutions and gives the best possible treatment to satisfy all its clients.

For all enquiries from Australia, Africa and Asia kindly contact COVAL head office in France.

COVAL S.A.S.
Head Office

COVAL INC.

COVAL IBERICA

COVAL GERMANY

COVAL ITALIA

COVAL CHINA

Distributed by:

DISTRIBUTED BY:

Air-Oil Systems, Inc.
AUTOMATION SOLUTIONS
753 WAMBOLD ROAD SOUDERTON, PA 18964-2715
215.721.9595 800.333.5520 FAX 215.721.7666
www.airoil.com

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

© COVAL – 01/2024 - Illustrations KeyDx - The diagrams are not contractual. The range and the products characteristics may be modified by COVAL without notice.