COVAL

vacuum managers

GENERAL CATALOGUE

vacuum components

ADVANCED VACUUM SOLUTIONS

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US2

VACUUM MANAGERS
OUR PROMISE

Our promise is to help our clients improve their productivity through a better understanding of vacuum automation, at each step of their manufacturing processes.

For this, Coval develops high quality innovative products and engages itself in offering its clients with quality consulting, reliable solutions and services adapted to their needs.

And this is why it says, "**VACUUM MANAGERS**" under **COVAL**.

We impose ourselves with strict exigencies during the conception and manufacturing of our products, thereby giving a special attention to the factors related to efficiency and the reliability of your installations (reduction of the energy consumption, noise level, clogging and over all cost of the equipment).

Our ambitious strategy relies on three fundamentals:

- A know-how of more than 20 years in the vacuum automation field.
- A cooperative strategy with our experienced staff & innovation partners.
- A strong presence in the proximity of our clients thanks to our sales team, our subsidiaries and our authorized distributors & independent representatives.

We invite you to discover all our solutions, especially our new products in this catalogue.

Our team of specialists will always be there to offer their expertise and necessary support to realize your projects.

Michel Cecchin
C.E.O.

LEMAX SITON® MVS SERIE C LEM





COVAL
vacuum managers

COVAL SERVICES

vacuum components

▶ 3D ONLINE LIBRARY

You have free access to 3D files of all our products in formats compatible with the main CAD software from our website at www.coval.com
You can use this fast, new, reliable service to make it easier to integrate our components directly into your designs.

3D COVAL Data

▶ ALL THE COVAL PRODUCT RANGES ONLINE

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vacuum management

▶ TELEPHONE HOTLINE

Your questions cover a wide range of subjects: technical enquiries, enquiries for products or spare parts, usage advice, requests for technical documentation or more specifically elimination of pressure loss, noise reduction, and energy savings.
Our advisers are specialists in vacuum automation applications and can provide you with technical solutions to get the best performance from your production equipment.

Please do not hesitate to contact your local COVAL adviser.

▶ SPECIFIC SOLUTIONS

Your business sometimes presents situations for which standard components are not suitable.

COVAL can provide you with solutions based on your specifications using the full range of technologies in which our engineers are specialized:

▶ adaptation of a product to your specifications.

ADVANCED VACUUM SOLUTIONS

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SUCTION PADS (continued and end)

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VACUUM PUMPS (continued and end)

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ACCESSORIES

Vacuum handling guide

Vacuum applications and measurements

■ Vacuum handling development

An industrial vacuum applied to suction pads is an efficient method for handling objects and materials.

This technique was developped to answer the 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.

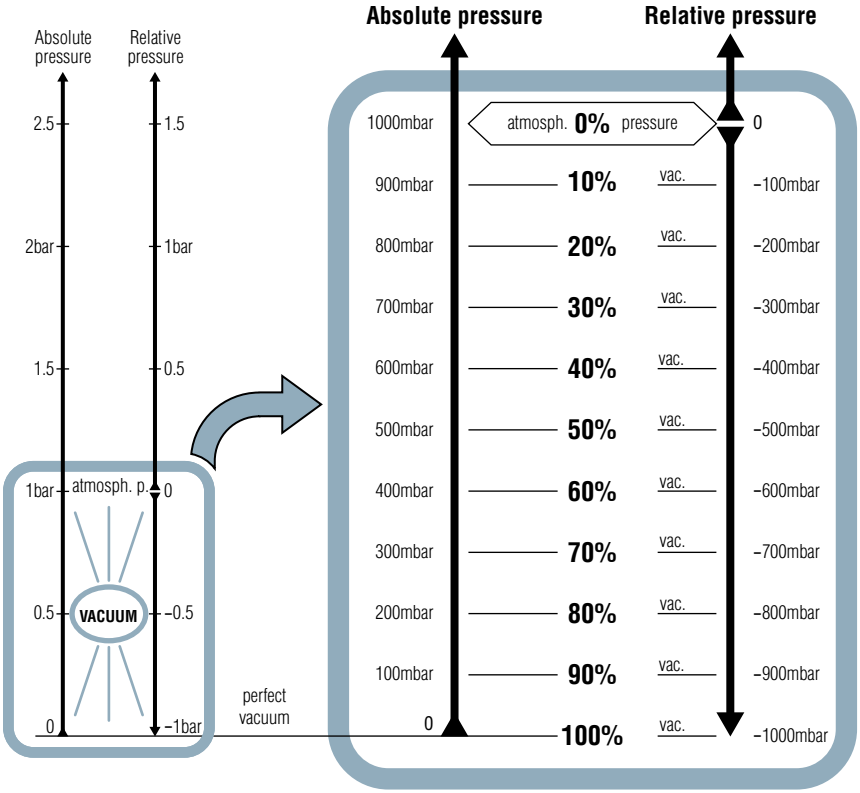
■ Measuring the vacuum level

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

For industrial applications, relative pressure is preferred. This makes a clear distinction between vacuum (negative pressure) and positive pressures.

In handling applications, the vacuum is only effective through 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 the vacuum level as a percentage of the atmospheric pressure.

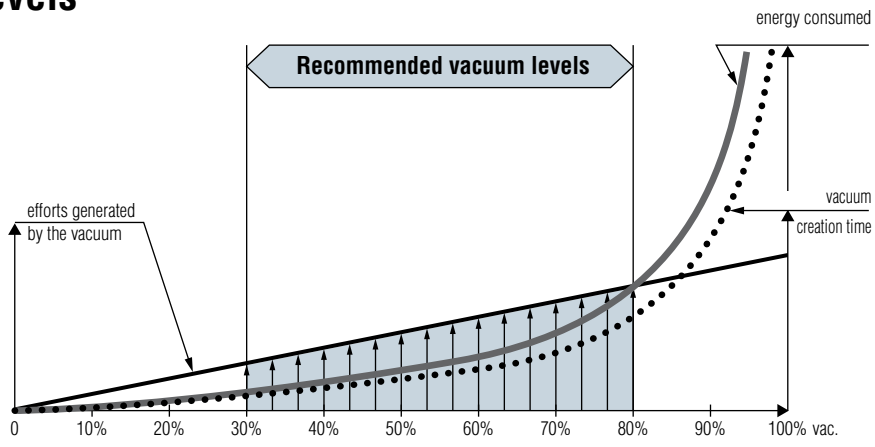
The scale shown to the right expresses the correspondence between pressures expressed in bar and mbar and the vacuum level expressed as a percentage of the atmospheric pressure. This correspondence is accurate for use at an altitude of 100m. This is the measurement that we will use when discussing suction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



■ Recommended vacuum levels

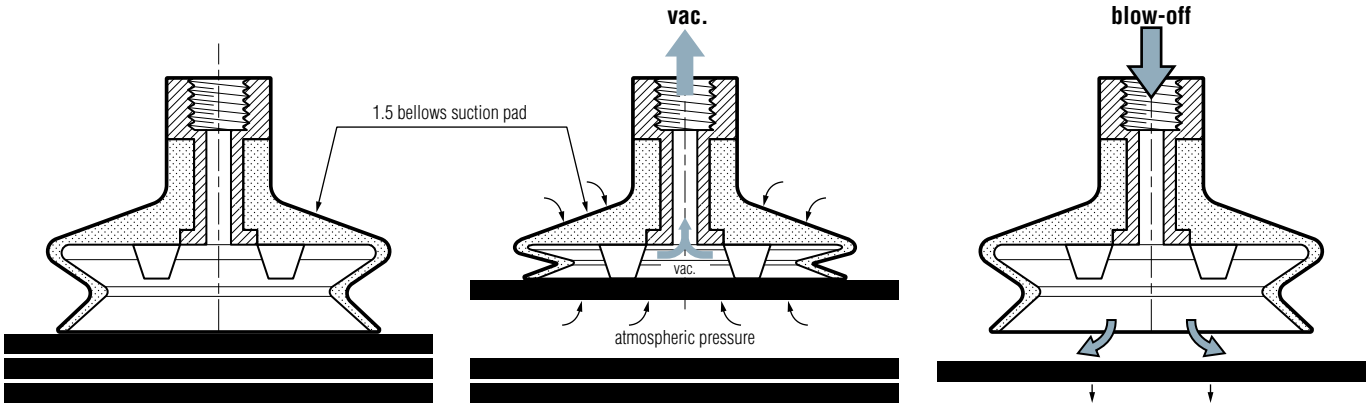
The handling system provides a level of effort that is proportional to the level of the vacuum that generates it (see curves opposite). For the most efficient operation, a maximum vacuum level is recommended. However, the curves also show that a high level of vacuum:
- has a high energy cost
- takes 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 air-tight circuit (no flow required to maintain the vacuum).



Suction pad operating mode

■ Vacuum handling phases



1- Approach
For a shock-free contact with the surface to be gripped, and to configurate to its shape, the suction pad in this instance has 1.5 bellows. Chapter 2 outlines a choice of suction pads and fixings to ease this phase.

2- Gripping
Vacuum is then applied to the suction pad, which lifts the object pushed by atmospheric pressure.
The suction pad and the object then remain binded 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 quicken the move to the next cycle.

■ Vacuum levels and suction pad sizing

In practice, the majority of surfaces requiring suction are not air-tight. 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 pad. 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.

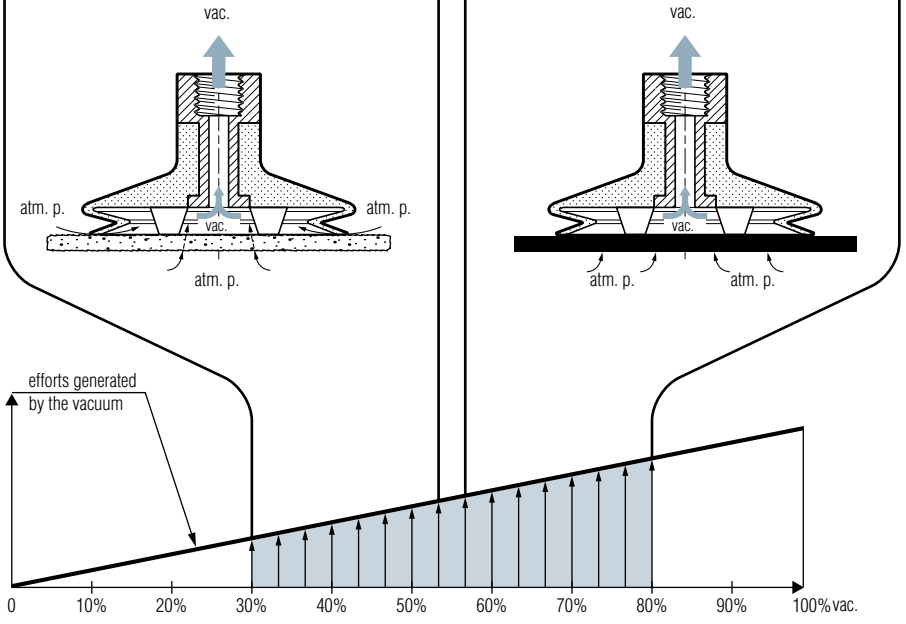
1 - Porous materials
The 30 to 55% vacuum zone is both economical and efficient, given the amount of vacuum flow required. The suction pads should be of the appropriate size to obtain the required gripping efforts.

2 - Air-tight surfaces
In this case, the 55 to 80% zone gives excellent results. The resulting effort is higher (curves opposite), so that more compact suction pads may be used.

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

1 - Porous materials
Cardboard, agglomerated materials, rough wood, irregular surfaces, etc, cause air leaks, that the vacuum flow must compensate.
The economic vacuum level is therefore: between 30 and 55%.

2 - Air-tight surfaces
With metal, plastics, glass and any other smooth, air-tight surface, the vacuum flow required remains low, or even zero.
The level of vacuum can therefore be higher: between 55 and 80 %.



Vacuum generation techniques

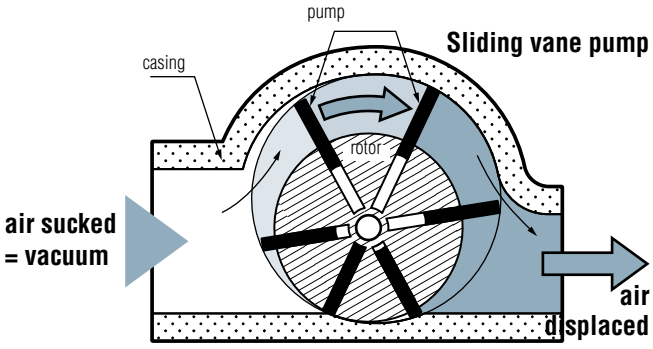
1- Continuous vacuum, using rotary vacuum pumps

Rotary vacuum pump principle

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

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

For low-level vacuums, turbines are also used, which operate in a similar manner to vacuum cleaners: a rotor with blades that do not make contact with the casing, 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 ability generated is much higher than the normal requirements of industrial suction pads.

Usage applications and practice

Rotary pumps are used where a constant, high level of suction flow rate is required. Machines packaging objects under vacuum are a typical example of this.

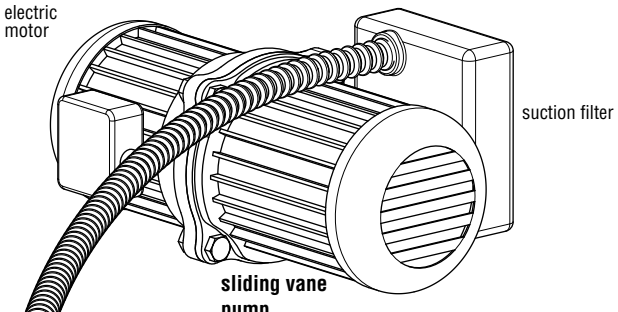
However, in the area of vacuum gripping, rotary pumps are only used in rare instances, where an object requires a high level of suction flow rate that needs to be maintained throughout the cycle.

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 pads.

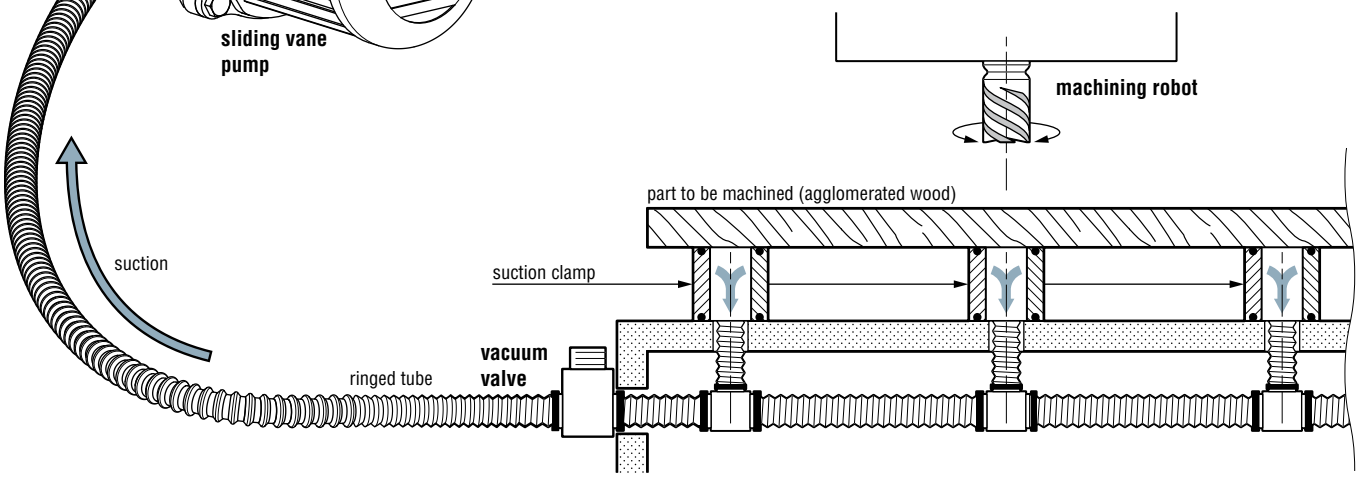
Applications :

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



A typical application

The example shown below is a numerical control manufacturing robot, which uses suction pads 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 line power loss, which are always heavy with vacuum.

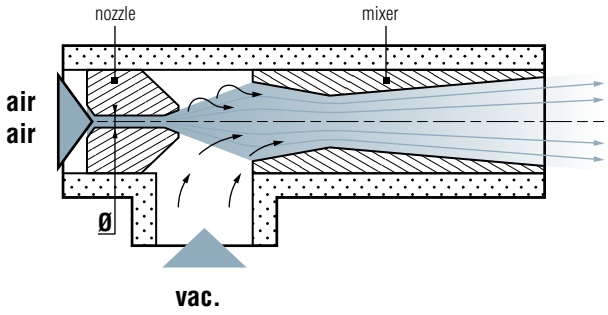


2 - Discontinuous vacuum, using venturi vacuum pumps

Venturi vacuum pump principle

Using the «venturi» effect : a nozzle of diamater Ø is supplied with compressed air. The air jet carries along ambient air in its turbulences and then passes the mixer on its way out. This suction of ambient air creates the depression that generates the vacuum.

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



Venturi vacuum pumps

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

Applications :

- All intermittent gripping operations, i.e. which do not last for complete cycle of the machine.

Venturi vacuum pump ranges

The variations in nozzle and the mixers offer an optimal range to respond all needs.

■ Nozzle diameter Ø

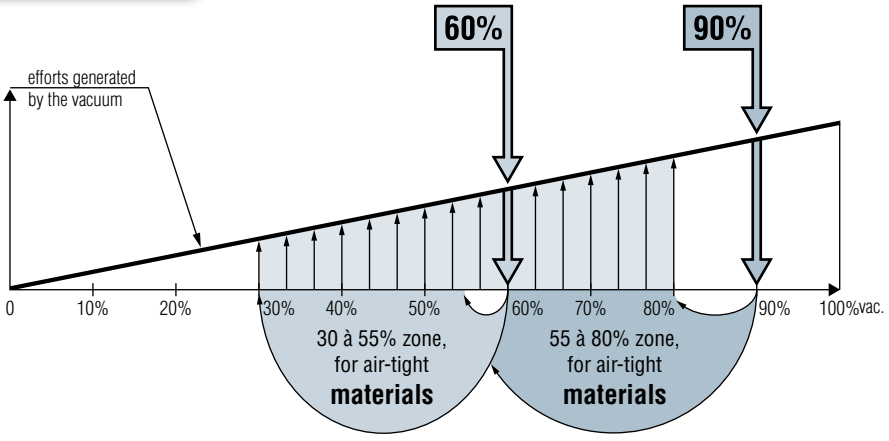
The diameter defines the force generated and therefore the suction capacity: starting from an Ø of 0.5mm for micro suction pads to Ø = 3mm with a suction capacity of 400 Nl/mn for several large suction pads.

■ Mixer profile

This profile defines the maximum level of vacuum achieved by the venturi. Two standard levels:

- 60% for porous material (30 to 55% vacuum)
- 90% for air-tight materials (55 to 80% vacuum)

Max. vacuum ▶2 standard levels :



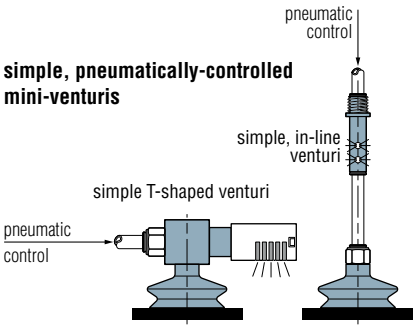
Applications and practice

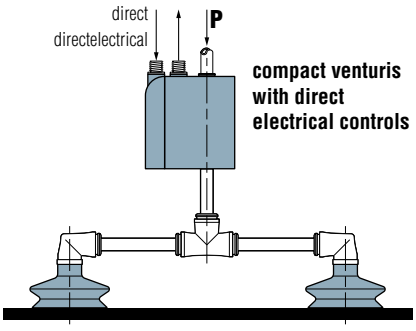
Venturi vacuum pumps are used for all normal vacuum gripping applications.
Compact and light, venturis may be installed close to the suction pads: no line power loss and a minimum volume to empty, resulting in short response times and minimum energy consumption.

The following pages distinguish between:

■ simple, pneumatically-controlled venturi pumps, which are miniaturized for installation on suction pads.

■ complete, electrically-controlled venturi pumps, for installation near to suction pads.





The process of defining an installation

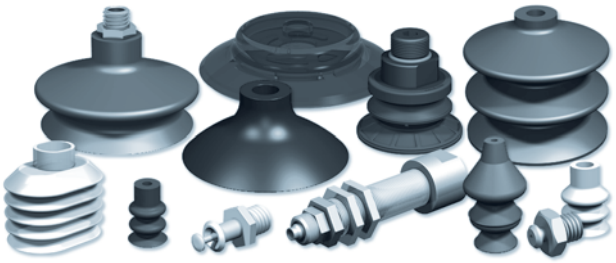
All vacuum handling systems require a three-stage approach:
1. Defining the appropriate suction pads and fixings for the object to be gripped, the movements required, the type of object (air-tight or porous), the effort required, the cycling rate, the environment, etc.
2. Selecting the appropriate vacuum generator for the suction pads, the type of object (air-tight 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: the suction pads and their fixings

COVAL offers a wide range of suction pads, in three main groups: standard, specific and generic. Tailored solutions can also be developed according to a set of specifications.

Chapter 1 starts with a guide to choose and size the suctions pads for a given application, among the wide offer presented in the catalogue from chapter 2 to 5.



Step 2: Selecting the perfect vacuum source for the suction pad used guarantees optimal productivity.

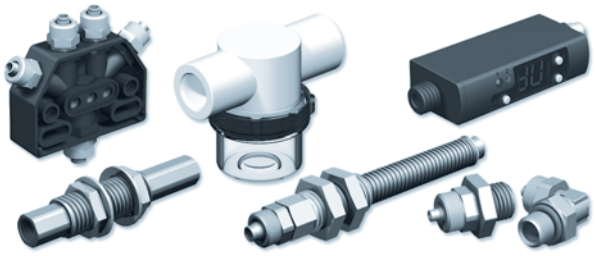
COVAL has developed a complete range of venturi vacuum pumps using the most advanced technologies. They offer a wide suction range, optimal output, low energy consumption, reduced weight and bulk, and silent operation. Numerous integrated functions mean that they are easier and more profitable to install and use.

Chapters 6 starts with a guide to choose and configurate a venturi among the many possibilities presented in the catalogue from chapter 7 to 12.

Step 3: The auxiliary components

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

Chapters 5 and 13 present a wide variety of auxiliary components.



chapter 1

Suction pads

How to choose a suction pad

A suction pad is a gripper which can be used to handle all sorts of objects of different weights, surfaces, shapes and dimensions.

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 pad.

The shapes

Flat Suction Pads

■ Flat suction pads 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 pads with cleats

Used for handling thin, flexible, deformable objects. They increase resistance to lateral forces and horizontal handling.

Suction pads 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 pad force calculation

The force of a suction pad 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 pad.

Theoretical force

■ F(N) = Surface of the suction pad (cm²) x Percentage of vacuum (%) x 0.01013

The force given in the COVAL suction pad tables is the force of the suction pad measured in practice at 90% vacuum. This figure also includes a safety factor of 2.

Actual force

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

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

The safety factor

All the forces are given in the tables for the various ranges of suction pad. These are actual values at 90% vacuum, calculated with a safety factor of:

■ 2 for horizontal gripping,

■ 4 for vertical gripping,

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

Diameters

The force of the suction pad and the product's available gripping surface depend on this parameter. COVAL offers standard suction pads of 1 to 600mm in diameter over all its ranges.

Parameters

You will find the most comprehensive list possible of parameters to be taken into consideration when choosing a suction pad, on the following page.

How to choose a suction pad

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

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	Shore Hardness A	Flexibility	Abrasion resistance	UV & weather resistance	Oil resistance	Heat resistance (in °C)	Food compatibility	Color
NBR: Nitrile	60	+	+	-	+ +	0 to 80	-	Black
SI: Translucent Silicone	50	+ + +	-	+ + +	-	-40 to 220	FDA and EC standard	Translucent
SIB: White Silicone	35	+ + + +	-	+ + +	-	-40 to 220	FDA and EC standard	White
SIT5: Translucent Silicone	50	+ + +	-	+ + +	-	-40 to 220	FDA and EC standard	Translucent
NR: Natural Rubber	50	+ + +	+ +	- -	- -	-20 to 70	+	Grey
STN: Siton®	60	+	++	-	+ +	0 to 160	-	Blue

SITON®

The COVAL laboratory has developed a new material: SITON®. SITON® is a silicone-free material which therefore does not leave a mark and was specially developed for handling hot objects that are waiting to be painted.

- SITON® can withstand maximum temperature of 320°F.
- SITON® has good resistance to abrasion.

Example of an application: Unmolding paintable plastic parts.

1

For all your day to day needs, VP, VPG, VSA and VS series

Standard Suction pads

COVAL QUALITY

Standard suction pads are suitable for all types of applications in areas of activity such as packaging, plastics, agri-food, sheet-metal working, etc.
These suction pads satisfy very diverse specifications thanks to a wide range of shapes, diameters and materials.
COVAL offers a full range of fittings adapted to suction pads and compatible with all types of applications.

Series	Technical Data	Advantages/Applications
VP 	■ Flat suction pads ■ Ø 8 to 75 mm ■ 4 standard materials	■ High tensile force and precise gripping and releasing ■ High resistance to lateral forces allowing vertical handling ■ Full range of fittings and shut-off valves
VPG 	■ Extra-flat suction pads ■ Ø 1 to 200 mm ■ 3 standard materials	■ Highly precise gripping and releasing of the load ■ High throughput rates
VSA 	■ Suction pads with 1.5 bellows ■ Ø 5 to 78 mm ■ 5 standard materials	■ Combines the advantages of flat suction pads with added angle, flexibility and precision ■ Used for gripping slightly concave or convex parts ■ Full range of fittings
VS 	■ Suction pads with 2.5 bellows ■ 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). ■ Full range of fittings
VPO 	■ Flat oblong suction pads ■ from 2x4mm to 30x90mm ■ 3 standard materials	■ Used for handling elongated products such as pens, tubes, bottles, bulbs and flat or cylindrical objects etc.
C 	■ Full range of shapes (flat, bellows, oblongs) ■ Ø 35 to 125mm and 25x65mm to 70x140mm ■ Integrated M3/8G, F38G or Square 32 fittings ■ Structure and internal cleats	■ Textured suction pads for gripping thin sheets ■ Non-slip cleats ensure optimum positioning of oily sheet metal ■ Extreme resistance to slipping, ■ Air-tight integrated fittings ■ Ideal for automated applications
VSBM 	■ Foam rings ■ Materials: nitrile and silicone ■ Can be adapted to standard suction pads	■ They can be bonded under a suction pad to allow products with an irregular or even ridged surface to be gripped ■ Sawn wood, metal sheets, flat surfaces with bumps or hollows (all types of granular surface)

For your specific needs: MVS, VSO, VPA, VPR, ...

Special purpose suction pads

Thanks to its technological prowess and collaboration with its customers in different branches, COVAL supplies solutions for vacuum handling through a wide range of special purpose suction pads.
E.g. handling eggs, CDs, bottles, paper, cakes, etc.

Series	Technical Data	Advantages/Applications
MVS 	■ Suction pads with 1.5 and 2.5 bellows ■ 3 models ■ Silicone: FDA and EC standard	■ Used to grip delicate objects. Very flexible lip (opening bags, gripping tins and flexible aluminum or plastic bottles, etc.) ■ High throughput rate ■ Gripping of flexible products
VSO 	■ Suction pads with 2.5 and 3.5 bellows ■ 3 models ■ Silicone: FDA and EC standard	■ Range specially designed for handling eggs ■ Very flexible lip ■ Different shapes of suction pad
VSD, VSE, VSP,VSB 	■ Suction pads with 2.5 to 5.5 bellows ■ 13 models ■ Silicone: FDA and EC standard	■ Range specially developed for gripping delicate objects such as cakes (buns, biscuits, etc.) ■ Specific shapes and shore hardness depending on the applications ■ Temperature resistance: - 40°F to 428°F
VSBO 	■ Suction pads with 4.5 bellows ■ 2 models ■ High tensile force ■ Highly flexible and long stroke	■ Used to grip 75cl bottles and Magnums. ■ Bottles gripped from the side, vertical and horizontal handling ■ Suction pad with stainless steel reinforcement in the bellows ■ Available with integrated high valve

The COVAL range

Series	Technical Data	Advantages/Applications
VPA 	■ Flat suction pads ■ 9 models ■ Very flexible lip ■ Natural rubber and silicone (FDA and CE standard)	■ Range of suction pads 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
VPR 	■ Flat suction pads ■ 4 models ■ Natural rubber	■ Range of suction pads designed for mailing applications ■ Envelope stuffing, film-wrapping, mailing (picking) ■ Very resistant to abrasion
VPAG 	■ Curved suction pads ■ 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 shaped objects ■ Very resistant to abrasion
VPYR 	■ Flat suction pads with ball-joint system ■ 4 models (Ø50 to 100mm) ■ Materials: nitrile and silicone	■ The range of ball-joint suction pads is recommended for gripping curved or rotating products which requires a lot of force and mechanical resistance
SPL 	■ "Heavy load" flat suction pads ■ 5 models (Ø240 to 600mm) ■ Materials: nitrile and silicone	■ SPL suction pads are used to handle heavy loads such as metal sheets or glass panels. They have internal cleats allowing them to handle thin metal sheets without distorting them and for vertical handling (non-slip)
ACIER 	■ Flat suction pads with a bonded foam seal ■ 9 cylindrical models (Ø 150 to 580 mm) ■ 9 oblong models (175x115 to 705x385mm)	■ For horizontal handling of heavy loads (thick metal sheets) or objects with an uneven surface such as concrete slabs or wood,etc. ■ Wide choice of dimensions
VA 	■ Flat suction pads with a removable foam seal ■ 5 cylindrical models (Ø 250 to 360 mm) ■ 5 oblong models (300x200 to 420x270mm)	■ For horizontal handling of heavy loads (thick metal sheets) or objects with an uneven surface such as concrete slabs or wood,etc. (removable seal = easier maintenance)

Simple and cost-effective

Generic suction pads for replacement

COVAL QUALITY

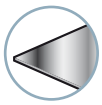
Some of our customers have sometimes used suction pads made by other manufacturers adapted to their applications. To satisfy them we have developed a range of generic suctions pads which are 100% compatible with their application. Please contact your COVAL correspondent for further information regarding generic solutions.

Series	Technical Data	
VPU 	■ Flat suction pads ■ Ø 6 to 50 mm ■ 2 standard materials (Nitrile and silicone)	■ Range of generic VPU flat suction pads.
VSAB 	■ Suction pads with 1.5 bellows ■ Ø 5 to 50 mm ■ 2 standard materials (Nitrile and silicone)	■ Range of generic VSAB suction pads with 1.5 bellows.
VSAG 	■ Suction pads with 1.5 bellows ■ Ø 10 to 150 mm ■ 3 standard materials	■ Range of generic VSAG suction pads with 1.5 bellows.
VSAJ 	■ Suction pads with 1.5 bellows ■ Ø 15 to 30 mm ■ 2 standard materials (Nitrile and silicone)	■ Range of generic VSAJ suction pads with 1.5 bellows .
VSG 	■ Suction pads with 2.5 bellows ■ Ø 5 and 7mm ■ 3 standard materials	■ Range of generic VSG suction pads with 2.5 bellows.

Index of symbols and pictograms

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

Branch-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

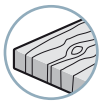
For handling requiring food compatibility, a very flexible lip and a specific shape of suction pad.
- Gripping eggs

Bottles

Gripping concave shapes and requiring strong vertical lifting force.
- For handling 75cl bottles or Magnums

Packaging

For handling wrapped products for packaging, cardboard products. Shaping cardboard, palletization, transfer, Pick & Place.
- Precision
- Abrasion



Wood

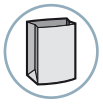
For handling materials with a slightly deformed, rough gripping surface requiring a foam seal to compensate for the unevenness and ensure air-tightness.

Cakes

For handling requiring food compatibility, a very flexible lip and a specific shape of suction pad.
- 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 stuffing, film-wrapping



Bags

Gripping very flexible, deformable materials (plastic or paper).
- e.g. blister, bagging, etc.

Types of use

Flat surfaces, all thicknesses

Flat surfaces, thin sheets

Rounded surfaces

Sheet metal (unstacking)

Flexible materials

Vertical handling

Granular surfaces

Tables

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

Standard suction pads

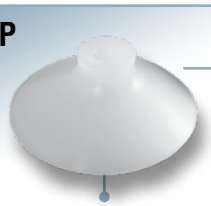
COVAL QUALITY

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

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

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

VP

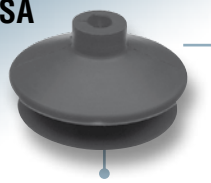


- Flat suction pads
- Ø 8 to 75 mm
- 4 standard materials

P 2/2

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

VSA



- Suction pads with 1.5 bellows
- Ø 5 to 78 mm
- 5 standard materials

P 2/6

- VSA series suction pads with bellows combine the advantages of flat suction pads with more deflection, flexibility and precision
- Used for gripping slightly concave or convex parts
- Full range of fittings
- Very flexible lip for the SIB version.

VPO

- Flat oblong suction pads
- From 2x4mm to 30x90mm
- 3 standard materials

P 2/10

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

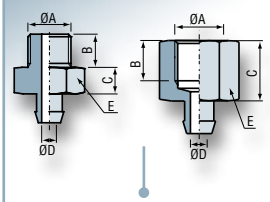
VSBM

- Foam rings
- Materials: nitrile and silicone
- Can be adapted to standard suction pads

P 2/14

- The strip of foam bonded under a suction pad allows products with an irregular or even ridged surface to be gripped
- Sawn wood, metal sheets, flat surfaces with bumps or hollows (all types of granular surface)

Male and female fittings



- Hollow shaft fittings
- Hollow screws + adapters
- Riveted fittings
- Screwed fittings

P 22

- Drawings with dimensions of fittings

VPG

- Extra-flat suction pads
- Ø 1 to 200 mm
- 3 standard materials

P 2/4

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

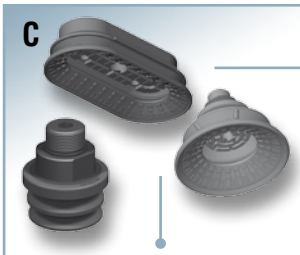
VS

- Suction pads with 2.5 bellows
- Ø 5 to 88 mm
- 4 standard materials

P 2/8

- VS series suction pads 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

C

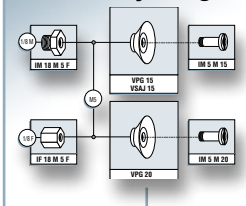


- Full range of shapes (flat, bellows, oblongs)
- Ø 35 to 125mm and 25x65mm to 70x140mm
- Integrated M3/8G, F38G or Square 32 fittings
- Structure and internal cleats

P 2/11

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

Assembly diagrams



- By suction pad series
- By diameter of suction pad

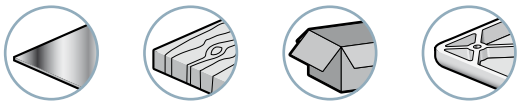
P 2/15

- This visual tool enables you to quickly and easily choose the fittings according to the series and diameter of the suction pad

COVAL vacuum managers

Flat suction pads Ø 8 to 75 mm

Branch-specific applications



Presentation

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

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

Types of use

Materials

NBR Nitrile
SIT5 Translucent silicone
NR Natural rubber
STN Siton®

	Ø (mm)	(cm³)	(N) (1)	(N) (1)	NBR	SIT5	NR	STN
VP 8	7.5	0.04	1.5	0.75	■	■		■
VP 10	10	0.05	2.2	1.1	■	■		
VP 15	15	0.18	5.1	2.5	■	■		■
VP 20	20	0.44	8.5	4.2	■	■	■	■
VP 25	25	0.7	13	6.5	■	■		■
VP 26	26	1.5	15.5	7.7	■	■		■
VP 30	30	2.9	22	11	■	■		■
VP 35	35	2.7	32	16	■	■		
VP 40	40	4	37	18.5	■	■	■	■
VP 50	52	7	53	26.5	■	■		■
VP 60	60	7.3	80	40	■	■		
VP 75	75	16	140	70	■	■	■	

(1) Actual force of the suction pad in use with a 90% vacuum and including a safety factor of 2 for horizontal handling and a factor of 4 for vertical handling.

■ Standard

Choice of fittings

(Ø)	Group		M3M	M5M	M6M	M8M	M10M	1/8F	1/8M	10/32M	1/4F	1/4M	3/8M	1/2M
8… 25	1	2/15		■	■			■	■	■				
26… 60	2	2/16		■	■	■	■	■	■		■	■		
75	3	2/17					■		■		■	■	■	■

■ Standard

Fitting: M = male
F = female

For all orders, please specify: **Model + Diameter + Material AND factory-crimped fitting (optional)**
or: Model + Diameter + Material + choice of removable fitting

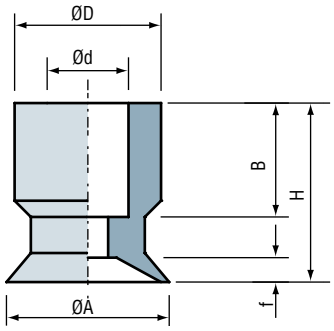
1: Model	2: Diameter	3: Material	
VP	8 ... 75	NBR ...	Please refer to the table

4: Factory-crimped fitting			
For Ø26… 60 mm suction pad		For Ø75… 75 mm suction pad	
IM14	1/4G male	IM14	1/4G male
IF14	1/4G female	IF14	1/4G female
		IM38	3/8G male

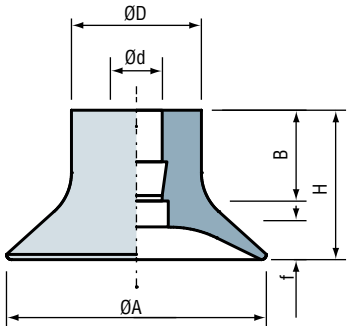
E.g. **VP 50 NBR IF14** (VP series suction pad, Diameter 50, Nitrile with factory-crimped 1/4G female fitting)

Dimensions

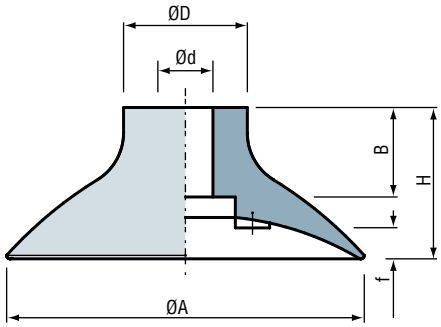
VP 8... 10



VP 15... 25



VP 26... 75

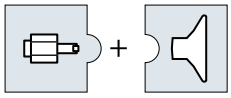


	Ø A (mm)	H (mm)	Ø d (mm)	Ø D (mm)	f (1) (mm)	B (mm)	(g)
VP 8	7.5	10	5	9	1.3	7	0.4
VP 10	10	10.5	4.4	9	1.5	7	0.5
VP 15	15	11	4	9	2.25	7	0.7
VP 20	20	11.5	4	10	3	7	1.2
VP 25	25	12	4	10	3	7	1.4
VP 26	26	19.5	8	16	3	13	3.7
VP 30	30	19	8	16	2.5	13	4
VP 35	35	20	8	16	3	13	5.6
VP 40	40	20	8	16	3	13	9
VP 50	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

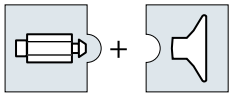
The values represent the average characteristics of our products.
(1) f = Deflection of the suction pad.

Types of assembly

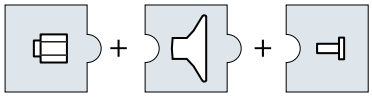
Factory-crimped fitting:



Hollow shaft fitting:



Removable fitting:
(adapter and hollow screw)



Assembly diagrams

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

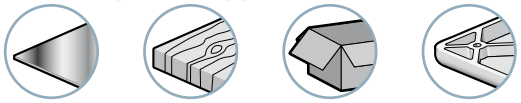
see pages 2/15 to 2/17.

Accessories

To optimize the use of your suction pads, Coval offers a comprehensive range of accessories (feelers, nozzle fittings, spring extensions, and feeder systems, etc.), see chapters 5 and 13.

Extra-flat suction pads Ø 1 to 200 mm

Branch-specific applications



Types of use

Presentation

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

Materials

NBR Nitrile
SI Silicone
STN Siton®

	Ø (mm)	(cm³)	(N) (1)	(N) (1)	R_{min} (mm)	NBR	SI	STN
VPG 1	1	0.00015	0.03	0.015	2	■	■	
VPG 1.5	1.5	0.00053	0.06	0.03	2	■	■	
VPG 2	2	0.00073	0.11	0.06	2	■	■	
VPG 3.5	3.5	0.0022	0.34	0.17	8	■	■	
VPG 5	5	0.005	0.67	0.34	8	■	■	■
VPG 6	6	0.008	0.98	0.49	8	■	■	■
VPG 8	8	0.03	1.7	0.85	10	■	■	■
VPG 10	10	0.07	2.8	1.40	13	■	■	■
VPG 15	15	0.2	6.5	3.3	13	■	■	■
VPG 20	20	0.5	12.2	6.1	20	■	■	■
VPG 25	25	1.1	16.7	8.4	25	■	■	■
VPG 30	30	1.4	22.7	11.4	40	■	■	■
VPG 35	35	2.9	33	16.5	50	■	■	■
VPG 40	40	3.8	48	24	50	■	■	■
VPG 50	50	5.3	75	37.5	75	■	■	■
VPG 60	60	12	123	61.5	100	■	■	■
VPG 60S	60	12	123	61.5	100	■	■	■
VPG 80	80	26.9	198	99	150	■	■	■
VPG 80S	80	26.9	198	99	150	■	■	■
VPG 95	95	41	280	140	200	■	■	■
VPG 95S	95	41	280	140	200	■	■	■
VPG 120	120	141	365	182.5	365	■	■	■
VPG 150	150	230	590	295	380	■	■	■
VPG 200	200	384	1050	525	430	■	■	■

(1) Actual force of the suction pad in use with a 90% vacuum and including a safety factor of 2 for horizontal handling and a factor of 4 for vertical handling.

■ Standard

Choice of fittings

(Ø)		M3 M	M5 M	M5 F	M6 M	M8 M	M10 M	M10 125 pitch	1/8 F	1/8 M	1/4 F	1/4 M	1/2 F
1, 1.5	2/18	■											
2, 3.5	2/18	■	■										
15A, 5… 10	2/18		■	■					■	■			
15, 20	2/19		■						■	■			
20B, 25… 50	2/20				■	■	■		■	■	■	■	
60… 95	2/21							■			■	■	
60S… 95S	2/21										■		
120… 200	2/21												■

■ Standard Fitting: M = male F = female

For all orders, please specify:

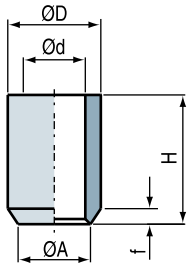
Model + Diameter + Material

E.g. **VPG 50 STN** (VPG series, Diameter 50, in Siton®)

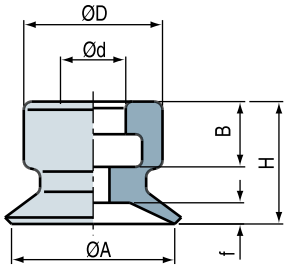
1: Model	2: Diameter	3: Material	
VPG	1 ... 200	NBR…	See table

Dimensions

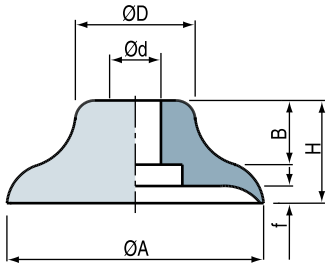
VPG 1 - 1.5



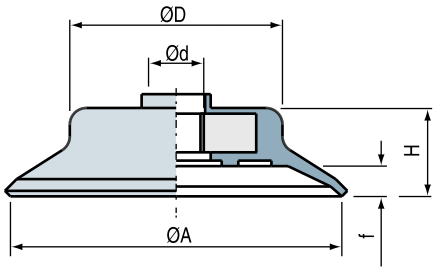
VPG 2... 10



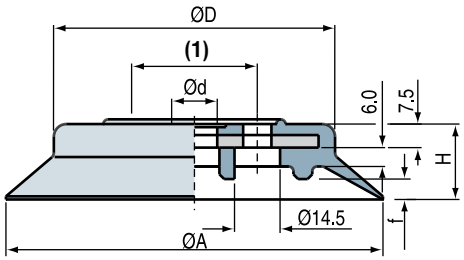
VPG 15... 50



VPG 60 - 95



VPG 120... 200



(1) 4 holes Ø9 on Ø40

	Ø A (mm)	H (mm)	Ø d (mm)	Ø D (mm)	f (1) (mm)	B (mm)	(g)
VPG 1	1	1.6	0.8	1.2	0.2	-	
VPG 1.5	1.5	2.5	1.2	1.8	0.3	-	
VPG 2	2	4	2	4	0.5	2.5	
VPG 3.5	3.5	4	2	4	0.5	2.5	
VPG 5	5	6.5	4	7.5	0.8	4	
VPG 6	6	6.5	4	7.5	0.8	4	
VPG 8	8	7	4	8	1.2	4	0.26
VPG 10	10	7.5	4	8.7	1.5	4	0.36
VPG 15	15	8	4.5	12	1.9	2.5	0.9
VPG 20	20	10	4.5	15	2.3	4.5	1.93
VPG 25	25	14	6	16	3	7	3
VPG 30	30	12	6	15	2	7	4
VPG 35	35	14	6	20.5	3	7	6.8
VPG 40	40	14	6	23.5	3.5	7	8.4
VPG 50	50	15	8	29	4	7	13
VPG 60	60	16	M10x125	38	5	-	25
VPG 60S	60	16	1/4G	38	5	-	25
VPG 80	80	18	M10x125	53	6	-	55
VPG 80S	80	18	1/4G	53	6	-	55
VPG 95	95	19	M10x125	68	6	-	96
VPG 95S	95	19	1/4G	68	6	-	96
VPG 120	120	24.5	14.5	89.5	6	-	242
VPG 150	150	30.5	13	105	9	-	480
VPG 200	200	35.5	13	143	12.5	-	840

The values represent the average characteristics of our products.

(1) f = Deflection of the suction pad.

Assembly diagrams

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

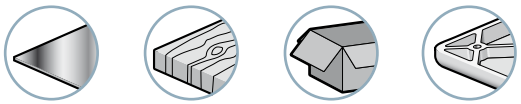
see pages 2/18 to 2/21.

Accessories

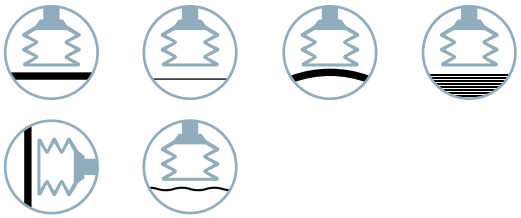
To optimize the use of your suction pads, Coval offers a comprehensive range of accessories (nozzle fittings,spring extensions, and feeder systems, etc.),
see chapters 5 and 13.

Suction pads with 1.5 bellows Ø 5 to 78 mm

Branch-specific applications



Types of use



Presentation

VSA series suction pads with bellows combine the advantages of flat suction pads 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 3/2, MVS series.

Materials

NBR	Nitrile	**NR**	Natural rubber
SIT5	Translucent silicone	**STN**	Siton®
SIB	35 shore A white silicone		

	Ø (mm)	(cm³)	(N) (1)	(N) (1)	R_{min} (mm)	NBR	SIT5	SIB	NR	STN
VSA 5	5.5	0.04	0.68	0.34	-	■	■		■	■
VSA 11	11	0.225	2.4	1.2	10	■	■		■	■
VSA 14	13	0.42	3.5	1.75	13	■	■		■	■
VSA 16	16	0.75	3.7	1.85	20	■	■	■	■	■
VSA 18	18	0.76	6.1	3.05		■	■	■	■	■
VSA 20	19	1.15	7.7	3.85	30	■	■	■	■	■
VSA 22	22	1.4	8.5	4.25	25	■	■	■	■	■
VSA 25	24	3.15	11	5.5	20	■	■	■	■	■
VSA 26	25	3.9	15	7.5		■	■		■	■
VSA 33	33	4.75	19.2	9.6	40	■	■		■	■
VSA 43	43	9.25	28	14	60	■	■		■	■
VSA 53	53	26.25	59	29.5	75	■	■		■	■
VSA 63	63	39	82	41	75	■	■		■	■
VSA 78	78	76	152	76	70	■	■		■	■

(1) Actual force of the suction pad in use with a 90% vacuum and including a safety factor of 2 for horizontal handling and a factor of 4 for vertical handling.

Choice of fittings

(Ø)	Group		M3M	M5M	M6M	M8M	M10M	1/8F	1/8M	10/32M	1/4F	1/4M	3/8M	1/2M
5	1	2/15	■	■	■			■	■	■				
11… 25	1	2/15		■	■			■	■	■				
26… 63	2	2/16		■	■	■	■	■	■		■	■		
78	3	2/17					■		■		■	■	■	■

■ Standard

Fitting: M = male
F = female

Note:
Ø 110 and 150mm available in the VSAG range of suction pads (page 4/6).

For all orders, please specify: Model + Diameter + Material AND factory-crimped fitting (optional)
or: Model + Diameter + Material + choice of removable fitting

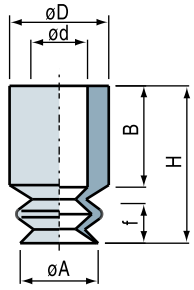
1: Model	2: Diameter	3: Material	
VSA	5 ... 78	NBR	Please refer to the table
		…	

4: Factory-crimped fitting			
For Ø26… 63 mm suction pad		for Ø78mm suction pad	
IM14	1/4G male	IM14	1/4G male
IF14	1/4G female	IF14	1/4G female
		IM38	3/8G male

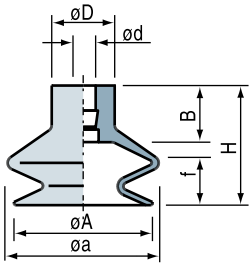
E.g. **VSA 78 NBR IM14** (VSA series suction pad, Diameter 78, in Nitrile with 1/4G male fitting)

Dimensions

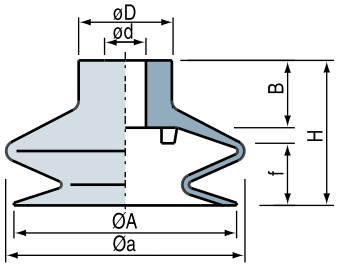
VSA 5



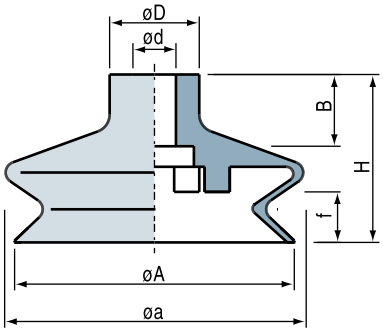
VSA 11… 25



VSA 26… 43



VSA 53… 78

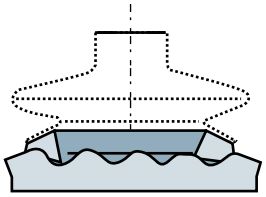


	Ø A (mm)	H (mm)	Ø a (mm)	Ø d (mm)	Ø D (mm)	f (1) (mm)	B (mm)	(g)
VSA 5	5.5	11	6	4	7	2	7	0.5
VSA 11	11	16	12.2	4	10	5.5	9	0.7
VSA 14	13	16	14	4	10	5	9	1
VSA 16	16	19	17.3	4	10	8.5	9	1.2
VSA 18	18	16.5	18	4	10	5	9	1.5
VSA 20	19	16	20	4	10	5	9	1.6
VSA 22	22	19	24	4	10	8	9	1.8
VSA 25	24	23	25	4	10	12	9	2.8
VSA 26	25	25	30	8	16	6	13	6.1
VSA 33	33	27.5	36.2	8	18	11	13	6.4
VSA 43	43	28	46	8	18	12.5	13	10
VSA 53	53	34	59	8	18	15	13	15
VSA 63	63	34	67	8	18	15	13	28
VSA 78	78	46.8	83	12	25	14	20	42

The values represent the average characteristics of our products.
(1) f = Deflection of the suction pad.

Granular surfaces

For handling objects with a granular or textured gripping surface, use VSA suction pads with the VSBM foam strip option (see page 2/14).



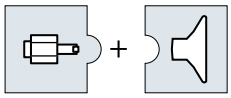
Assembly diagrams

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

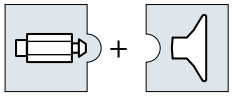
see pages 2/15 to 2/17.

Types of assembly

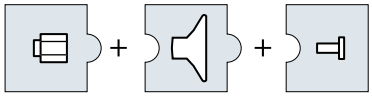
Factory-crimped fitting:



Hollow shaft fitting:



Removable fitting:
(adapter and hollow screw)

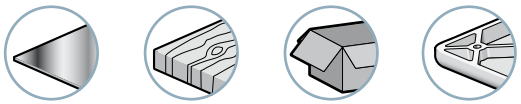


Accessories

To optimize the use of your suction pads, Coval offers a comprehensive range of accessories (nozzle fittings, spring extensions, and feeder systems, etc.), see chapters 5 and 13.

Suction pads with 2.5 bellows Ø 5 to 88 mm

Branch-specific applications



Types of use

Presentation

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

- Large deflection (stroke)
- Flexibility

Materials

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

	Ø (mm)	(cm³)	(N) (1)	R_{min} (mm)	NBR	SIT5	NR	STN
VS 5	5	0.04	0.66	8	■	■		■
VS 6	6	0.04	0.68	8	■	■		
VS 7	7	0.0425	1.3	8	■	■		■
VS 9	9	0.15	1.5	10	■	■	■	■
VS 12	12	0.54	3.9	13	■	■	■	■
VS 14	14	0.975	4.1	15	■	■	■	■
VS 18	17.5	1.35	6.1	20	■	■	■	■
VS 20	20	2	6.4	30	■	■	■	■
VS 25	25	5.4	9	30	■	■	■	■
VS 26	25	6.1	15	30	■	■	■	■
VS 32	32	10	16.8	35	■	■	■	■
VS 42	42	19.5	29	75	■	■	■	■
VS 52	52	36	40	75	■	■	■	■
VS 62	62	72.5	57	75	■	■	■	■
VS 88	88	165	184	100	■	■	■	

(1) Actual force of the suction pad with a 90% vacuum and a safety factor of 2 included.

■ Standard

Choice of fittings

(Ø)	Group		M3M	M5M	M6M	M8M	M10M	1/8F	1/8M	10/32M	1/4F	1/4M	3/8M	1/2M
5, 6	1	2/15	■	■	■			■	■	■				
7… 25	1	2/15		■	■			■	■	■				
26… 62	2	2/16		■	■	■	■	■	■		■	■		
88	3	2/17					■		■		■	■	■	■

■ Standard

Fitting: M = male
F = female

For all orders, please specify: Model + Diameter + Material AND factory-crimped fitting (optional)
or: Model + Diameter + Material + choice of removable fitting

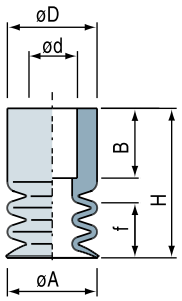
1: Model	2: Diameter	3: Material	
VS	5 ... 88	NBR …	Please refer to the table

4: Factory-crimped fitting			
For Ø26… 62 mm suction pad		For Ø88mm suction pad	
IM14	1/4G male	IM14	1/4G male
IF14	1/4G female	IF14	1/4G female
		IM38	3/8G male

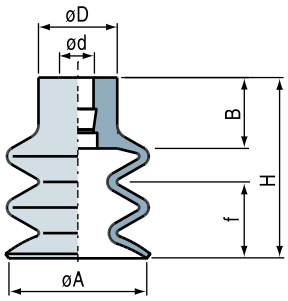
E.g. **VS 18 SIT5 IF14** (VS series suction pad, Diameter 17.5, translucent silicone with factory-crimped 1/4G female fitting)

Dimensions

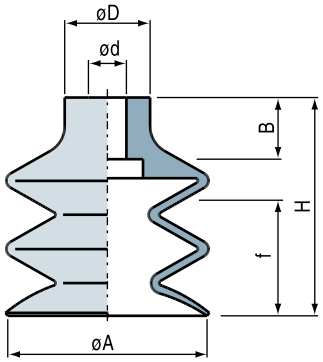
VS 5… 9



VS 12… 25



VS 26… 88

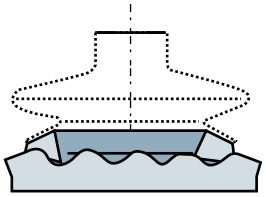


	Ø A (mm)	H (mm)	Ø d (mm)	Ø D (mm)	f (mm)	B (mm)	(g)
VS 5	5	13.5	4	7	3	8	0.5
VS 6	6	13.2	4	7	3	7	0.5
VS 7	7	13.5	4.7	9	3	6	0.5
VS 9	9	15	4.4	9	3	7	0.6
VS 12	12	21	4	10	7	9	1.1
VS 14	14	23	4	10	10	9	1.4
VS 18	17.5	23	4	10	10	9	1.8
VS 20	20	23	4	10	10	9	2.2
VS 25	25	34	4	10	20	9	3.8
VS 26	25	31	8	16	11	13	8
VS 32	32	37.5	8	18	14.5	13	9.4
VS 42	42	46	8	18	22	13	18.5
VS 52	52	49	8	18	27	13	24.6
VS 62	62	55	8	21	31	13	50
VS 88	88	87.5	12	25	48.5	20	175

The values represent the average characteristics of our products.
(1) f = Deflection of the suction pad.

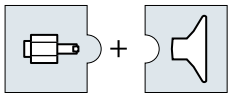
Granular surfaces

For handling objects with a granular or textured gripping surface, use VS suction pads with the VSBM foam strip option (see page 2/14).

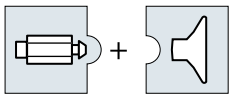


Types of assembly

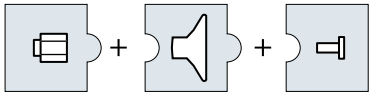
Factory-crimped fitting:



Hollow shaft fitting:



Removable fitting:
(adapter and hollow screw)



Assembly diagrams

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

see pages 2/15 to 2/17.

Accessories

To optimize the use of your suction pads, Coval offers a comprehensive range of accessories (nozzle fittings, spring extensions, and feeder systems, etc.),
see chapters 5 and 13.

Oblong suction pads

Branch-specific applications

Presentation

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

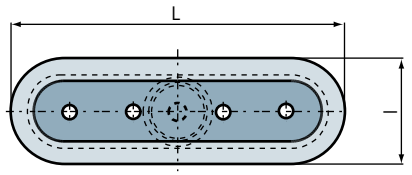
Types of use

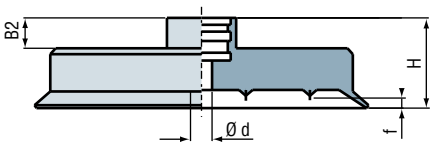
Materials

NBR Nitrile
SI Silicone
STN Siton®

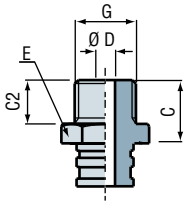
	(cm³)	(N) (1)	Rmin (mm)	L (mm)	l (mm)	B2 (mm)	Ø d (mm)	H (mm)	f (mm)	C (mm)	C1 (mm)	C2 (mm)	Ø D (mm)	G	E (mm)	j (mm)	NBR	SI	STN
VPO 24	0.004	0.315	1	4	2	3.5	0.7	6	0.5	5	-	3	1	M3	5	-	■	■	■
VPO 357	0.019	0.75	3	7	3.5	3.5	1	6	0.8	5	-	3	1	M3	5	-	■	■	■
VPO 515	0.036	2.33	4	15	5	7	1.2	12	0.7	10	8.5	5	2	M5	8	-	■	■	■
VPO 618	0.058	3.38	4	18	6	7	1.5	12	0.8	10	8.5	5	2	M5	8	-	■	■	■
VPO 824	0.138	6.0	8	24	8	4.3	1.5	12	1	13	9	8	3.5	1/8G	14	4	■	■	■
VPO 1030	0.280	9.15	8	30	10	4.3	2.5	12	1.5	13	9	8	3.5	1/8G	14	4	■	■	■
VPO 1545	0.980	21.15	10	45	15	6	3	21	2	15	12	10	3.5	1/4G	17	4	■	■	■
VPO 2060	2.30	37.57	20	60	20	5	4	21	2.5	15	12	10	3.5	1/4G	17	4	■	■	■
VPO 2575	4.70	58.7	30	75	25	7	4	21	2.8	15	12	10	3.5	1/4G	17	4	■	■	■
VPO 3090	8.50	84.5	35	90	30	5	4	21	3.5	15	12	10	3.5	1/4G	17	4	■	■	■

(1) Actual force of the suction pad with a 90% vacuum and a safety factor of 2 included.

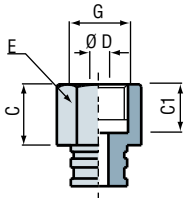


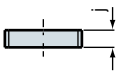


Male fitting



Female fitting





Clamp collar

Adaptable fittings

	Fitting	Male fitting	Female fitting	Collar
VPO 24, 357	M3	IM 3 VPO 24	-	-
VPO 515, 618	M5	IM 5 VPO 515	IF 5 VPO 515	-
VPO 824, 1030	1/8 G	IM 18 VPO 824	IF 18 VPO 824	VPO COV18
VPO 1545… 3090	1/4 G	IM 14 VPO 1545	IF 14 VPO 1545	VPO COV14

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

Fitting: M = male
F = female

Accessories

Anti-rotation spring system, see page 5/5.

For all orders, please specify: Model + Material + Fitting

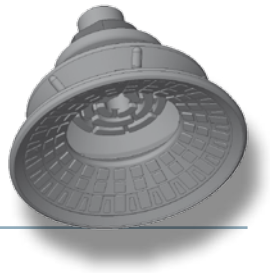
1: Model	
VPO	Please refer to the table

2: Material
NBR, SI or STN

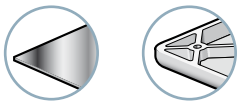
3: Fitting	
IF… IM…	Please refer to the table

E.g. **VPO 618 NBR IF M5**
(VPO series suction pad, model 618, in Nitrile, M5 female fitting)

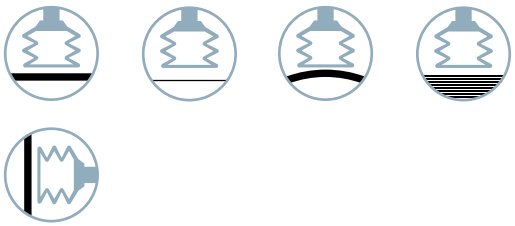
High-performance suction pads



Branch-specific applications



Types of use



Presentation

The C series high-performance suction pad 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 diameters to meet every requirement.
- Non-slip cleats ensure optimum positioning of oily sheet metals.
- Textured suction pads for gripping thin sheets without deforming them.
- Ideal for automated applications.
- Specifically for use in the fields of stamping and welding.

3/8G female fitting

3/8G male fitting

32 square coupling

Characteristics

- Extreme resistance to slipping.
- Gripping of thin metal sheets without deforming them, thanks to the central cleats.
- Elastomer and glass-fibre reinforced plastic design to avoid any risk of damaging costly equipment and to facilitate recycling.
- Double tightening: 2 wrenches of 22 mm and 1 hex key of 6 mm or 8 mm.
- Air-tight fittings using:

- O-rings on 3/8G male cylindrical suction pads 32 square suction pads,- sealing on all oblong 3/8 male suction pads.

- Traceability.

Materials

Suction pads:

NBR Nitrile 55 Shore A (high resistance to oils), grey color.

Fitting:

PA Polyamide PA 6.6 ensuring reduced weight (3/8G Male or Female fitting).

O-ring:

NBR Nitrile blue or black.

Square coupling:

Aluminum

Other fittings available on request.

Accessories

To optimize use of your suction pads, Coval offers a comprehensive range of accessories (3/8G extensions, feeders and special couplings for 100% air-tight vacuum networks,) see chapters 5 and 13.

For all orders, please specify:

Model + Dimensions + Fitting

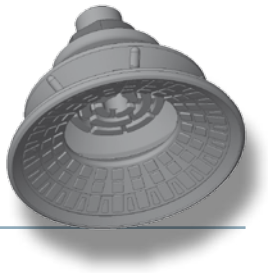
1: Model
CFC
CBC
COFC
COBC

2: Dimensions	
85	please refer to the codes in the tables of characteristics

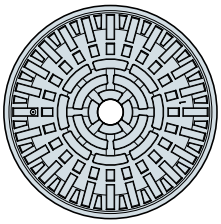
3: Fitting	
M38G	3/8G male fitting
F38G	3/8G female fitting
C32	square coupling

E.g. **CBC 85 M38G**
(Round C series suction pad with 1.5 bellows Ø 85, 3/8G male fitting)

High-performance suction pads



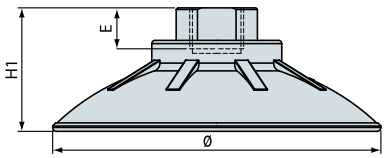
CFC flat suction pad



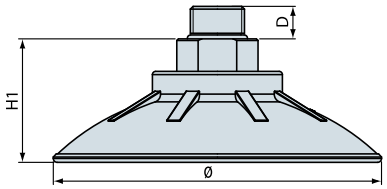
	Ø at rest (mm)	Ø gripping (mm)	(cm³)	(N) (1)	(N) (1)	Rmin (mm)	Rmin (mm)	Ø bore (mm)	tightening (mm)
CFC 35	37	38.5	2.46	50	50	58	50	6.3	w 22 + hk 6
CFC 50	51	54	8.37	100	100	66	52	6.3	w 22 + hk 6
CFC 75	76	80	25.03	200	170	100	58	6.3	w 22 + hk 6
CFC 100	101	105.7	57.61	350	270	120	90	6.3	w 22 + hk 6
CFC 125	127	132	119.7	550	480	160	115	6.3	w 22 + hk 8

	H1 (mm)	D (mm)	E (mm)	f (2) (mm)	(g) F 3/8G	(g) M 3/8G	(g) C32
CFC 35	25	10	12.6	3	14	18	36.2
CFC 50	30	10	12.6	5.5	25	29	47.2
CFC 75	33	10	12.6	8	40	45	62.2
CFC 100	38	10	12.6	10	67	72	89.2
CFC 125	44	10	12.6	14	119	124	141.2

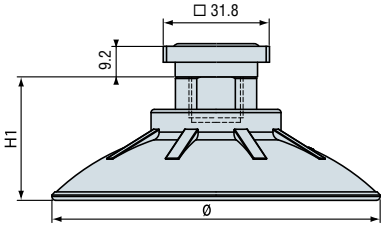
(1) Force measured at 65% on dry, smooth, flat sheet metal without safety factor.
(2) f: deflection of the suction pad.



3/8G female fitting

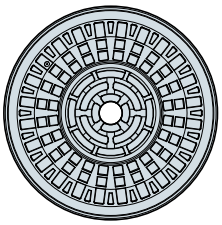


3/8G male fitting



32 square coupling

CBC suction pad with 1.5 bellows



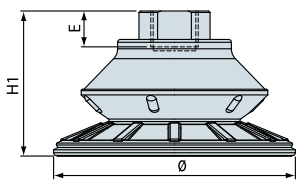
	Ø at rest (mm)	Ø gripping (mm)	(cm³)	(N) (1)	(N) (1)	Rmin (mm)	Rmin (mm)	Ø bore (mm)	tightening (mm)
CBC 30 (3)	32	34	5	40	40	30	32	6.3	w 22 + hk 6
CBC 45	47	48.7	11.47	70	90	36	45	6.3	w 22 + hk 6
CBC 60	62	64.5	25.31	140	130	44	62	6.3	w 22 + hk 6
CBC 85	85	88	66.54	230	240	65	115	6.3	w 22 + hk 6
CBC 115	115	119	141.47	420	390	84	140	6.3	w 22 + hk 8

	H1 (mm)	D (mm)	E (mm)	f (2) (mm)	(g) F 3/8G	(g) M 3/8G	(g) C32
CBC 30 (3)	31	10	12.6	8	14	19	36.2
CBC 45	36	10	12.6	11	22	26	44.2
CBC 60	41	10	12.6	14	32	37	54.2
CBC 85	51	10	12.6	22	64	69	86.2
CBC 115	53	10	12.6	24	103	107	125.2

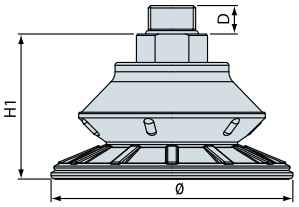
(1) Force measured at 65% on dry, smooth, flat sheet metal without safety factor.
(2) f: deflection of the suction pad.

3) A specific model of the CBC 30 is available with M 3/8G fitting and 9.5mm diameter bore.

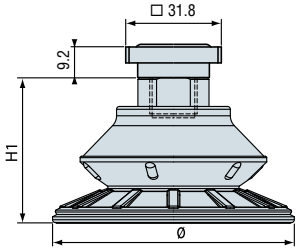
Order reference:
CBC 30 M38G SP624 (black O-ring).



3/8G female fitting



3/8G male fitting

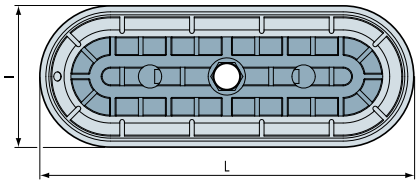


32 square coupling

High-performance suction pads

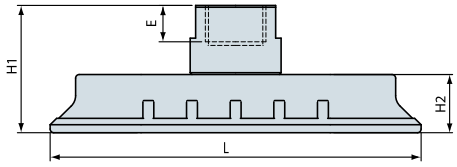
COFC flat oblong suction pad

	Dim. at rest (l x L mm)	Dim. gripping (l x L mm)	(cm³)	(N) (1)	(N) (1)	Rmin (mm)	Rmin (mm)	Ø bore (mm)	tightening (mm)
COFC 2565	25x65	26.8x67	3.78	70	70	25	25	6	hex key 6
COFC 3080	30x80	31.5x82	6.08	110	90	40	32	6	hex key 6
COFC 4080	40x80	42x82	11.03	140	120	60	40	6	hex key 6
COFC 50100	50x100	52.5x102.5	22.25	230	240	70	50	6	hex key 6

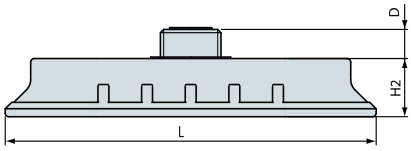


	H1 (mm)	H2 (mm)	D (mm)	E (mm)	f (2) (mm)	(g) F 3/8G	(g) M 3/8G	(g) C32
COFC 2565	31.5	12.5	8	10	3	24	17	35
COFC 3080	32	13	8	10	3	29	22	40
COFC 4080	34	15	8	10	4.5	30	23	41
COFC 50100	35	16	8	10	6	43	36	54

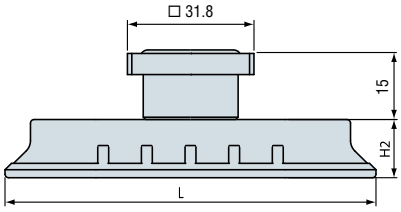
(1) Force measured at 65% on dry, smooth, flat sheet metal without safety factor.
(2) f: deflection of the suction pad.



3/8G female fitting



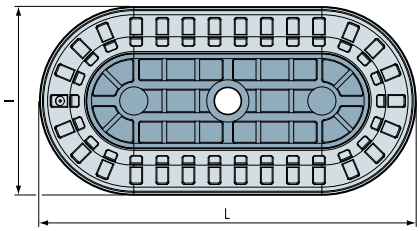
3/8G male fitting



32 square coupling

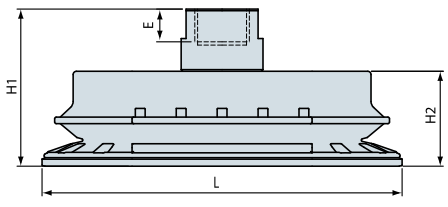
COBC oblong suction pad with 1.5 bellows

	Dim. at rest (l x L mm)	Dim. gripping (l x L mm)	(cm³)	(N) (1)	(N) (1)	Rmin (mm)	Rmin (mm)	Ø bore (mm)	tightening (mm)
COBC 3065	31x65	32.3x67	9.98	60	60	25	30	6	hex key 6
COBC 4080	40x80	41.5x82	19.44	110	120	38	37	6	hex key 6
COBC 55110	55x110	57x112.5	49.25	170	190	58	57	6	hex key 6
COBC 70140	70x140	72x143	93.57	300	300	72	68	6	hex key 6

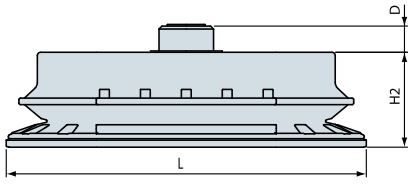


	H1 (mm)	H2 (mm)	D (mm)	E (mm)	f (2) (mm)	(g) F 3/8G	(g) M 3/8G	(g) C32
COBC 3065	39	20	8	10	7	31	25	43
COBC 4080	41	22	8	10	9	37	31	49
COBC 55110	48	29	8	10	13	68	62	80
COBC 70140	49	30	8	10	16	103	97	115

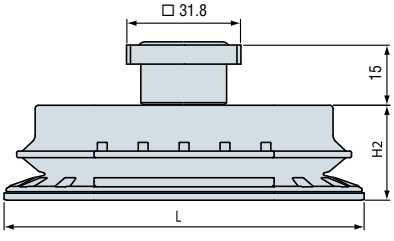
(1) Force measured at 65% on dry, smooth, flat sheet metal without safety factor.
(2) f: deflection of the suction pad.



3/8G female fitting



3/8G male fitting



32 square coupling

Foam rings

Branch-specific applications

Use

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

- Sawn wood, metal sheets, flat surfaces with bumps or hollows.
- All granular surfaces to which suction pads cannot adhere correctly and therefore cannot be air-tight.

Materials

NBR Nitrile
Si Silicone

Operating characteristics of the materials

- Nitrile (NBR - Black)

5 or 10mm thick, depending on the diameters of the suction pads.
Good resistance to oil.
The nitrile foam strip can only be bonded to nitrile suction pads.

- Silicone (SI - White)

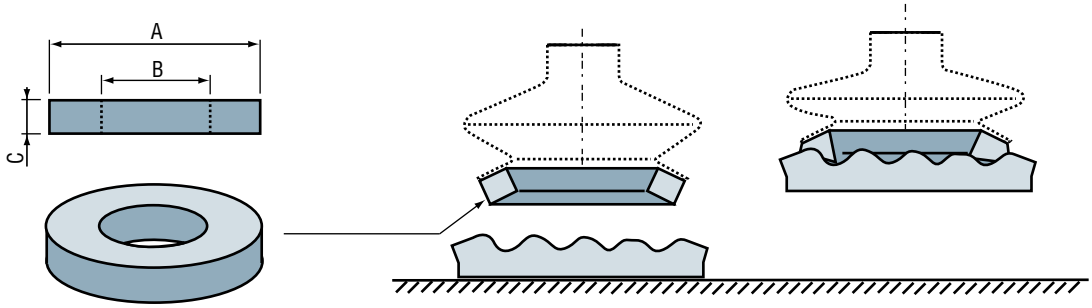
2 or 5 mm thick, depending on the diameters of the suction pads.
Heat-resistant up to 320°F, does not leave marks on products handled.
Do not use the silicone foam strip for gripping products before painting or lacquering.
The silicone foam strip can only be bonded onto silicone suction pads (bonding is guaranteed if it is performed 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 should be performed in the COVAL factory.

Ø (mm)	NBR				SI			
	Ref.	ØA (mm)	ØB (mm)	C (mm)	Ref.	ØA (mm)	ØB (mm)	C (mm)
20	-	-	-	-	VSBM 20 SI	20	10	2
25	-	-	-	-	VSBM 25 SI	25	13	2
32- 33	VSBM 32 NBR	32	22	5	VSBM 32 SI	32	19	2
42- 43	VSBM 42 NBR	42	28	5	VSBM 42 SI	42	20	5
52- 53	VSBM 53 NBR	53	33	10	VSBM 53 SI	53	33	5
62- 63	VSBM 62 NBR	62	42	10	VSBM 62 SI	62	42	5
78	VSBM 78 NBR	78	58	10	VSBM 78 SI	78	54	5
88	VSBM 88 NBR	88	68	10	VSBM 88 SI	88	64	5

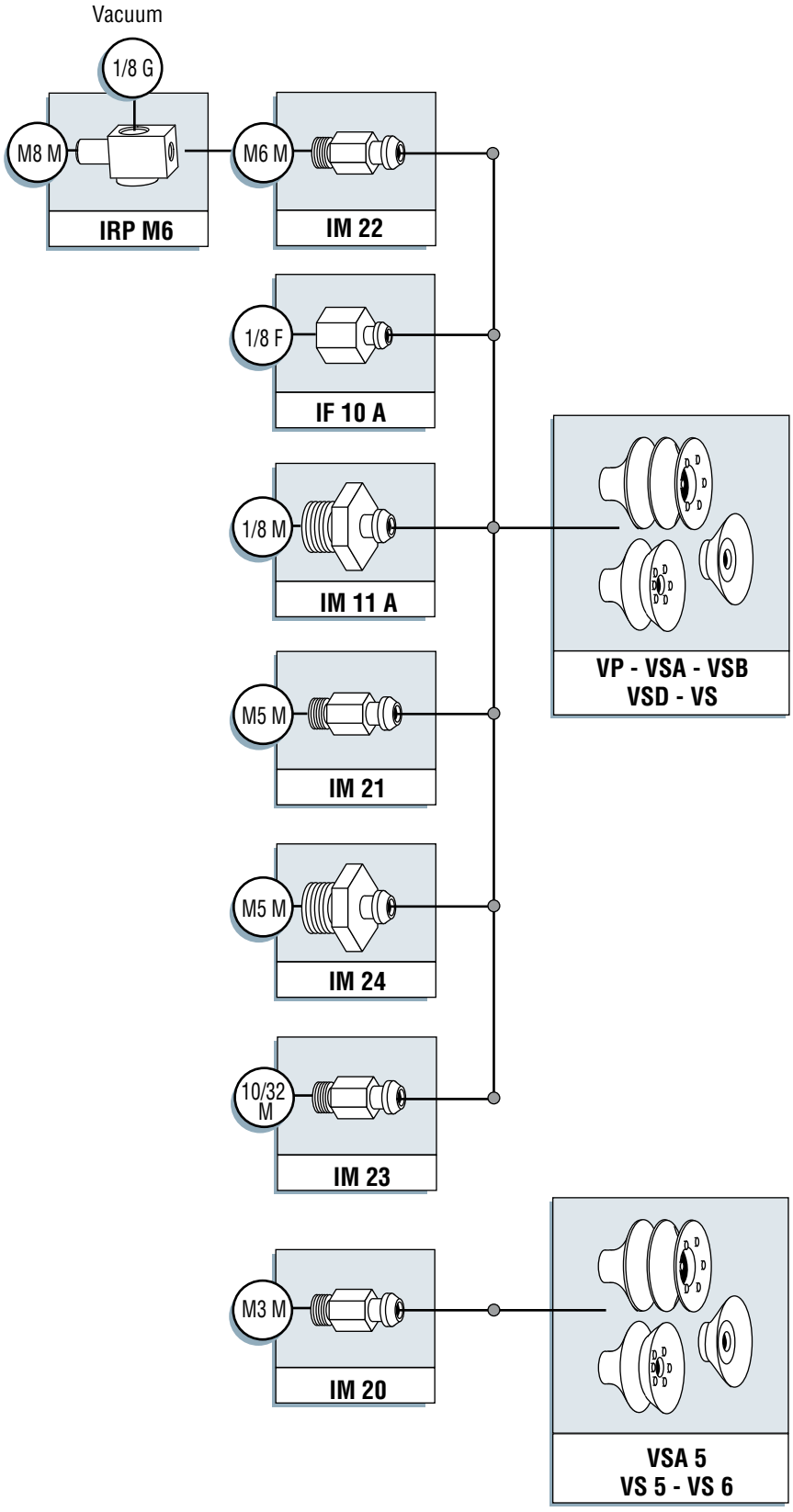
Note: Suction pads with bellows are preferable when foam rings are required, as the slope of the lips is better suited to this type of grip. Please consult us for other models based on quantities.



VP - VSA - VSB - VSD - VS
Ø 5... 25 mm

Group 1

Hollow shaft fittings

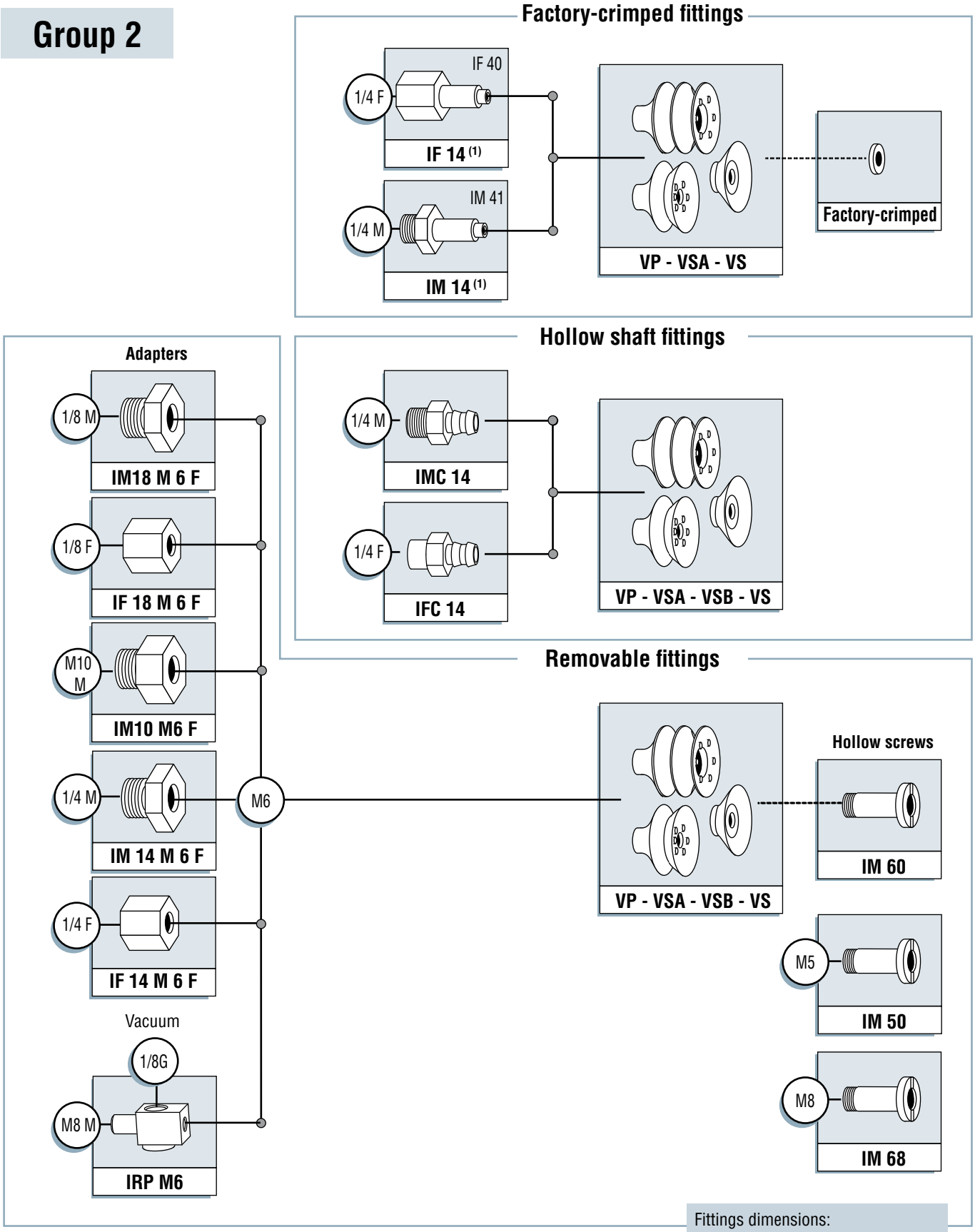


Note: Nozzle fittings for random gripping are available for these suction pads (see pages 5/7 and 5/8).

Fittings dimensions:
see pages 2/22 and 2/23.

VP - VSA - VSB - VS
Ø 26... 63mm

Group 2



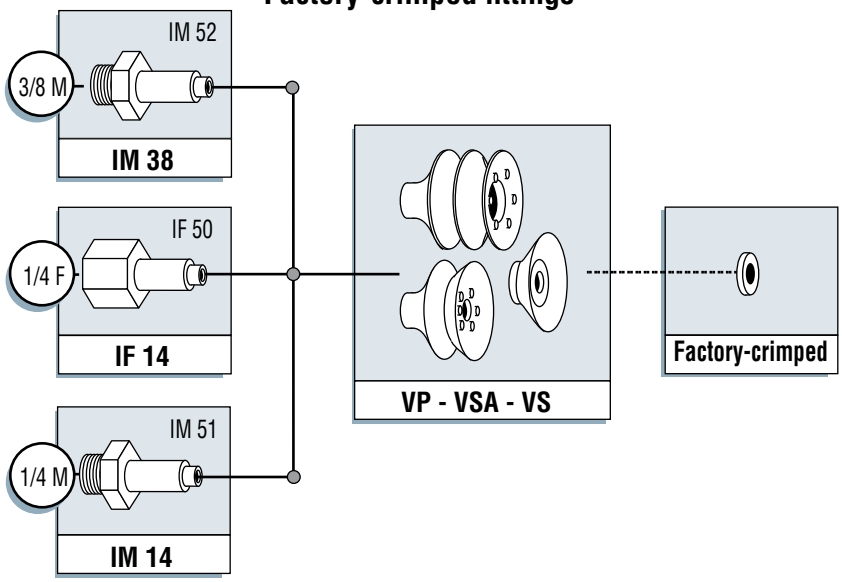
Fittings dimensions:
see pages 2/22 and 2/23.

(1) Reference = fitting crimped onto the suction pad by COVAL.

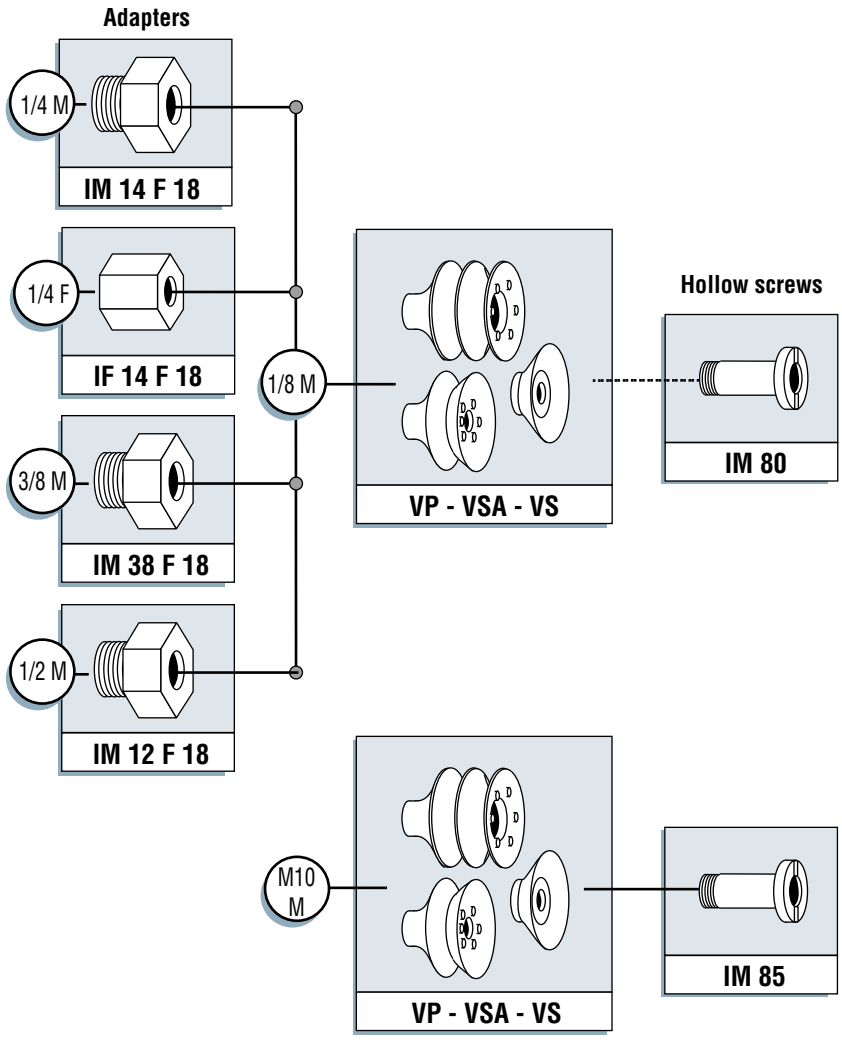
VP - VSA - VS
Ø 75... 88 mm

Group 3

Factory-crimped fittings



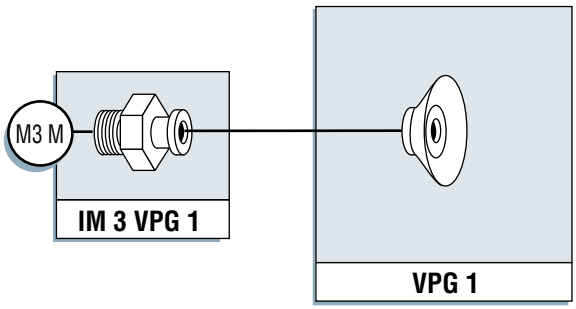
Removable fittings

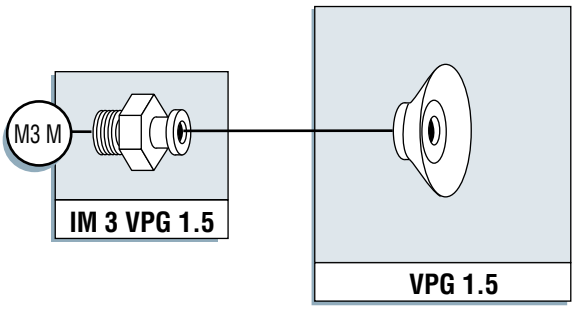


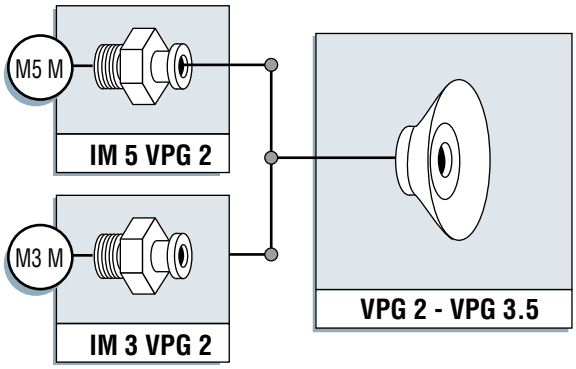
Fittings dimensions:
see pages 2/22 and 2/23.

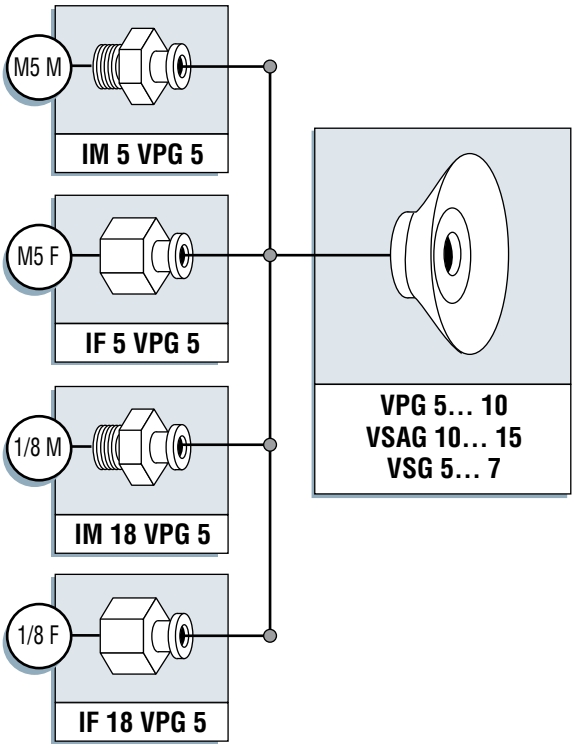
VPG 1... 10
VSAG 10... 15
VSG 5 and 7

Hollow shaft fittings





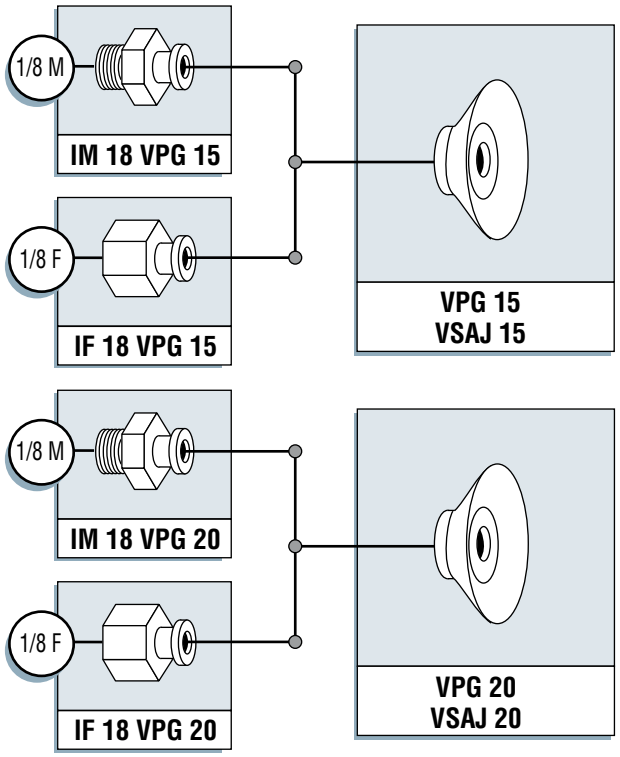




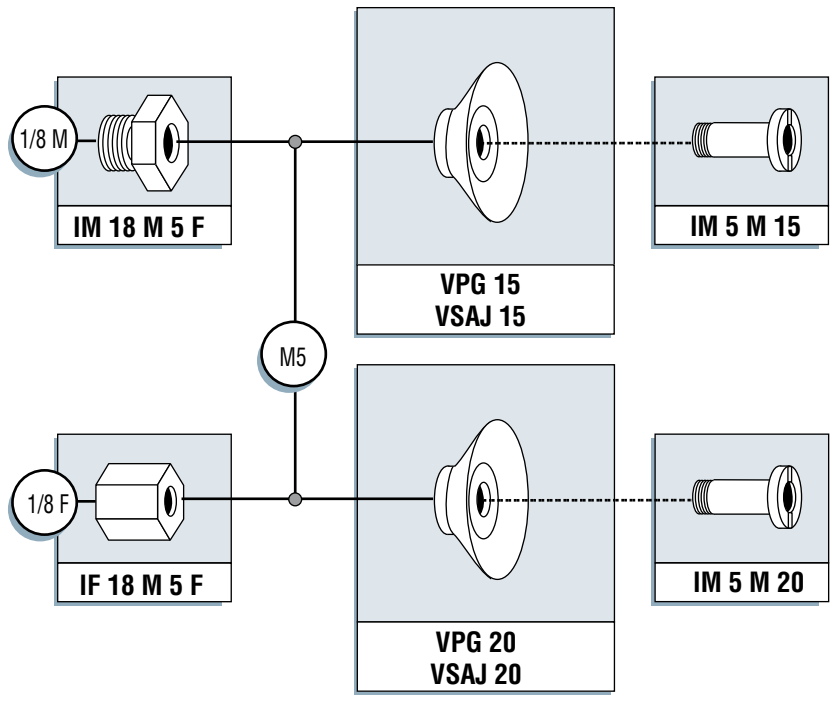
Fittings dimensions:
see pages 2/22 and 2/23.

VPG 15 and 20
VSAJ 15 and 20

Hollow shaft fittings



Removable fittings

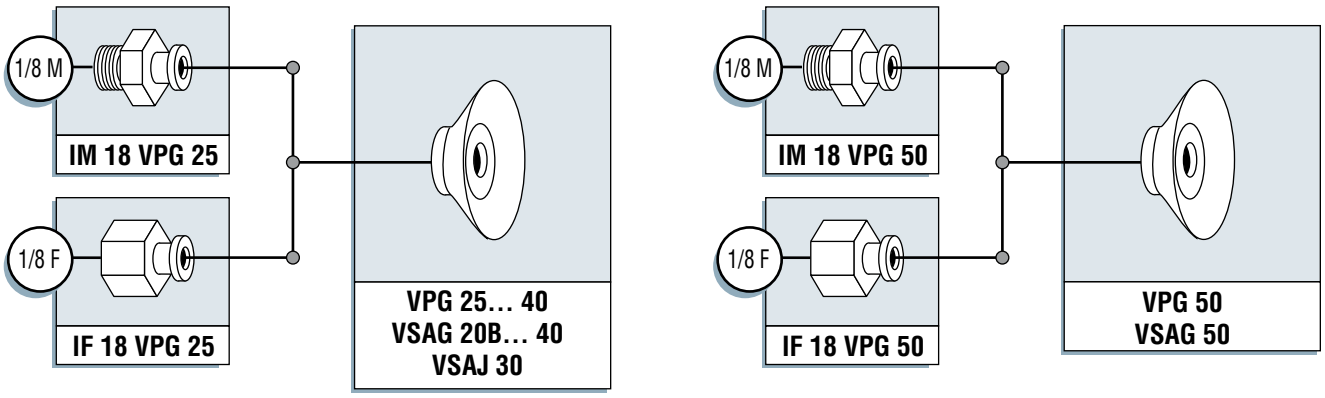


Fittings dimensions:
see pages 2/22 and 2/23.

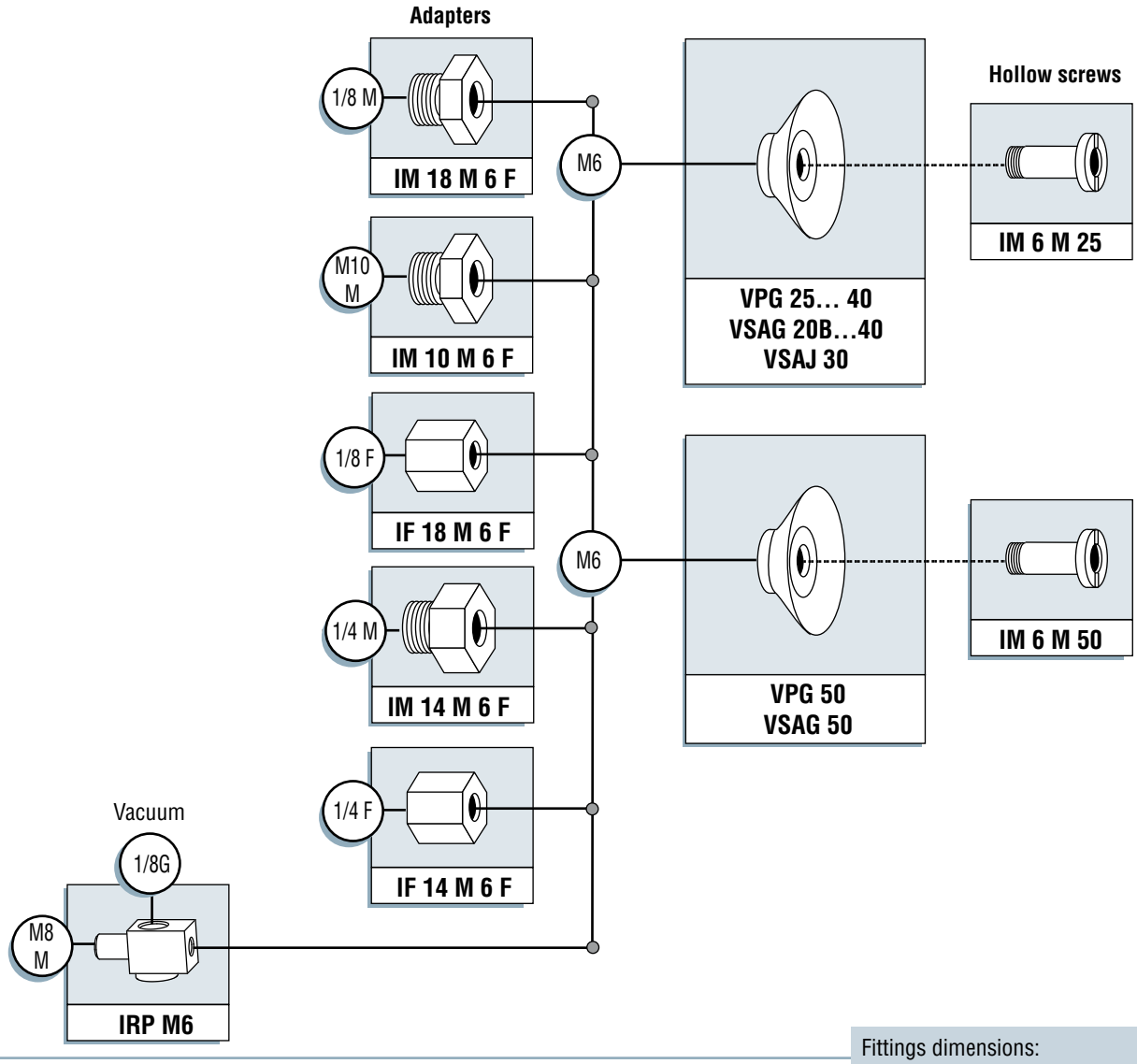
assembly diagrams

VPG 25... 50
VSAG 20B... 50
VSAJ 30

Hollow shaft fittings



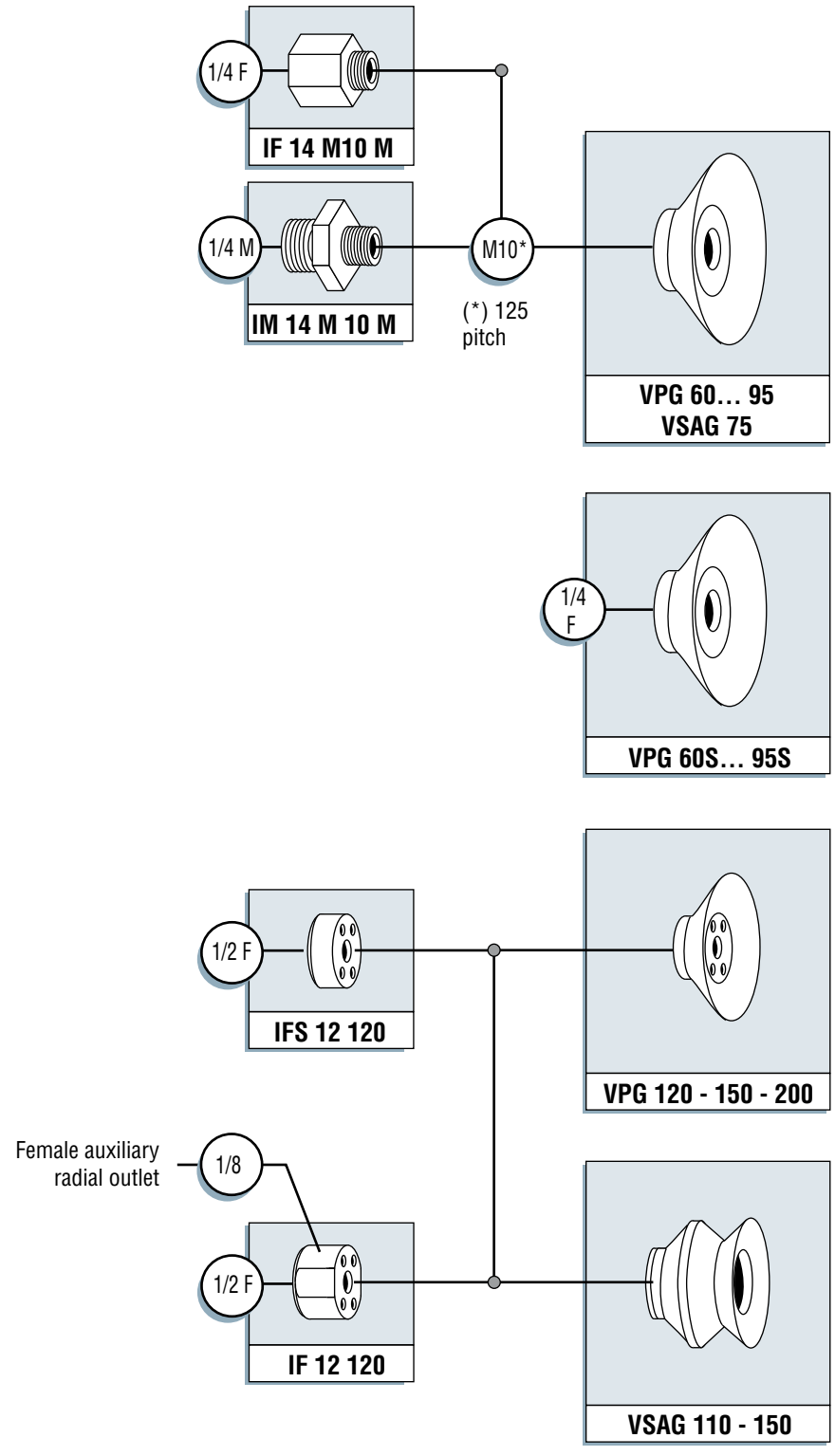
Removable fittings



Fittings dimensions:
see pages 2/22 and 2/23.

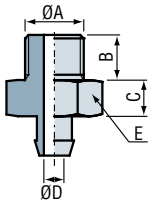
VPG 60... 200
VSAG 75 and 150

Removable fittings



Fittings dimensions:
see pages 2/22 and 2/23.

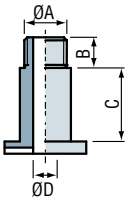
Male fittings



Hollow shaft fittings

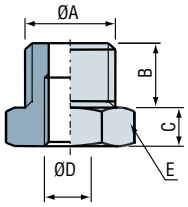
	ØA (mm)	**B** (mm)	**C** (mm)	**ØD** (mm)	**E** (mm)
IM 3 VPG 1	M3	3	2	0.4	5
IM 3 VPG 1.5	M3	3	2	0.7	5
IM 5 VPG 2	M5	4.5	3.5	1	7
IM 5 VPG 5	M5	4.5	3.5	2.2	7
IM 11 A (1)	1/8G	7.5	6	3.5	14
IM 11 A SP 139*	1/8G	7.5	6	3.5	14
IMC 14	1/4G	10	8	7	17
IM 14 VSP 3856	1/4G	14.6	3	9	Ø 24
IM 18 VPG 5	1/8G	8	5	2.2	14
IM 18 VPG 15	1/8G	8	5	2.2	14
IM 18 VPG 20	1/8G	8	5	3	14
IM 18 VPG 25	1/8G	8	5	4	14
IM 18 VPG 50	1/8G	8	5	4	14
IM 20	M3	3	2	1.4	5
IM 21 (2)	M5	4.5	5	2.5	7
IM 21 SP 139*	M5	4.5	5	2.5	7
IM 22 (2)	M6	5	5	3.5	7
IM 23	10-32	4.5	5	2.5	7
IM 24	M5	4.5	2.5	2.5	10

* fitting for VSP 14



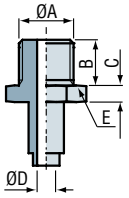
Hollow screws

	ØA (mm)	**B** (mm)	**C** (mm)	**ØD** (mm)
IM 5 M 15	M5	5	2	2.5
IM 5 M 20	M5	5	4	2.5
IM 6 M 25	M6	6	6	3.5
IM 6 M 50	M6	6	6	3.5
IM 50	M5	5	11	2.8
IM 60 (2) (3)	M6	7	11	3.5
IM 68	M8	8	11	5.2
IM 80	1/8G	8	18	6
IM 85	M10x150	8	18	6



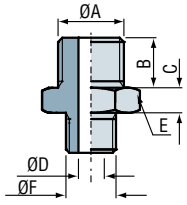
Adapters for hollow screws

	ØA (mm)	**B** (mm)	**C** (mm)	**ØD** (mm)	**E** (mm)
IM 10 M 6 F (1)	M10	7	3.5	M6	13
IM 12 F 18	1/2G	14	6	1/8 G	22
IM 14 M 6 F (1)	1/4G	8	5	M6	17
IM 14 F 18	1/4G	8	5	1/8 G	17
IM 18 M 5 F	1/8G	6	4.5	M5	13
IM 18 M 6 F (1)	1/8G	6	4.5	M6	13
IM 38 F 18	3/8G	9	5	1/8 G	19



Riveted (factory-crimped)

	ØA (mm)	**B** (mm)	**C** (mm)	**ØD** (mm)	**ØE** (mm)
IM 41	1/4G	11	4	4.4	17
IM 51	1/4G	11	6	8	21
IM 52	3/8G	11	6	8	21



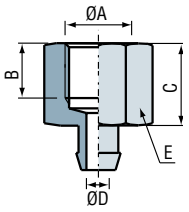
Screwed

	ØA (mm)	**B** (mm)	**C** (mm)	**ØD** (mm)	**E** (mm)	**ØF** (mm)
IM 14 M 10 M	1/4G	10	5	5	17	M10x125

(1) Available in NPT version.
(2) Nozzle fittings version: calibrated diameter to reduce leaks when a multi-section pad unit is being used (see page 5/8).
(3) Available in stainless steel.

Note: nozzle fittings versions of these fittings are available on pages 5/7 and 5/8.

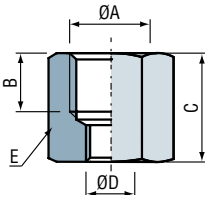
Female fittings



Hollow shaft fittings

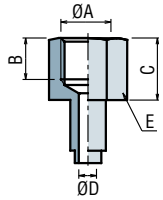
	ØA	B	C	ØD	E
IF 5 VPG 5	M5	6	9	2.2	14
IF 10 A (1)	1/8G	8	12	3.5	14
IF 10 A SP 139*	1/8G	8	12	3.5	14
IFC 14	1/4G	12	15	6.9	8
IF 18 VPG 5	1/8G	9	15	2.2	14
IF 18 VPG 15	1/8G	9	15	2.5	14
IF 18 VPG 20	1/8G	9	15	3	14
IF 18 VPG 25	1/8G	9	15	4	14
IF 18 VPG 50	1/8G	9	15	4	14

* fitting for VSP 14



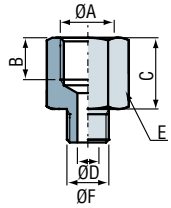
Adapters for hollow screws

	ØA (mm)	B (mm)	C (mm)	ØD (mm)	E (mm)
IF 14 M 6 F (1)	1/4G	11	16	M6	17
IF 14 F 18	1/4G	9	19	1/8G	17
IF 18 M 5 F	1/8G	7.5	13	M5	13
IF 18 M 6 F (1)	1/8G	7.5	13	M6	13



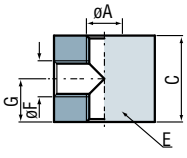
Riveted (factory-crimped)

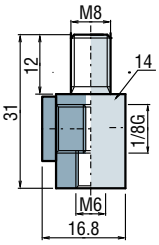
	ØA (mm)	B (mm)	C (mm)	ØD (mm)	E (mm)
IF 40	1/4G	10	15	4.4	17
IF 50	1/4G	10	15	8	21



Screwed

	ØA (mm)	B (mm)	C (mm)	ØD (mm)	E (mm)	ØF (mm)
IF 14 M 10 M	1/4G	10	17	5	17	M10x125

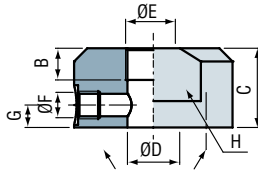




IRP M6

With radial outlet

	ØA (mm)	B (mm)	C (mm)	ØD (mm)	E (mm)	ØF (mm)	G (mm)
IR M5	M5	-	12	-	14X8	M5	6
IRP M6	See diagram						



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

For VPG 120 to 200 and VSAG 110 and 150 suction pads

	ØA	B	C	ØD	E	ØF	G	H
IF 12,120	1/2G	24	30	Ø19	Ø60	1/8G	8.7	48
IFS 12 120	1/2G	13	13	-	Ø65	-	-	-

(1) Available in NPT version.

Special purpose suction pads

Special purpose suction pads

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

MVS

- Suction pads with 1.5 and 2.5 bellows
- 3 models
- Silicone: FDA and EC standard

P 3/2

- Used to grip delicate objects. Very flexible lip (opening bags, gripping tins and flexible aluminum or plastic bottles, etc.).
- High throughput rate
- Gripping of flexible products

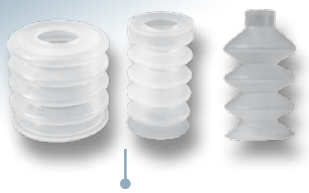
VSO

- Suction pads with 2.5 and 3.5 bellows
- 3 models
- Silicone: FDA and EC standard 1935/2004

P 3/3

- Range specially designed to meet the constraints involved in handling eggs.
- Very flexible lip
- Different shapes of suction pad

VSD, VSE, VSP, VSB



- Suction pads with 2.5 to 5.5 bellows
- 13 models
- Silicone: FDA and EC standard

P 3/4

- Range specially developed for gripping delicate objects such as cakes (buns, biscuits, etc.)
- Specific shapes and shore A hardness depending on the applications
- Temperature resistance: - 40°F to 428°F

VSBO

- Suction pads with 4.5 bellows
- 2 models
- High tensile force
- Highly flexible and long stroke

P 3/6

- Used to grip 75cl bottles and Magnums.
- Bottles gripped from the side, vertical and horizontal handling
- Suction pad with stainless steel reinforcement in the bellows
- Available with integrated high valve

VPA

- Flat suction pads
- 9 models
- Very flexible lip
- Materials: natural rubber and silicone (food compatibility)

P 3/9

- Range of suction pads 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

Special purpose suction pads

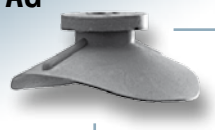
VPR

- Flat suction pads
- 4 models
- Material: natural rubber

P 3/10

- The VPR range of suction pads is designed to meet the requirements of mailing applications.
- Envelope stuffing, film-wrapping, mailing (picking)
- Very resistant to abrasion

VPAG



- Curved suction pads
- 2 models
- Material: natural rubber

P 3/10

- 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

VPYR

- Flat suction pads with axial ball-joint system
- 4 models (Ø50 to 100mm)
- Materials: nitrile and silicone

P 3/11

- The range of ball-joint suction pads is recommended for gripping curved or rotating products which requires a lot of force and mechanical resistance

SPL

- "Heavy load" flat suction pads
- 5 models (Ø240 to 600mm)
- Materials: nitrile and silicone

P 3/12

- SPL suction pads are used to handle heavy loads such as metal sheets or glass panels. They have internal cleats allowing them to handle thin metal sheets without distorting them and for vertical handling (non-slip)

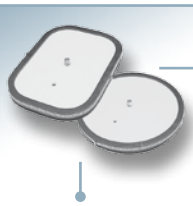
Acier

- Flat suction pads with a bonded foam seal
- 9 cylindrical models (Ø 150 to 580 mm)
- 9 oblong models (175 x 115 to 705 x 385mm)

P 3/13

- For horizontal handling of heavy loads (thick metal sheets) or objects with an uneven surface such as concrete slabs or wood,etc.
- Wide choice of dimensions

VA



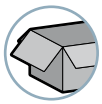
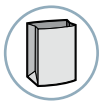
- Flat suction pads with a removable foam seal
- 5 cylindrical models (Ø 250 to 360 mm)
- 5 oblong models (300 x 200 to 420 x 270 mm)

P 3/14

- For horizontal handling of heavy loads (thick metal sheets) or objects with an uneven surface such as concrete slabs or wood,etc. (removable seal = easier maintenance)

Suction pads for opening bags

Branch-specific applications

Types of use


Materials

SIB 35 Shore A white silicone
SIT5 Translucent silicone

For applications requiring suction pads with a smaller diameter, we recommend the VSA series in the SIB version, see pages 2/6 and 2/7

Note:

Nozzle fitting **IM5MVS** page 5/8

Presentation

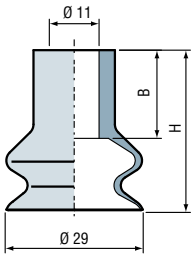
Used for all kinds of delicate gripping requiring a very flexible lip (opening bags, gripping tins and flexible aluminum or plastic bottles, etc.).

- High throughput rate
- Silicone: FDA and EC standard
- Lip highly adaptable to the entire delicate surface to be handled.

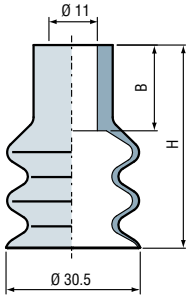
	H (mm)	B (mm)	f (1) (mm)	(cm³)	(N) (2)	PVC	SIB	SIT5	(g)
MVS 30 1.5 SIB	35	19.5	15.5	7	6.5		■		5.7
MVS 30 1.5 SIT5	35	19.5	15.5	7	-			■	5.7
MVS 30 2.5 SIB	46	19.5	20	11.2	9		■		6.5

(1) f = Deflection of the suction pad.
(2) Actual force of the suction pad with a 90% vacuum and a safety factor of 2 included.

MVS 30 1.5



MVS 30 2.5

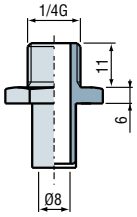


Fittings

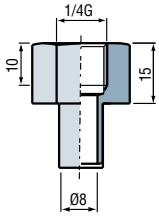
- Fittings for MVS 30 1.5 SIB and MVS 30 2.5 SIB
- Male and female 1/4 G BSP. Add IM14 or IF14 at the end of the suction pad reference on your order.

- 1/4 G male IM51SP143
- 1/4 G female IF50SP143

IM51SP143



IF50SP143



Accessories

To optimize the use of your suction pads, Coval offers a comprehensive range of accessories (nozzle fittings, spring extensions, and feeder systems, etc.), see chapters 5 and 13.

For all orders, please specify: Model + Material + Fitting

1: Model	
MVS	Please refer to the table

2: Material
SIB
SIT5

3: Fitting
IM51SP143
IF50SP143

E.g. **MVS 30 1.5 SIT5 IM14**
(MVS 30 1.5 suction pad in translucent silicone with male 1/4 gas fitting)

Suction pads for egg-handling

Branch-specific applications

Presentation

The VSO range of suction pads has been specially designed to meet the constraints involved in handling eggs.

- Very flexible lip
- Different shapes of suction pad
- Food standard silicone

Types of use

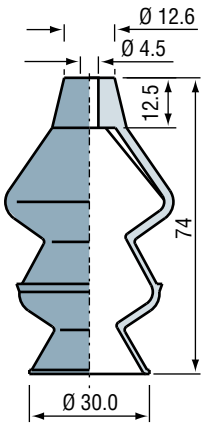
Materials

SI	35 Shore A red silicone	**SIT6**	60 Shore A translucent silicone
SIT3	35 Shore A translucent silicone		

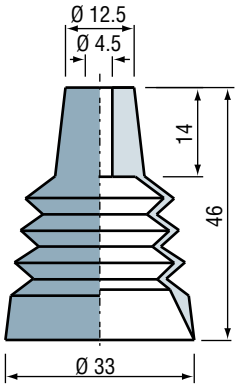
	(cm³)	(N) (1)	SI	SIT3	SIT6	(g)
VSO 30 SI	40	1.5	■			17
VSO 33 SIT6	13	1.5			■	7.3
VSO 36 SIT3	34	1.5		■		16.3

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

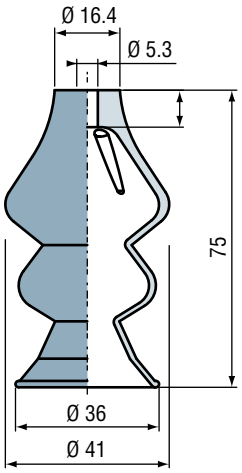
VSO 30 SI



VSO 33 SIT6



VSO 36 SIT3



For all orders, please specify: Model + Material + Fitting

1: Model		2: Diameter		3: Material	
VSO	Please refer to the table	30 ... 36	Please refer to the table	SI	Please refer to the table

E.g. **VSO 30 SI** (Diameter 30 VSO suction pad in red silicone)

VSD, VSE, VSP series

Suction pads for bakery applications

Branch-specific applications

Presentation

Suction pads specially developed for gripping delicate objects such as cakes (buns, biscuits, etc.) . Specific shapes and shore hardness depending on the applications. Food standard translucent silicone means the suction pads can be used at temperatures between - 40°F to + 428°F.

Types of use

Materials

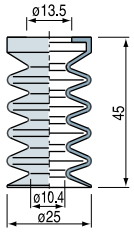
Si	Silicone	**SIT5**	50 Shore A translucent silicone
Si3	30 Shore A silicone	**SIT6**	60 Shore A translucent silicone
Si5	50 Shore A silicone	**SIT7**	70 Shore A translucent silicone
SIT3	30 Shore A translucent silicone		

	dim. (mm)	height (mm)	f (1) (mm)	maximum vacuum (%)	shore hardness	Fittings			
						M5M	1/4G M	1/8G F	1/8G M
VSD 25 SI	Ø 25	45	24	90	30				
VSD 38 SI	Ø 38	35	21	15	30				
VSD 38 SI5	Ø 38	35	21	20	50				
VSE 35 SI3	Ø 35	42	26	20	30				
VSE 35 SI	Ø 35	42	26	30	50				
VSE 39 SI	Ø 39	44	28	30	50				
VSP 14 SI3	Ø 14	19	9	70	30 (2)	IM21SP139		IF10ASP139	IM11ASP139
VSP 14 SIT6	Ø 14	19	9	90	60	IM21SP139		IF10ASP139	IM11ASP139
VSP 2258 SIT5	22 x 58	35	8	20	50				
VSP 2258 SIT7	22 x 58	35	8	30	70				
VSP 2747 SIT3	27 x 47	50	26	15	30		IM14VSP3856		
VSP 3856 SIT5	38 x 56	50	28	15	50		IM14VSP3856		
VSP 7623 SIT5	23 x 76	44	14	15	50				

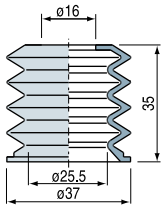
(1) f = Deflection of the suction pad / (2) Non-toxic red silicone.

Fittings dimensions, see pages 2/22 and 2/23.

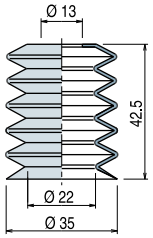
VSD 25



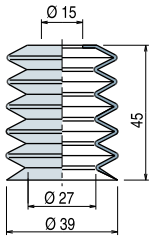
VSD 38



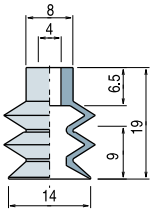
VSE 35



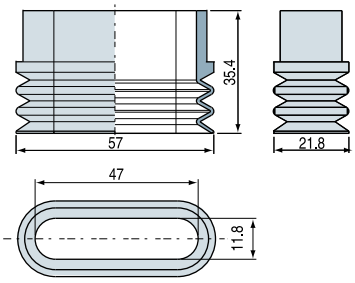
VSE 39



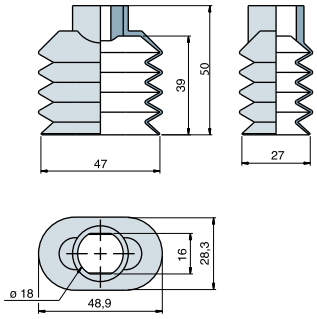
VSP 14



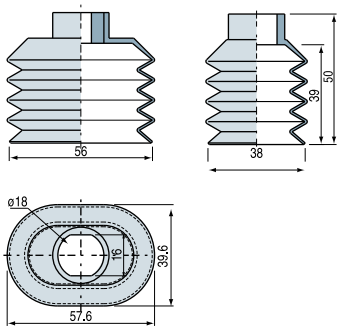
VSP 2258



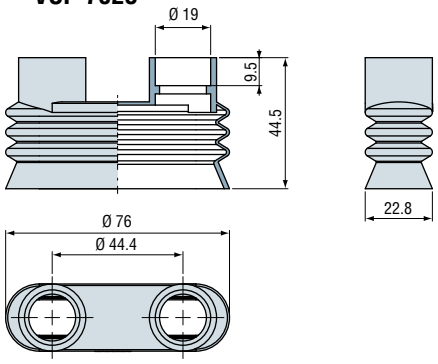
VSP 2747



VSP 3856



VSP 7623



Accessories

To optimize the use of your suction pads, Coval offers a comprehensive range of accessories (nozzle fittings, spring extensions, and feeder systems, etc.), see chapters 5 and 13.

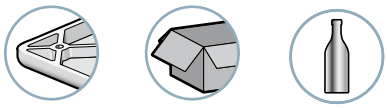
For all orders, please specify: Model + Dimensions + Material

1: Model		2: Dimensions		3: Material	
VSD	Please refer to the table	Ø 25	Please refer to the table	SI	Please refer to the table

E.g. **VSP 2258 SIT7**
(VSP 2258 suction pad in 70 shore A translucent silicone)

Long stroke suction pads

Branch-specific applications



Presentation

Long stroke suction pads (3.5 and 4.5 bellows) are specially recommended for handling spherical or cylindrical objects or which require compensation for varying heights.

Types of use

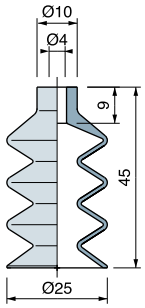
Materials

NBR Nitrile
SIT3 35 Shore A translucent silicone
SIT5 50 Shore A translucent silicone

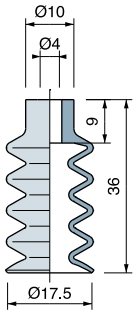
	(cm³)	(N) (1)	f (2) (mm)	NBR	SIT3	SIT5	(g)
VSB 25	7.2	8	27	■		■	5
VSD 18	2.5	5.5	18			■	3.2
VSD 32	21.7	14.5	34	■	■		13.4

(1) Force at 90% vacuum including a safety factor of 2.
(2) f = Deflection of the suction pad.

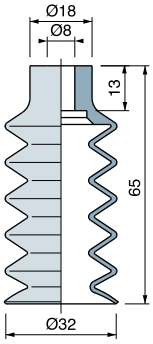
VSB 25



VSD 18



VSD 32



Choice of fittings

(Ø)	Group		M5M	M6M	M8M	M10M	1/8F	1/8M	10/32M	1/4F	1/4M
VSB 25 / VSD 18	1	2/15	■	■			■	■	■		
VSD 32	2	2/16	■	■	■	■	■	■		■	■

Fitting: M = male
F = female

Assembly diagrams

see pages 2/15 and 2/16.

Accessories

To optimize the use of your suction pads, Coval offers a comprehensive range of accessories (feelers, spring extensions, and feeder systems, etc.), see chapters 5 and 13.

For all orders, please specify: Model + Material

1: Model
VSB 25
VSD 18
VSD 32

2: Material
NBR
SIT3
SIT5

E.g. **VSD 18 SIT5**
(VSD 18 suction pad in translucent silicone)

Bottle suction pads

Applications

Types of use

Materials

NBR Nitrile
NR Natural rubber

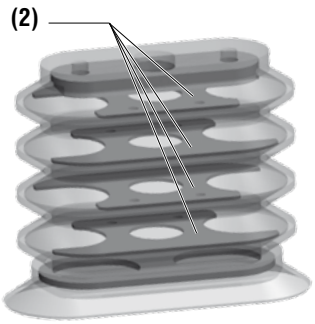
Presentation

Designed for gripping 75 cl bottles, the VSBO range of suction pads has been extended to include a suction pad specially developed to grip Magnum bottles. The curve and surface of the lip are adapted to the weight and diameter of this size of bottle.

The VSBO bottle suction pads are designed to hold bottles from the side for vertical and horizontal handling.

Two fitting types: to provide users with maximum possibilities, the bottle suction pads have an M6 internal thread which allows the suction pads to be attached either from inside with 2 x M5 screws or from above with 2 x M6 screws.

The VSBO suction pad is fitted with 4 stainless steel reinforcements in the bellows **(2)** to increase the tensile force while maintaining a long stroke and high flexibility.



Characteristics

The actual force is 80 Newtons at 90% vacuum with a safety factor of 2 included (VSBO fitted with internal reinforcements).

The force of the lip is stronger to increase resistance to slipping (VSBO 50105, etc.).

	(cm³)	(N) (1)	(N) (1)	deflection (mm)	NBR	NR
VSBO 4095	112.5	80	40	38	■	■
VSBO 50105	142.5	80	50	2.5 + 38	■	

(1) Actual force of the suction pad with a 90% vacuum and including a safety factor of 2 for horizontal handling and a factor of 4 for vertical handling.

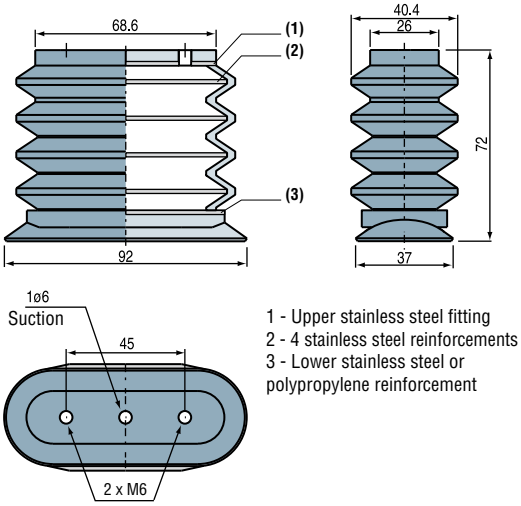
Bottle suction pads with high valve option

Advantages of the high valve

- No loss of stroke for the suction pad when placed under vacuum
- Valve adjustment from under the suction pad
- Immediate vacuum action from the first pressure
- Elimination of auto-suction pad phenomenon at release
- No vacuum loss in the event a bottle is absent

Note: Bottle suction pad with high valve, see page 3/8.

Bottle suction pads



1 - Upper stainless steel fitting
2 - 4 stainless steel reinforcements
3 - Lower stainless steel or polypropylene reinforcement

75 cl Bottle suction pad - VSBO 4095

	material	reinforcement	
VSBO 4095	NBR	D5	Lower stainless steel reinforcement
	NR	D5P	Lower polypropylene reinforcement

■ Example: **VSBO4095NBRD5P**

VSBO4095 suction pad in nitrile with upper fitting, 4 stainless steel reinforcements and lower polypropylene reinforcement.

■ Replacement suction pad: VSBO4095NBR or NR

■ Option: CAVSBO valve

VSBO 4095 NBR D5 or D5P can be transformed to VSBO 50105 NBR D5 by ordering the kit **Part No. VPBO 50105 M VPBO 50105 M**

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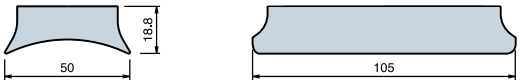
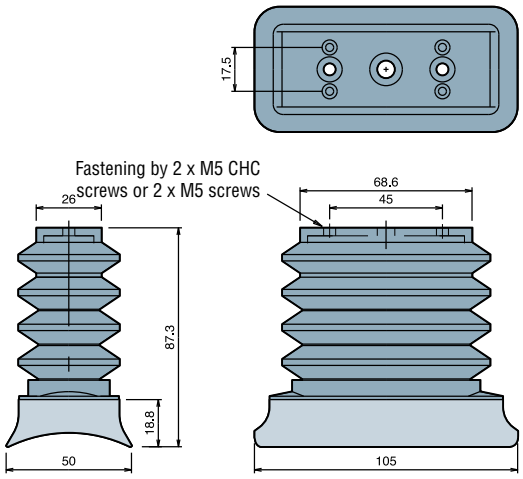


VPBO 50 105 M

Including the 50 x 105mm lip with reinforcement to be mounted under the VSBO4095 suction pad.

Kit part No.: VPBO50105M

=



Magnum bottle suction pad fitted with internal reinforcements VSBO 50105 NBR D5

4 bellows suction pad with:

■ a 50 x 105 mm nitrile lip

■ 4 stainless steel internal reinforcements

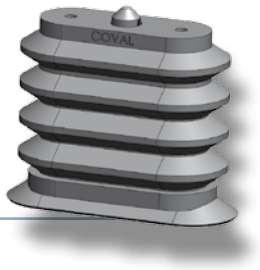
■ a lower stainless steel reinforcement

Part No.: VSBO 50105 NBD5

Replacement lip: **Part No. VPBO 50105 NBR**

3

Bottle suction pads with high valve (Version V3)



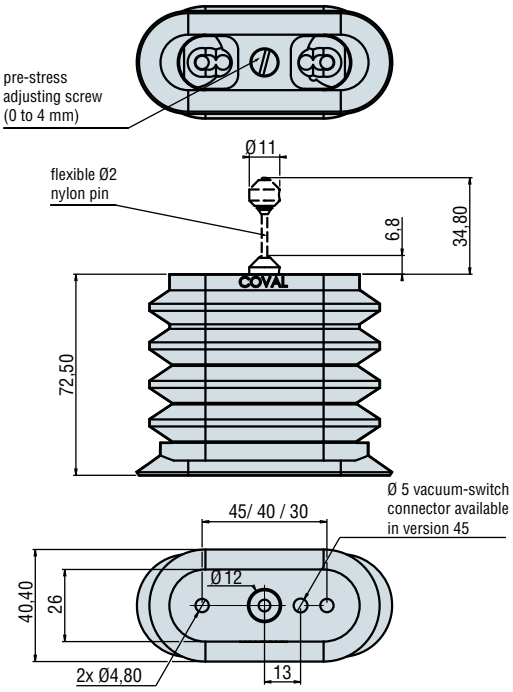
Applications

Types of use

Materials

Suction pad	Nitrile (NBR)
High valve:	
Pin	Nylon
Cone	Aluminum
O-ring	Nitrile
Trigger plate	POM
Reinforcements	Stainless steel
Spring	Stainless steel

Diagrams

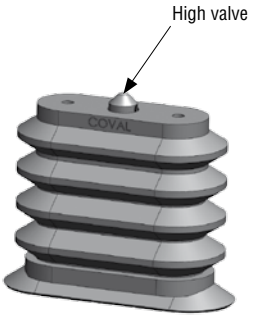


Presentation

Designed for gripping 75 cl bottles, the VSBO4095 range of suction pads has been expanded with the development of a new high valve (version V3), making it possible to ensure air-tightness of the network in the event a bottle is absent. This new technology makes it possible to have great sensitivity in opening the valve and placing the suction pad under vacuum once contact is made with the bottle.

Advantages of the High valve V3

- No loss of stroke for the suction pad when placed under vacuum
- Valve adjustment from under the suction pad
- Immediate vacuum action from the first pressure
- Elimination of auto-suction pad phenomenon at release
- No vacuum loss in the event a bottle is absent



The VSBO suction pad with high valve is fitted with 4 reinforcements in the bellows to increase the tensile force, while maintaining a long stroke and high flexibility for boxing/unboxing applications.

Characteristics

The high valve opens when pressure starts to be exerted on the suction pad by a lower reinforcement called the "trigger plate".

	(cm³)	(N) (1)	(N) (1)	deflection (mm)	NBR
VSBO 4095	112.5	80	40	38	■

(1) Actual force of the suction pad with a 90% vacuum and including a safety factor of 2 for horizontal handling and a factor of 4 for vertical handling.

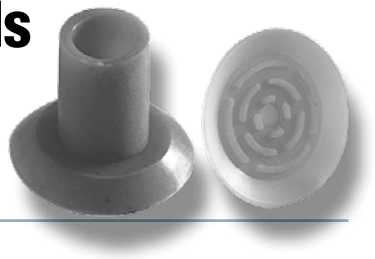
Vacuum-switch connection: the VSBO suction pad with high valve V3 (45 mm center-to-center distance) has a Ø5 mm enabling a vacuum-switch connection or blow-off.

To place an order, specify:

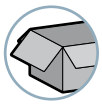
The part number based on the fitting center-to-center distance

Part No.	Fixing center-to-center distance
VSBO4095CH330	30 mm
VSBO4095CH340	40 mm
VSBO4095CH345	45 mm

Paper suction pads



Branch-specific applications




Presentation

The VPA series suction pads for paper are made of natural rubber(NR) to ensure resistance to abrasion caused by paper and cardboard or of silicone (SIT5) for food compatibility. A range of suction pads with a very flexible lip used to handle highly flexible materials

Types of use

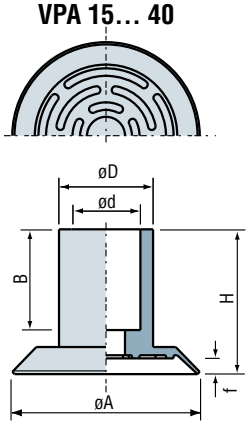

Materials

NBR Nitrile
SIT5 50 Shore A translucent silicone (FDA)
NR Natural rubber

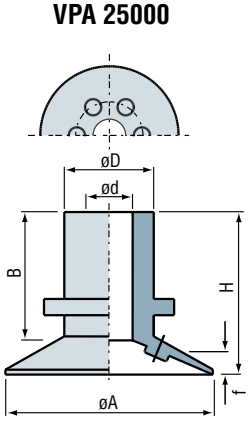
	(N) (1)	NBR	SIT5	NR	ØA (mm)	H (mm)	Ød (mm)	ØD (mm)	f (mm)	B (mm)	male fittings				female fittings	
											1/8G	1/4G	M5	M6	1/8G	1/4G
VPA 15	4		■	■	15	9.8	5	9	0.8	7	IM11A		IM21	IM22	IF10A	
VPA 20	6	■	■	■	20	10.3	5	10	1.3	7	IM11A		IM21	IM22	IF10A	
VPA 25	9		■	■	25	10.8	5	10	1.8	7	IM11A		IM21	IM22	IF10A	
VPA 26	9			■	25	21.5	6	14	1.9	13.5						
VPA 30	13	■	■	■	30	23	11	15	2.5	16		IM51SP143	IM5VPA30			IF50SP143
VPA 35 A	17			■	35	23	11	15	2.5	16		IM51SP143	IM5VPA30			IF50SP143
VPA 40	29		■	■	40	20	8	16	2	15		IM41SP477				IF40SP477
VPA 25000	10		■	■	25.5	20	5.8	11	3	15.8						
VPA 25001	10		■	■	25.5	9.5	5.8	16	3	5.1	IM18D6		IM5D6		IF10ASP082	

(1) Actual force of the suction pad with a 90% vacuum and a safety factor of 2 included.

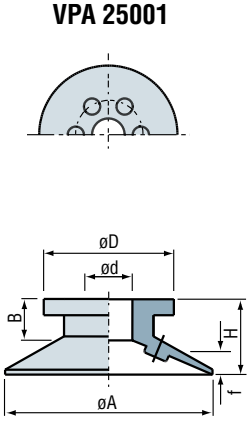
VPA 15… 40



VPA 25000



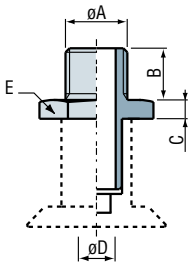
VPA 25001



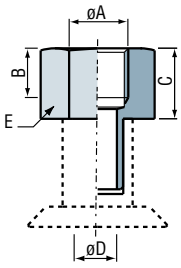
male fittings					
model	**ØA** (mm)	**B** (mm)	**C** (mm)	**ØD** (mm)	**E** (mm)
IM11A	1/8G	7.5	6	3.5	14
IM21	M5	4.5	5	2.5	7
IM22	M6	5	5	3.5	7
IM51SP143	1/4G	11	6	8	21
IM41SP477	1/4G	11	4	4.4	17
IM18D6	1/8G	7.5	5	3.5	17
IM5D6	M5	5.5	4.5	2	13
IM5VPA30	M5	5	3	2.5	13

female fittings					
model	**ØA** (mm)	**B** (mm)	**C** (mm)	**ØD** (mm)	**E** (mm)
IF10A	1/8G	8	12	3.5	14
IF50SP143	1/4G	10	15	8	21
IF40SP477	1/4G	10	15	4.4	17
IF10ASP082	1/8G	8	12	3.5	14

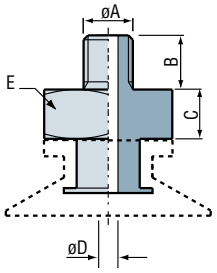
Male fittings



Female fittings



IM5D6 - IM18D6 fittings



Accessories

To optimize the use of your suction pads, Coval offers a comprehensive range of accessories (nozzle fittings, spring extensions, and feeder systems, etc.), see chapters 5 and 13.

For all orders, please specify: Model + Material

1: Model	
VPA 15	Please refer to the table

2: Material	
NBR…	Please refer to the table

E.g. **VPA 20 NR**
(VPA 20 series suction pad, in natural rubber)

VPR series

Suction pads for mailing applications

Branch-specific applications **Types of use**

Presentation

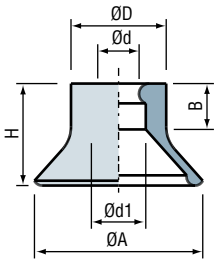
The COVAL range of mailing application suction pads is designed to meet the requirements of the mailing industry. The improved characteristics mean you can optimize production equipment in your branch, such as:

- Envelope stuffing
- Film wrapping
- Envelope insertion
- Mailing (picking).

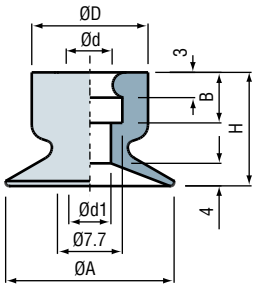
Advantages

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

VPR 001 - 002



VPR 003 - 004



Material

NR Natural rubber

	Ø A (mm)	H (mm)	Ø d (mm)	Ø d1 (mm)	Ø D (mm)	B (mm)	NR	color
VPR 001	24.4	15	5.9	7.8	13.8	8	■	green
VPR 002	25.7	14.5	5.9	7.8	14	9	■	brown
VPR 003	20	14.2	5.7	4	13.8	6	■	red
VPR 004	20	14.2	5.7	5	14.8	6	■	black

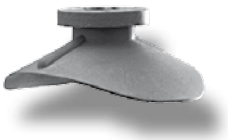
For all orders, please specify: Model

1: Model	
VPR	Please refer to the table

E.g. VPR 003 (VPR 003 red suction pad)

VPAG series

Rounded suction pads



Branch-specific applications **Types of use**

Presentation

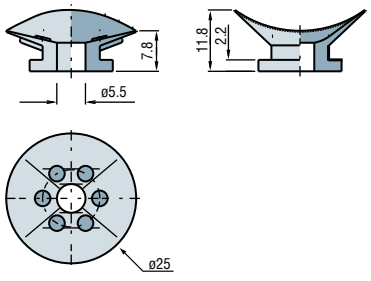
Thanks to very flexible lips, the VPAG range is ideally suited to gripping flexible materials such as labels or sheets of paper - or textured objects. Their shape allows them to be used for unstacking.

Materials

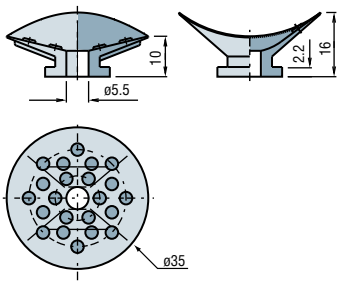
NR Natural rubber

	NR
VPAG 25	■
VPAG 3536	■

VPAG 25



VPAG 3536



Fitting for VPAG 25

1/8 G M IM11ASP082 **1/8 G F** IF10ASP082

Accessories

To optimize the use of your suction pads, Coval offers a comprehensive range of accessories (nozzle fittings, spring extensions, and feeder systems, etc.), see chapters 5 and 13.

For all orders, please specify: Model + Material

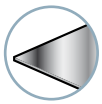
1: Model	
VPAG	Please refer to the table

2: Material
NR

E.g. VPAG 3536 NR (VPAG 3536 suction pad in natural rubber)

Radial ball-joint suction pads

Branch-specific applications



Presentation

VPYR series ball-joints are recommended for gripping rounded or rotating products. They are also recommended for gripping requiring high mechanical resistance and force.

Types of use

Materials

Suction pads:

NBR Nitrile
Si Silicone

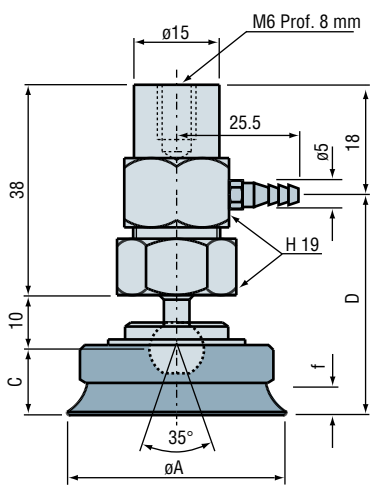
Ball-joint:

Nickel-plated brass and zinc-plated steel

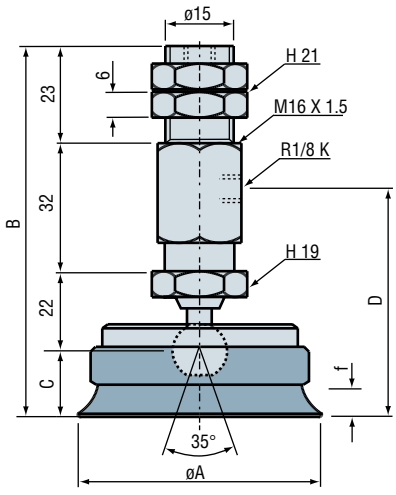
	(N) (1)	Rmin (mm)	NBR	Si	Ø A (mm)	B (mm)	C (mm)	D (mm)	f (2) (mm)	(g)
VPYR 50	90	41	■	■	50	60	12	42	4	117
VPYR 60	129.7	70	■	■	60	93	16	58	5	352
VPYR 80	230	100	■	■	80	95	18	60	6	444
VPYR 100	360	150	■	■	100	95	18	60	6	568

(1) Actual force of the suction pad with a 90% vacuum and a safety factor of 2 included.
(2) f = Deflection of the suction pad.

VPYR 50



VPYR 60... 100



Replacement suction pad

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

Accessories

Possibility of telescopic spring-mounting on request.

For all orders, please specify: Model + Material

1: Model
VPYR

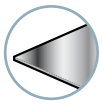
2: Diameter	
50	Ø 50
60	Ø 60
80	Ø 80
100	Ø 100

3: Material
NBR
Si

E.g. VPYR 50 NBR
(VPYR series radial ball-joint suction pad, Diameter 50, in Nitrile)
or: VPYR 50 NBR (VPR series suction pad, Diameter 50, in Nitrile)

Heavy load suction pads

Branch-specific applications



Types of use

Presentation

SPL suction pads are used to handle heavy loads such as metal sheets or glass panels. They have internal cleats allowing them to handle thin metal sheets without distorting them and for vertical handling (non-slip).

SPL suction pads are delivered without holes for fittings or with your choice from our range of standard models or specific models on request.

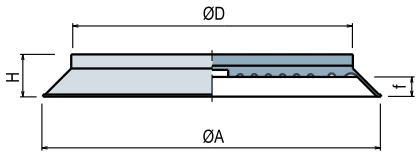
Materials

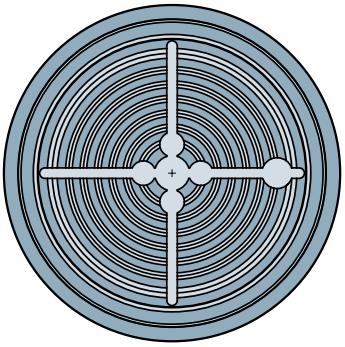
NBR Nitrile **Si** Silicone

	ØA (mm)	(cm³)	(N) (1)	(N) (1)	H (mm)	ØD (mm)	f (2) (mm)	NBR	Si	Fitting (3)	(kg)
SPL 240	240	510	1800	900	28	200	14	■	■	Acier	2.2
SPL 340	340	720	3800	1900	32	300	15	■	■	Acier	5.5
SPL 400	400	850	5000	2500	46	300	25	■	■	Acier	7.6
SPL 500	500	1050	8000	4000	46	400	25	■	□	Acier	12
SPL 600	500	1300	11000	5500	46	500	25	■	□	Acier	18

■ Standard / □ On request

(1) Actual force of the suction pad in use with a 90% 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 pad.
(3) Thickness of the steel fitting: 8 mm)





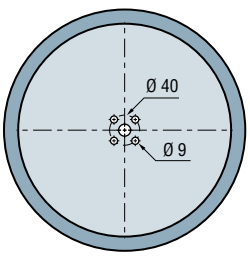
Standard internal threads

The threads given below are for mounting on the COVAL spring systems (not supplied with the suction pad).

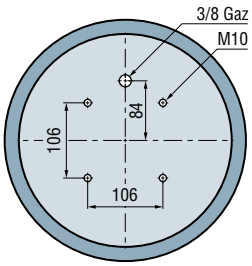
	TS 560 + IFA 12120	RSC1 (1)	RSC 2 (1)
SPL 240	■	■	-
SPL 340	■	■	■
SPL 400	-	-	■

(1) A 3/8 G internal thread is available for connection to the vacuum system.
RSC1: specify G38 RS1 in the reference when ordering,
RSC2 : specify G38 RS2 in the reference when ordering,

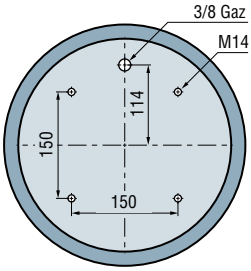
TS5



RSC1



RSC2



Accessories

Suction pads from the SPL series can be mounted on RSC series spring systems. SPL 240 suction pads can be mounted on the IFA 12 120 fitting and the TS560 spring system. See page 5/3.

For all orders, please specify: Model + Material + Internal thread

1: Model	
SPL	Please refer to the table

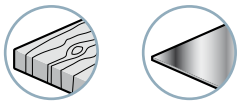
2: Material
NBR or Si

3: Internal thread	
G38 RS1	Please refer to the table
—	without internal thread

E.g. SPL 240 NBR G38 RS1
(SPL series suction pad, diameter 240 in Nitrile with internal thread for the COVAL spring system and 3/8 Gas for connection to the vacuum system)

Steel suction pads with bonded seal

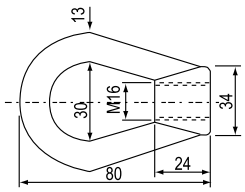
Branch-specific applications



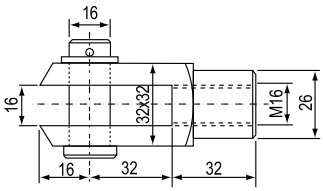
Types of use

Fittings

■ 5000 An ring fitting



■ 5000 Ch cap fitting



Presentation

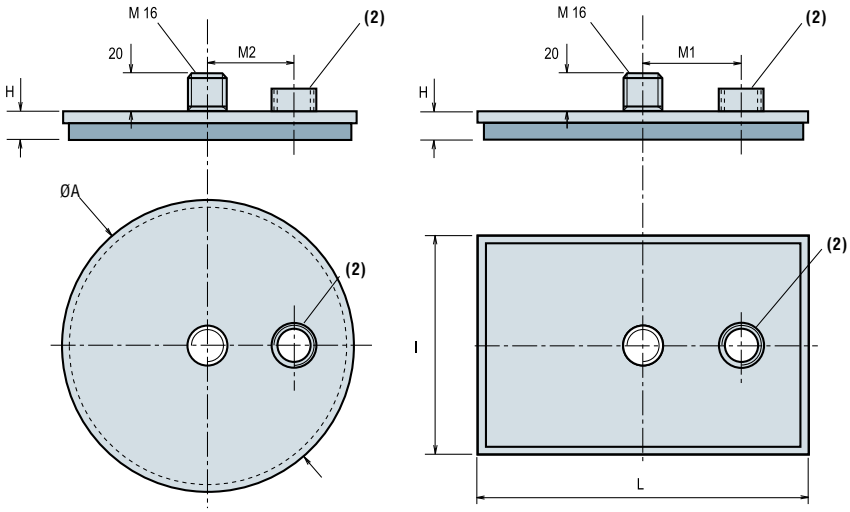
For horizontal handling of heavy loads (thick metal sheets) or objects with an uneven surface such as concrete slabs or wood,etc.

Advantage: wide choice of shapes and dimensions.

Materials

Body	painted steel
Foam seal	Nitrile

Characteristics



Round suction pads				Rectangular suction pads							
	ØA (mm)	H (mm)	(N) (1)		L (mm)	l (mm)	H (mm)	M1/M2 (mm)	Con. (2)	(N) (1)	Type of seal
5020	150	25	430	**6020**	175	115	25	40	1/4G	460	BM 2020 SPTR
5028	170	25	600	**6028**	215	115	25	45	1/4G	590	BM 2020 SPTR
5035	190	25	790	**6035**	225	125	25	50	1/4G	710	BM 2020 SPTR
5050	210	25	1020	**6050**	250	150	25	60	1/4G	1040	BM 2020 SPTR
5085	260	25	1710	**6085**	305	180	25	70	1/4G	1670	BM 2020 SPTR
5150	350	35	2970	**6150**	410	250	35	80	3/8G	2990	BM 3030 SPTR
5240	420	35	4580	**6240**	480	310	35	100	3/8G	4730	BM 3030 SPTR
5330	500	35	6840	**6330**	575	330	35	120	3/8G	6260	BM 3030 SPTR
5500	580	35	9550	**6500**	705	385	35	140	3/8G	9430	BM 3030 SPTR

(1) Force measured at 90% vacuum including a factor of 2.

For all orders, please specify:

Round suction pad: Model + Diameter + Fitting model

1: Model
5020 to 6500

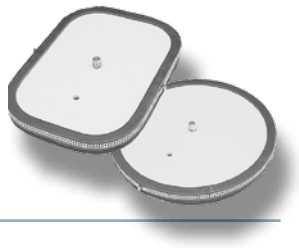
2: Fitting model	
Ring	5000 An
Cap	5000 Ch

E.g. **6050 5000 An**
(Rectangular steel suction pad 250 x 150mm with 5000 An ring fitting).

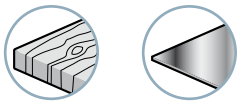
Option

■ Spring system mounting, see page 5/3.

Steel suction pads with removable seal



Branch-specific applications



Types of use

Presentation

For horizontal handling of heavy loads (thick metal sheets) or objects with an uneven surface such as concrete slabs or wood,etc.

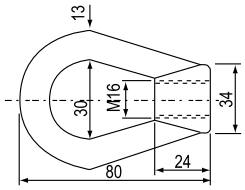
Easier maintenance; no more tricky bonding. The seal is clipped onto the metal fitting and held in place with a stainless steel wire.

Materials

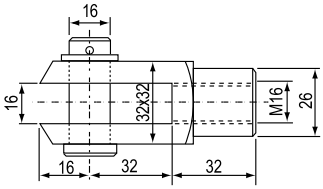
Body	painted steel	**Ring and clip**	Stainless steel
Foam seal	Nitrile		

Fittings

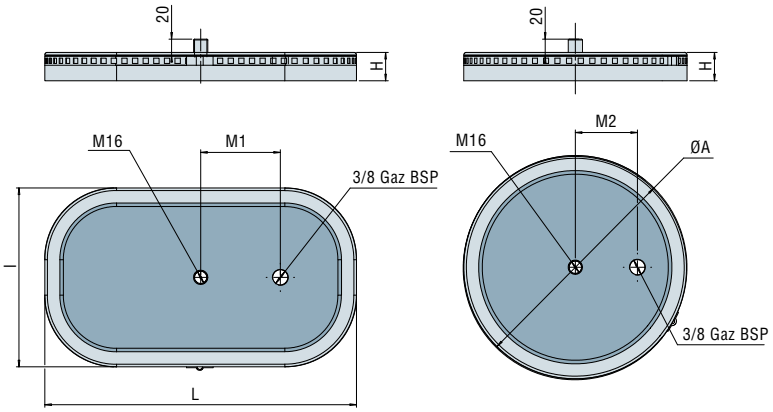
■ 5000 An ring fitting



■ 5000 Ch cap fitting



Characteristics



Round suction pads				Rectangular suction pads							
	ØA (mm)	H (mm)	(N) (1)		L (mm)	l (mm)	H (mm)	M1/M2 (mm)	Con.	(N) (1)	Type of seal
VA 250	250	32	1500	**VA 300**	300	200	32	70	3/8G	1500	BM 2015 ELASTO
VA 280	280	32	2000	**VA 330**	330	220	32	70	3/8G	2000	BM 2015 ELASTO
VA 310	310	32	2500	**VA 360**	360	230	32	70	3/8G	2500	BM 2015 ELASTO
VA 330	330	32	3000	**VA 390**	390	250	32	80	3/8G	3000	BM 2015 ELASTO
VA 360	360	32	3500	**VA 420**	420	270	32	80	3/8G	3500	BM 2015 ELASTO

(1) Force measured at 90% vacuum including a factor of 2.

Spare parts

■ Foam seal, ref. BM 2015 ELASTO (sold by the meter)
■ Stainless steel collar, ref. 095 06 108 (sold by the meter)
■ Stainless steel clip, ref. 095 06 109.

on request:

■ Full kit for replacement of removable seal.

Option

■ Spring system mounting, see page 5/3.

For all orders, please specify:

Round suction pad: Model + Diameter + Fitting model

1: Model	2: Diameter	3: Fitting model	
VA	250 to 360 mm	Ring	5000 An
		Cap	5000 Ch

Rectangular suction pad: Model + Length + Width + Fitting model

1: Model	2: Length	3: Width	4: Fitting model	
VA	300 to 420 mm	200 to 270mm	Ring	5000 An
			Cap	5000 Ch

E.g. **VA 250 5000 An**
(VA series suction pad, diameter 250 with 5000 An ring fitting).

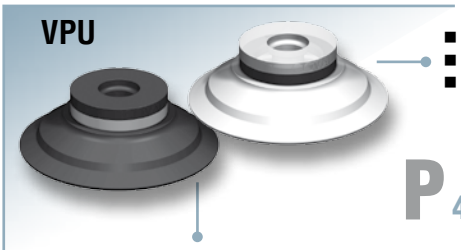
Generic suction pads

Generic suction pads for replacement

COVAL QUALITY

Some of our customers have sometimes used suction pads made by other manufacturers adapted to their applications. To satisfy them we have developed a range of generic suctions pads which are 100% compatible with their application. Please contact your COVAL correspondent for further information regarding generic solutions.

VPU

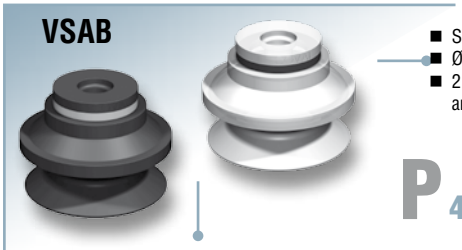


- Flat suction pads
- Ø 6 to 50 mm
- 2 standard materials (Nitrile and silicone)

P 4/2

- Range of generic VPU flat suction pads

VSAB

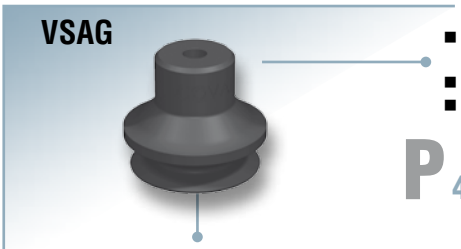


- Suction pads with 1.5 bellows
- Ø 5 to 50 mm
- 2 standard materials (Nitrile and silicone)

P 4/4

- Range of generic VSAB suction pads with 1.5 bellows

VSAG

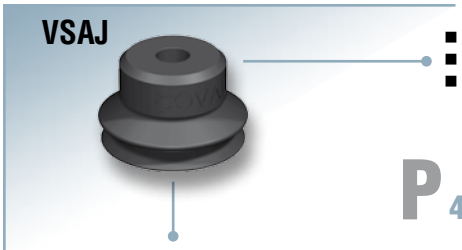


- Suction pads with 1.5 bellows
- Ø 10 to 150 mm
- 3 standard materials

P 4/6

- Range of generic VSAG suction pads with 1.5 bellows

VSAJ

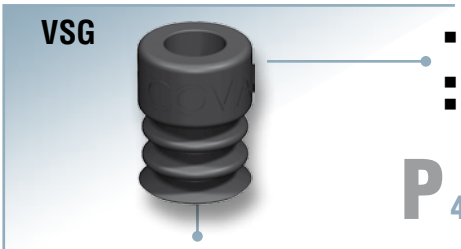


- Suction pads with 1.5 bellows
- Ø 15 to 30 mm
- 2 standard materials (Nitrile and silicone)

P 4/8

- Range of generic VSAJ suction pads with 1.5 bellows

VSG

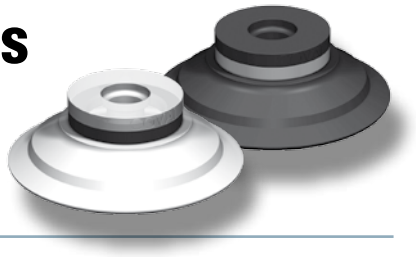


- Suction pads with 2.5 bellows
- Ø 5 and 7mm
- 3 standard materials

P 4/9

- Range of generic VSG suction pads with 2.5 bellows

Flat suction pads Ø 6 to 50 mm



Branch-specific applications

Presentation

■ Range of generic VPU flat suction pads.

Types of use

Materials

NBR	Black nitrile
SI	Translucent Silicone

	Ø (mm)	(cm³)	(N) (1)	(N)	Rmin (mm)	NBR	Si
VPU 6	7	0.05	1.3	0.6	5	■	■
VPU 8	9	0.1	2	1	6	■	■
VPU 10	11	0.18	3.5	1.7	8	■	■
VPU 15	16.5	0.5	6	3	8	■	■
VPU 20	22	1	9	4.5	13	■	■
VPU 30	32	2	18	9	20	■	■
VPU 40	41	5.5	26	13	30	■	■
VPU 50	51.4	12	46	23	35	■	■

(1) Actual force of the suction pad in use with a 90% vacuum and including a safety factor of 2 for horizontal handling and a factor of 4 for vertical handling.

Choice of fittings

	M5 M	1/8G M	1/4G M
VPU 6	IMM5P1		
VPU 8	IMM5P1		
VPU 10	IMM5P2		
VPU 15	IMM5P2		
VPU 20		IM18P3	
VPU 30		IM18P3	
VPU 40			IM14P4
VPU 50			IM14P5

Fittings: M = Male / F = Female

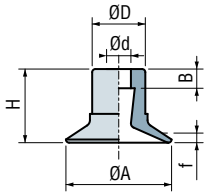
For all orders, please specify: Model + Material + Fitting

1: Model		2: Material	3: Fitting	
VPU 6	Please refer to the table	NBR or Si	IMM5	M5 male
			IM18	1/8G male
			IM14	1/4G male

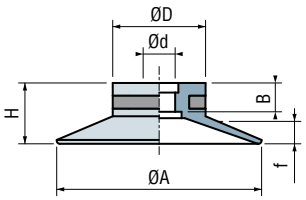
E.g. **VPU 20 NBR IM14**
(VPU 20 series suction pad, in black nitrile with 1/4G male fitting)

Dimensions

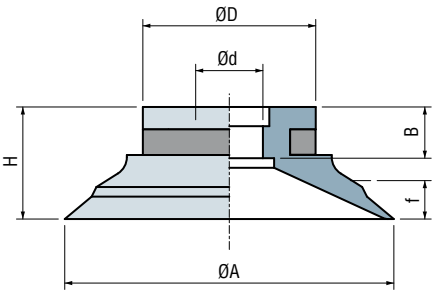
VPU 6… 15



VPU 20… 30



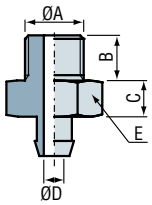
VPU 40 - 50



	Ø A (mm)	H (mm)	Ø d (mm)	Ø D (mm)	f (1) (mm)	B (mm)	(g)
VPU 6	7	6.5	2	5	0.3	3.5	0.14
VPU 8	9	7	2	5	0.5	3.5	0.16
VPU 10	11	10.5	3.8	9	0.5	3	0.65
VPU 15	16.5	11.5	3.8	8.3	1.5	3	0.7
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	1.8
VPU 40	41	13	6.5	20	4.5	6	4
VPU 50	51.4	17.5	10.5	27	6	8	10

The values represent the average characteristics of our products.
(1) f = Deflection of the suction pad.

Male fitting



	ØA	B	C	ØD	E
IMM5P1	M5	4	3.5	1.5	7
IMM5P2	M5	4	4.5	2.7	7
IM18P3	1/8G	7	3.5	4	14
IM14P4	1/4G	9	6	5	17
IM14P5	1/4G	9	6	5	21

Accessories

To optimize use of your suction pads, Coval offers a comprehensive range of accessories (sensors, spring extensions, and feeder systems, etc.)
see chapters 5 and 13.

Suction pads with 1.5 bellows Ø 5 to 50 mm

Branch-specific applications

Presentation

■ Range of generic VSAB suction pads with 1.5 bellows.

Types of use

Materials

NBR Black nitrile

SI Translucent Silicone

	Ø (mm)	(cm³)	(N) (1)	(N)	Rmin (mm)	NBR	Si
VSAB 5	5.6	0.05	0.5	0.2	1.5	■	■
VSAB 8	8.8	0.15	1.3	0.6	1.9	■	■
VSAB 10	11	0.48	2.4	1.2	4	■	■
VSAB 15	15.7	1.1	4.2	2.1	5	■	■
VSAB 20	22	2.7	7	3.5	10	■	■
VSAB 30	34	10	16	8	15	■	■
VSAB 40	43	15	26	13	20	■	■
VSAB 50	53	32	44	22	30	■	■

(1) Actual force of the suction pad in use with a 90% vacuum and including a safety factor of 2 for horizontal handling and a factor of 4 for vertical handling.

Choice of fittings

	M5 M	1/8G M	1/4G M
VSAB 5	IMM5P1		
VSAB 8	IMM5P1		
VSAB 10	IMM5P2		
VSAB 15	IMM5P2		
VSAB 20		IM18P3	
VSAB 30			IM14P4
VSAB 40			IM14P4
VSAB 50			IM14P5

Fittings: M = Male / F = Female

For all orders, please specify: Model + Material + Fitting

1: Model	
VSAB 5	Please refer to the table

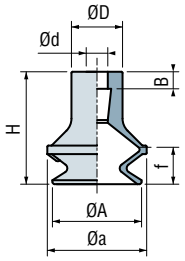
2: Material
NBR or Si

3: Fitting	
IMM5	M5 male
IM18	1/8G male
IM14	1/4G male

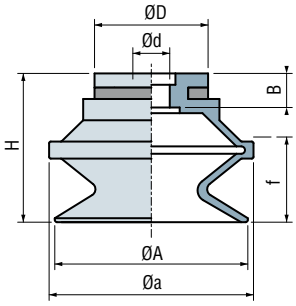
E.g. **VSAB 30 NBR IM14**
(VSAB 30 series suction pad, in black nitrile with 1/4G male fitting)

Dimensions

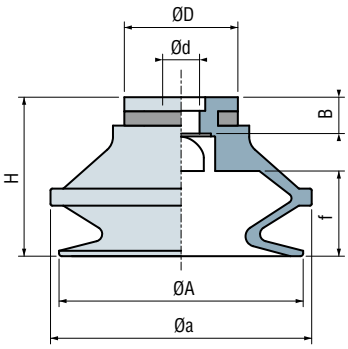
VSAB 5… 15



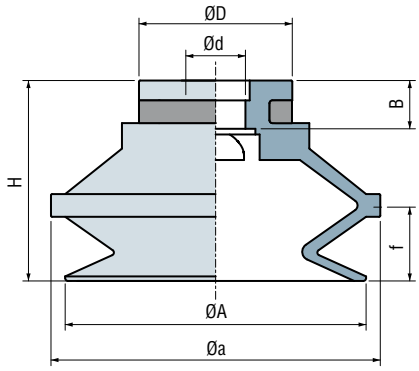
VSAB 20 - 30



VSAB 40



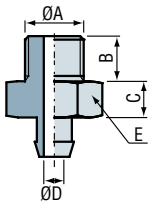
VSAB 50



	Ø A (mm)	H (mm)	Ø a (mm)	Ø d (mm)	Ø D (mm)	f (1) (mm)	B (mm)	(g)
VSAB 5	5.6	9.2	6.2	2	4.5	1.5	3.5	0.11
VSAB 8	8.8	11.9	9.6	2	5.5	3.5	3.5	0.3
VSAB 10	11	16.4	12	3.8	9	4.5	5	1
VSAB 15	15.7	19.8	17.5	3.8	9	6.5	3	1.5
VSAB 20	22	19	24	5	14.5	10	4.5	3.2
VSAB 30	34	26.2	36	6.5	20	15	6	7
VSAB 40	43	28	46	6.5	20	15	6.4	10
VSAB 50	53	35.3	58	10.5	27	13	8.5	20

The values represent the average characteristics of our products.
(1) f = Deflection of the suction pad.

Male fitting



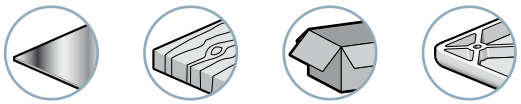
	ØA	B	C	ØD	E
IMM5P1	M5	4	3.5	1.5	7
IMM5P2	M5	4	4.5	2.7	7
IM18P3	1/8G	7	3.5	4	14
IM14P4	1/4G	9	6	5	17
IM14P5	1/4G	9	6	5	21

Accessories

To optimize use of your suction pads, Coval offers a comprehensive range of accessories (sensors, spring extensions, and feeder systems, etc.)
see chapters 5 and 13.

Suction pads with 1.5 bellows Ø 10 to 150 mm

Branch-specific applications



Presentation

■ Range of generic VSAG suction pads with 1.5 bellows.

Types of use

Materials

NBR Nitrile
SI Translucent Silicone
STN Siton®

	Ø (mm)	(cm³)	(N) (1)	(N)	R_{min} (mm)	NBR	SI	STN
VSAG 10	10.7	0.2	2.5	1.3	4	■	■	■
VSAG 15	15	0.7	3.5	1.8	6	■	■	■
VSAG 20 B	20	1	6.6	3.3	8	■	■	■
VSAG 30	30	4	21	10.5	15	■	■	
VSAG 40	40	9	32	16	30	■	■	
VSAG 50	50	26	53	26	40	■	■	
VSAG 75	75	76	125	62	70	■	■	■
VSAG 110	110	280	265	130	100	■	■	■
VSAG 150	150	640	523	260	130	■	■	

(1) Actual force of the suction pad in use with a 90% vacuum and including a safety factor of 2 for horizontal handling and a factor of 4 for vertical handling.

■ Standard

Choice of fittings

(Ø)		M5 F	M5 M	M6 M	M8 M	M10 M	M10 125 pitch	1/8 F	1/8 M	1/4 F	1/4 M	1/2 F
10… 15	2/18	■	■					■	■			
20… 50	2/20			■	■	■		■	■	■	■	
75	2/21						■			■	■	
110, 150	2/21											■

■ Standard

Fitting: M = male
F = female

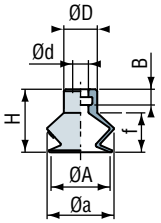
For all orders, please specify: Model + Diameter + Material

1: Model	2: Diameter	3: Material	
VSAG	10 ... 150	NBR…	Please refer to the table

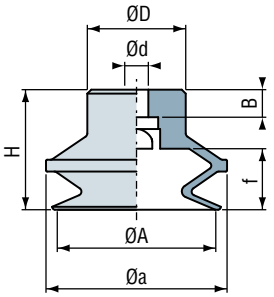
E.g. **VPYR 10 NBR** (VSAG series suction pad, Diameter 10, in Nitrile)

Dimensions

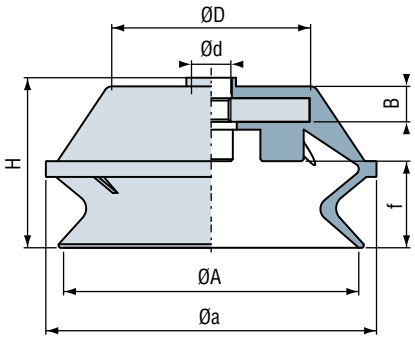
VSAG 10 - 15



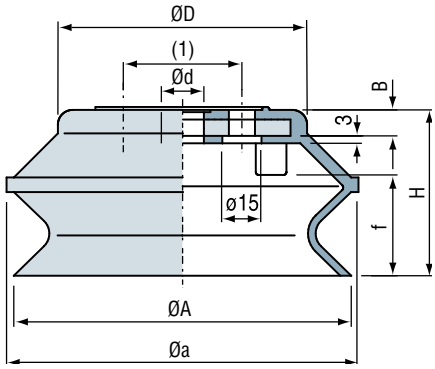
VSAG 20… 50



VSAG 75



VSAG 110 - 150



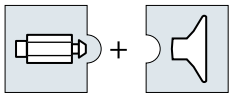
(1) 4 holes Ø9 on Ø40

	Ø A (mm)	H (mm)	Ø a (mm)	Ø d (mm)	Ø D (mm)	f (1) (mm)	B (mm)	(g)
VSAG 10	10.7	13.3	12.5	4	8.5	7.5	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	3.1
VSAG 30	30	30.5	36	6	20	17	7	9
VSAG 40	40	30.5	46	6	25	15.5	7	14.8
VSAG 50	50	36.5	59.5	7.8	28.5	20	7	23.2
VSAG 75	75	43.2	84	M10 x 125	50.5	22	9	90
VSAG 110	110	55	121.5	14	85	32.5	9	320
VSAG 150	150	75.5	166	13	120	39.5	11	820

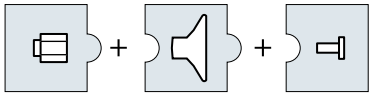
The values represent the average characteristics of our products.
(1) f = Deflection of the suction pad.

Types of assembly

Hollow shaft fitting:



Removable fitting:
(adapter and hollow screw)



Assembly diagrams

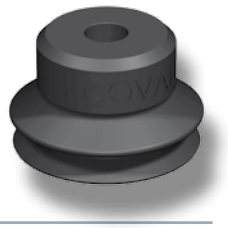
COVAL suction pads can be assembled in a wide variety of configurations.

see pages 2/18 to 2/21.

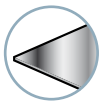
Accessories

To optimize use of your suction pads, Coval offers a comprehensive range of accessories (sensors, spring extensions, and feeder systems, etc.)
see chapters 5 and 13.

Suction pads with 1.5 bellows Ø 15 to 30 mm



Branch-specific applications




Presentation

■ Range of generic VSAJ suction pads with 1.5 bellows .

Types of use



Materials

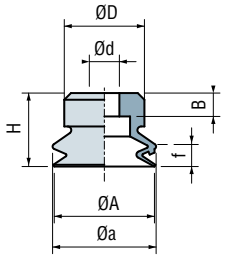
NBR Nitrile

SI Translucent Silicone

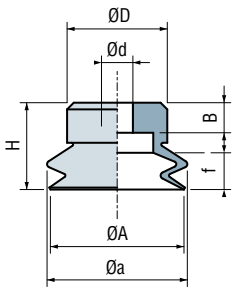
	Ø A (mm)	(cm³)	(N) (1)	(N) (1)	Rmin (mm)	H (mm)	Ø a (mm)	Ø d (mm)	Ø D (mm)	f (2) (mm)	B (mm)	(g)	NBR	SI
VSAJ 15	15	0.5	5	2.5	10	11	15.5	4.5	12	3.3	3.5	0.8	■	■
VSAJ 20	20	1.2	9.5	4.7	13	13	21	4.7	15	5.5	4.5	1.7	■	■
VSAJ 30	30	3	18.5	9.2	26	17	30.6	5.8	20	7	7.2	5	■	■

The values represent the average characteristics of our products.
(1) Actual force of the suction pad in use with a 90% 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 pad.
■ Standard

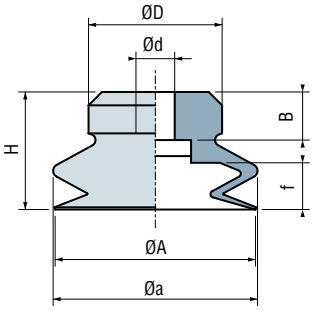
VSAJ 15



VSAJ 20



VSAJ 30



Choice of fittings

(Ø)		M3 M	M5 M	M6 M	M8 M	M10 M	M10 125 pitch	1/8 F	1/8 M	1/4 F	1/4 M	1/2 F
15	2/19		■					■	■			
20	2/19		■					■	■			
30	2/20			■		■		■	■	■	■	

■ Standard Fitting: M = male
F = female

Assembly diagrams

see pages 2/19 and 2/20.

Accessories

To optimize use of your suction pads, Coval offers a comprehensive range of accessories (sensors, spring extensions, and feeder systems, etc.) see chapters 5 and 13.

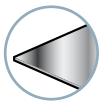
For all orders, please specify: Model + Diameter + Material

1: Model	2: Diameter	3: Material	
VSAJ	15 ... 30	NBR…	Please refer to the table

E.g. **VSAJ 20 NBR** (VSAJ series suction pad, Diameter 20, in Nitrile)

Suction pads with 2.5 bellows Ø 5 and 7mm

Branch-specific applications




Presentation

■ Range of generic VSG suction pads with 2.5 bellows.

Types of use



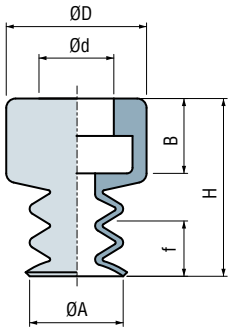
Materials

NBR Nitrile
SI Silicone
STN Siton®

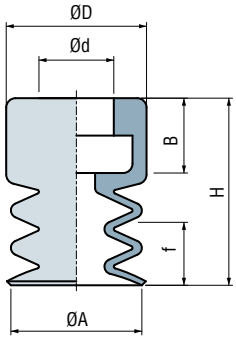
	Ø A (mm)	(cm³)	(N) (1)	Rmin (mm)	H (mm)	Ø d (mm)	Ø D (mm)	f (2) (mm)	B (mm)	(g)	NBR	SI	STN
VSG 5	5	0.03	0.5	3.5	9.5	4	7.5	3	4	0.2	■	■	■
VSG 7	7	0.04	1.4	4	10	4	7.5	3	4	0.23	■	■	■

The values represent the average characteristics of our products.
(1) Actual force of the suction pad in use with a 90% 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 pad.
■ Standard

VSG 5



VSG 7



Choice of fittings

(Ø)		M5 M	M5 F	1/8G M	1/8G F
5 and 7	2/18	IM5VPG5	IF5VPG5	IM18VPG5	IF18VPG5

■ Standard

Fitting: M = male
F = female

Assembly diagrams

See page 2/18

Accessories

To optimize use of your suction pads, Coval offers a comprehensive range of accessories (sensors, spring extensions, and feeder systems, etc.) see chapters 5 and 13.

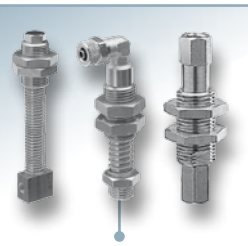
For all orders, please specify: Model + Diameter + Material

1: Model	2: Diameter	3: Material	
VSG	5 or 7	NBR…	Please refer to the table

E.g. **VSAJ 5 NBR** (VSAJ series suction pad, Diameter 5, in Nitrile)

Suction pad accessories

TS, YS

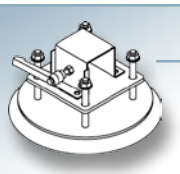


- 6 models
- 5 to 70mm stroke available

P 5/2

- The TS and YS 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 pads.

RSC



- 2 models
- 30mm stroke + 10° ball-joint effect
- Possibility of mounting on square tube with fitting system

P 5/4

- The system of 4 compensated springs is particularly recommended for horizontal handling requiring large diameter suction pads. The springs compensate for different levels between the suction pads (ball-joint effect)

TSOP, TSOG

- 8 models
- Anti-rotation
- 7 to 50 mm stroke available
- Protected spring.

P 5/5

- The TSOP and 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

L

- 3 ranges (M1/4G, M1/8G and F3/8G)
- 3 possible strokes

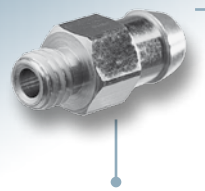
P 5/6

- The L series extensions are used for gripping on various levels from the same installation plate. These extensions are adjustable to different heights

COVAL vacuum managers

Suction pad accessories

Nozzle fittings



- 13 models
- (Hollow screw or hollow shaft fitting)

P 5/8

- These fittings are designed for installations including a large number of suction pads connected to the same vacuum generator, particularly for situations where there may be objects missing in the layer of objects to be handled. Using nozzle fittings reduces the loss of flow and therefore optimizes the size of the vacuum generator.

PMG2

- Mechanical feelers
- 5 models
- For VP series Ø30 to 60mm suction pads

P 5/9

- The PMG2 series mechanical feelers are mounted on VP series diameter 30 to 60mm flat suction pads in all types of material. The feeler is actuated by the object to be handled, causing it to open and free the route for the vacuum

IMUKGL

- Ball-joint fitting
- 4 models

P 5/10

- IMUKGL series ball-joints are recommended for gripping rounded products
- Fitted on a flat suction pad, they transmit more force than a bellows type suction pad.

CSP

- "Vacuum" check-valve
- Directly mounted on the suction pad
- Release by blow-off

P 5/11

- The CSP series safety valve is a useful safety device in the event of loss of vacuum or emergency stop as it maintains the vacuum in the suction pad. Release is obtained by connecting the ancillary coupling to the pressure

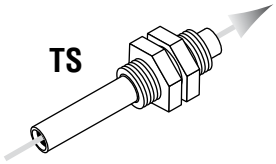
BM

- Foam strip (air-tight cells)
- 10 models
- 3 types of material (Nitrile, Silicone and Natural rubber)

P 5/12

- The foam ring 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 pads cannot adhere correctly and therefore cannot be air-tight.

Spring systems



Use

The TS 11 series compensated spring systems are recommended for the 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 pads.

■ Protected spring.

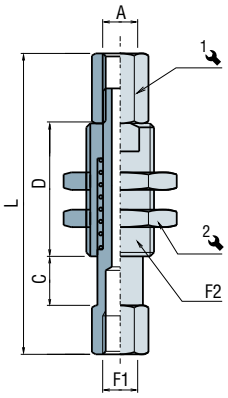
Materials

Spring	Stainless steel
Tubing	Zinc-plated steel
Slider	Brass

Characteristics

5

References	**A** (mm)	**F1** (mm)	**F2**	C (stroke) (mm)	**D** (mm)	**L** (mm)	1 (mm)	2 (mm)	Spring force (N/mm)	Force at rest (N)	(g)
TS11 7	M5	M5	1/8G	7	19	43	7	14	0.68	1.3	20
TS11 10	M5	M5	1/8G	10	22	49	7	14	0.45	1.8	22
TS11 20	M5	M5	1/8G	20	39	76	7	14	0.24	1.7	33
TS11 40	M5	M5	1/8G	40	64	121	7	14	0.13	1.6	50



TS 11

Suction pad mounting

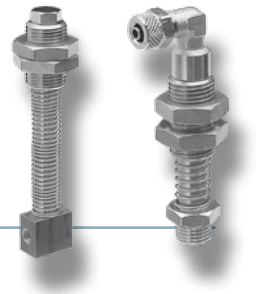
To choose the spring system corresponding to the reference of the suction pad, see the assembly diagrams on pages 2/15 to 2/21.

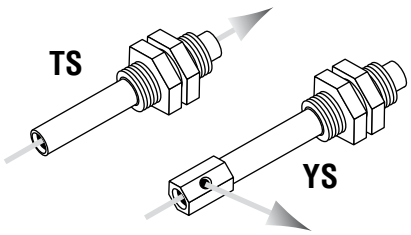
The TS 11 series spring system can be fitted on all suction pads in group 1 (VP, VSA, VS Ø5 to 25mm) for IM21 and on suction pads in series VPG 5 to 20.

For all orders, please specify:

The reference in the characteristics table

Spring systems





Use

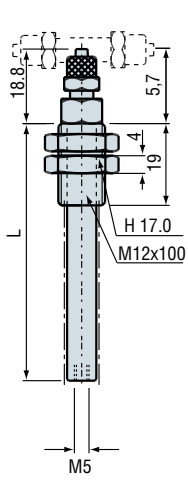
TS and YS series compensated spring systems are recommended for the horizontal handling of parts at different levels. The spring function also ensures that the gripping points are applied on the same plane when gripping with multiple suction pads.

Materials

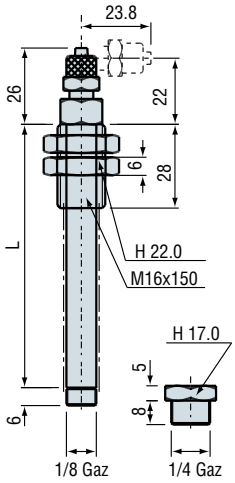
Spring	Stainless steel
Tubing	Zinc-plated steel
Slider	Brass

Characteristics

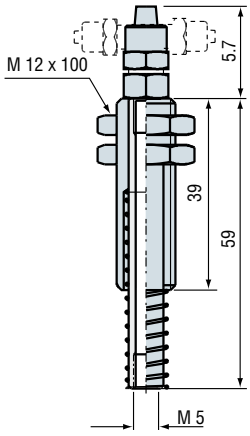
Models	TS1				TS2				TS3				TS1.20 LG	YS1			
Stroke (mm)	05	10	20	30	10	30	50	70	10	30	50	70	20	5	10	20	30
L (mm)	29	39	59	79	48	88	128	168	48	88	128	168	59	29	39	59	79
Spring force (N/mm)	0.36	0.15	0.07	0.045	0.9	0.2	0.115	0.08	0.9	0.2	0.115	0.08	0.07	0.36	0.15	0.07	0.045
Force at rest (FR)	1.00	1.70	1.45	2	8.1	4.2	4.5	4.5	5.1	4.2	4.5	4.5	1.45	1.00	1.70	1.45	2



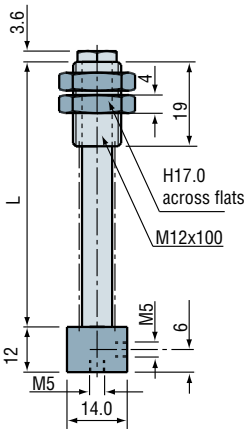
TS1



TS2 **TS3**



TS1.20LG



YS1

Advantage of the TS 120 LG

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

Suction pad mounting

To choose the spring system corresponding to the reference of the suction pad, see the assembly diagrams on pages 2/15 to 2/21.

For all orders, please specify:

Model + Spring stroke + Fitting

1: Model
TS1
TS2
TS3
YS1

2: Spring stroke	
05 - 10 - 20 - 30	TS1, YS1
10 - 30 - 50 - 70	TS2, TS3

3: Fittings (for TS series)		
D46	Straight 4 x 6	TS1, TS2, TS3
D68	Straight 6 x 8	TS2, TS3
C46	Elbow 4 x 6	TS1, TS2, TS3
C68	Elbow 6 x 8	TS2, TS3
T46 (1)	T-shape 4 x 6	TS1
N (2)	Without fitting	

(1) versions T46 and T68 on request for TS2 and TS3.
(2) For TS1 model, vacuum connection M5F and for models TS2 and TS3 vacuum connection M 1/8G

E.g. **TS3 50 C46**
(TS3 spring system, Spring stroke 50mm, elbow fitting 4 x 6)

TS series

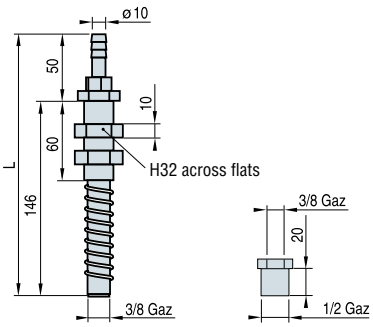
Spring systems

Characteristics

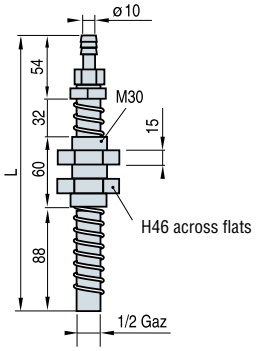
Models	TS4 50	TS5 60
Stroke (mm)	45	60
L (mm)	196	234
Spring force (N/mm)	0.47	1.23
Force at rest (FR)	4	0

Materials

Spring Stainless steel
Tubing Zinc-plated steel
Slider Brass



TS4 50 VPI **TS4 50 VPG**



TS5 60

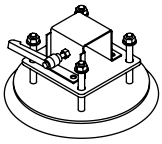
RSC series

Systems with 4 compensated springs

5

Materials

Spring Stainless steel
Damper Stainless steel
Studs A 60
Colour Yellow RAL 1023

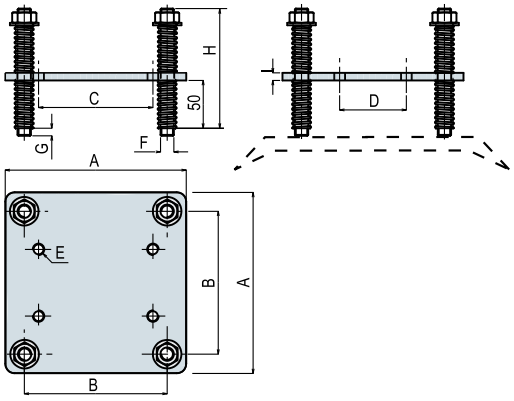


Use

The system of 4 compensated springs is particularly recommended for horizontal handling requiring large diameter suction pads. The upper stainless steel springs act as dampers for all vertical movements. They compensate for different levels between the suction pads. The system of 4 compensated springs mounted in a square gives the assembly a ball-joint effect.

Characteristics

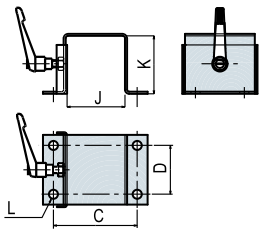
Models	Max. load (N)	Stroke under traction (mm)	Vertical force (N)	Max. weight at half-way point (kg)	Ball-joint angle	Tube mounted (mm)	A (mm)	B (mm)	C (mm)	D (mm)	E	F	G (mm)	H (mm)	I (mm)	J (mm)	K (mm)	L (mm)
RSC1	2000	30	160	1	10 °	50	140	106	88	50	M8	M10	8	120	5	52	52	9
RSC2	4000	30	340	2.7	10 °	80	190	150	120	70	M12	M14	8	130	8	83	83	13



Note:
■ RSC1: for SPL 240 suction pads, 5085 steel suction pads, VA 250, VA 280 and VA 320.
■ RSC2: for SPL 340 suction pads, 5150 steel suction pads, VA 350, VA 380 and VA 410.

RSC option...VAC

Square tube mounting options (Tightening by indexable lever).
■ RSC1 VAC on 50mm square tube.
■ RSC2 VAC on 80mm square tube.



For all orders, please specify:

Model + Type + Tube mounting option

1: Model
RSC

2: Type	
1	max. 2000 N
2	max. 4000 N

3: Tube-mounting option	
VAC	with tube-mounting option

E.g. **RSC 2 VAC**
(RSC type spring system, max. 4000 N with 80mm square tube mounting option).

Anti-rotation spring systems

Use

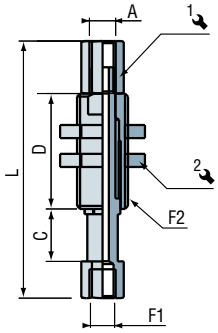
The TSOP and TSOG series spring systems are anti-rotation spring systems. They are used for horizontal handling of parts at different levels. The anti-rotation function ensures that objects are always gripped in the same position

The TSOP range is designed for applications requiring very precise handling.

- The hexagonal rod prevents the suction pad from rotating.
- Protected spring.

Characteristics - TSOP series

References	A (mm)	F1 (mm)	F2	C (stroke) (mm)	D (mm)	L (mm)	1 (mm)	2 (mm)	Spring force (N/mm)	Force at rest (N)	(g)
TSOP 107	M5	M5	1/8 G	7	18	42	7	14	0.68	1.3	20
TSOP 110	M5	M5	1/8 G	10	22	49	7	14	0.45	1.8	22
TSOP 120	M5	M5	1/8 G	20	39	73.5	7	14	0.24	1.7	33
TSOP 140	M5	M5	1/8 G	40	64	118.5	7	14	0.13	1.6	50



Materials

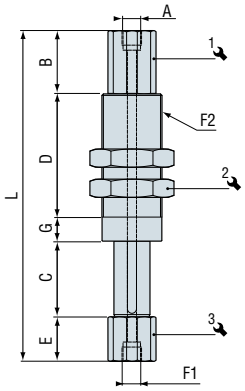
Spring	Stainless steel
Tubing	Anodized aluminum
Slider	Nickel-plated steel

Characteristics - TSOG series

References	A (Gas)	F1 (Gas)	F2	C (stroke) (mm)	B (mm)	D (mm)	E (mm)	G (mm)	L (mm)	1 (mm)	2 (mm)	3 (mm)	Spring force (N/mm)	Force at rest (N)	(g)
TSOG2 20F	1/8 G	1/8 G	M16x1	20	20	31.5	20	7	98.5	12	19	12	0.268	3.617	41
TSOG2 35F	1/8 G	1/8 G	M16x1	35	20	51.5	20	7	133.5	12	19	12	0.150	4.267	53
TSOG3 25F	1/8 G	1/8 G	M20x1.5	25	21	41	15	8	110	16	24	16	0.275	4.131	75
TSOG3 50F	1/8 G	1/8 G	M20x1.5	50	21	73.5	15	8	167.5	16	24	16	0.141	4.308	107

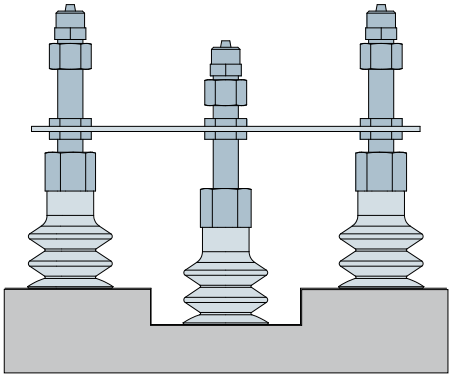
Materials

Spring	Stainless steel
Tubing	Anodized aluminum
Slider	Anodized aluminum



For all orders, please specify: The reference in the characteristics table

Extensions



Use

The L series extensions are used for gripping on various levels from the same installation plate. These extensions are adjustable to different heights.
This system is especially useful for 2.5 bellows type suction pads, as height adjustment is made easier by the deflection of the suction pad.

Spring systems should be chosen instead, for flat suction pads with low deflection.

Materials

Threaded rod and nut Brass
Screwed vacuum fitting Nickel-plated brass

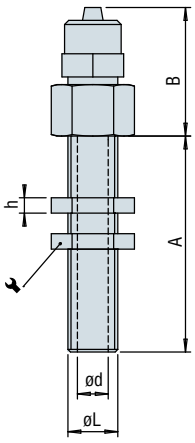
Characteristics

Models	A (1) (mm)			B (mm)	C (mm)	h (mm)	(mm)	Ød (mm)	ØL	D (mm)	P (mm)
1/8 Gas	22	42	52	25	19	3	14	6	1/8G	-	-
1/4 Gas	19	49	69	29	24	4	19	9	1/4G	-	-
3/8 Gas F	19	49	69	20.5	19.5	4	23	-	3/8G	19	22
3/8 Gas M	19	49	69	20.5	19.5	4	23	10	3/8G	-	-

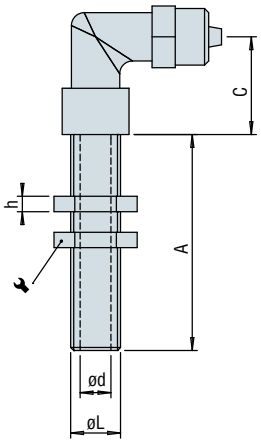
(1) Other lengths available on request for a minimum quantity of 10 pieces.

1/4G - 1/8G

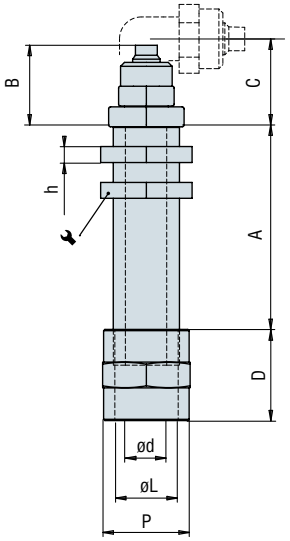
Straight



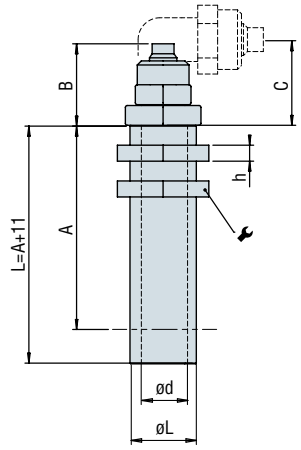
Elbow



F3/8G
Straight or elbow 6x8



M3/8G
Straight or elbow 6x8



3/8G extensions are compatible with the High Performance C series range of suction pads (see pages 2/11 to 2/13).

For all orders, please specify:

Model + Thread + Adjustable stroke + Fitting + Suction pad fitting

1: Model
L

2: Thread	
18	1/8 Gas
14	1/4 Gas
38	3/8 Gas

3: Adjustable stroke (A)	
22 - 42 - 52	(1/8 Gas)
19 - 49 - 69	(1/4 Gas)
	(3/8 Gas)

4: Fittings	
D46	Straight 4 x 6
D68	Straight 6 x 8
C46	Elbow 4 x 6
C68	Elbow 6 x 8
N	Without fitting

5: Suction pad fitting 3/8G version	
F	3/8G Female
M	3/8G Male

E.g. **L 14 49 C68**
(L series extension, 1/4 Gas thread, Adjustable stroke 49, elbow fitting 6 x 8)

On request

Possibility of T-shaped coupling. Please consult us.

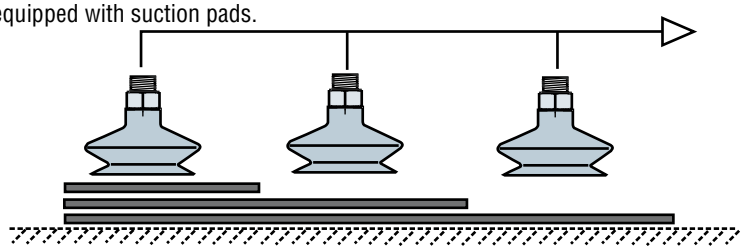
Miscellaneous gripping

Principle

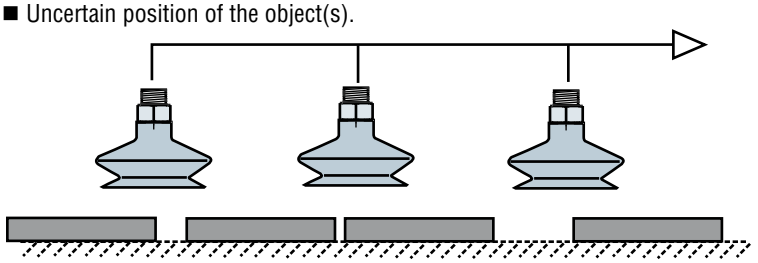
In many cases when using a multi-suction pad installation, some of the pads will not be covered by the product(s) to be handled. This leads to a high risk of reduced grip from the covered suction pads, or may even prevent them gripping at all.

E.g.

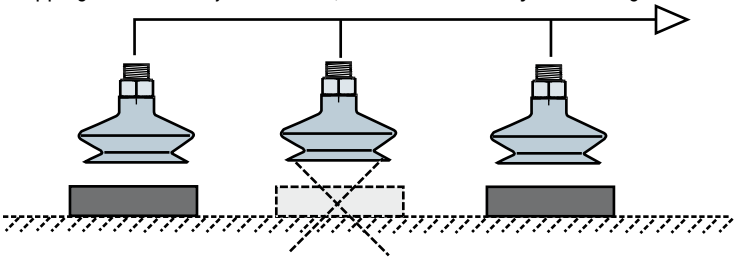
■ Gripping of panels, sheet metal,etc. in a wide variety of sizes by a lifting beam equipped with suction pads.



■ Uncertain position of the object(s).



■ Gripping of several objects at once, some of which may be missing.



Solutions

■ Independent ejector

Mounting an ejector for each suction pad guarantees the installation will operate perfectly even if one or more suction pads are not covered.
COVAL answer to this problem is the VR and CIL series micro-ejectors.
For further information, see chapter 7.

■ Nozzle fittings

The nozzle fittings are incorporated inside the suction pad fitting, thus reducing the leakage when the pad is not covered by an object.
This technical solution is particularly suitable for vacuum chambers.
To establish the diameter of the nozzle, COVAL has developed a specific CAD.

■ Mechanical feelers

See previous pages. COVAL offers four solutions depending on the application, with their advantages and disadvantages.

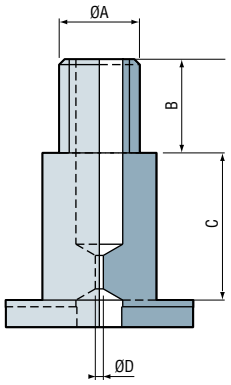
Suction pad nozzle fittings groups 1 and 2

Use

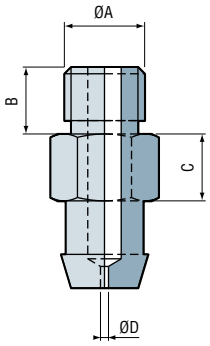
This fittings are designed for installations with a large number of suction pads connected to the same vacuum generator (vacuum chamber technology), in particular for cases where there may be objects missing from the layer of objects to be handled. Using nozzle fittings reduces the loss of flow and therefore optimizes the size of the vacuum generator.

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

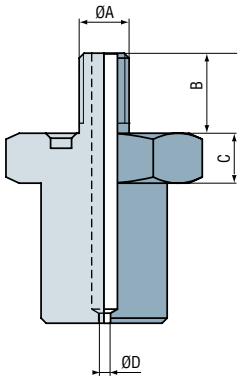
IM60



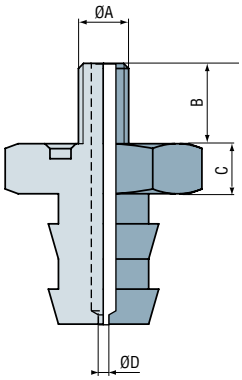
IM21 - IM22



IM5MVS



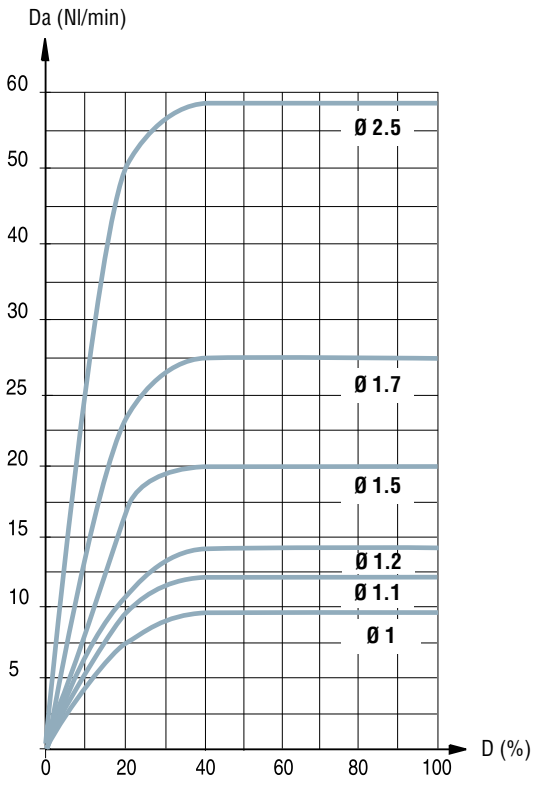
IMC



Characteristics

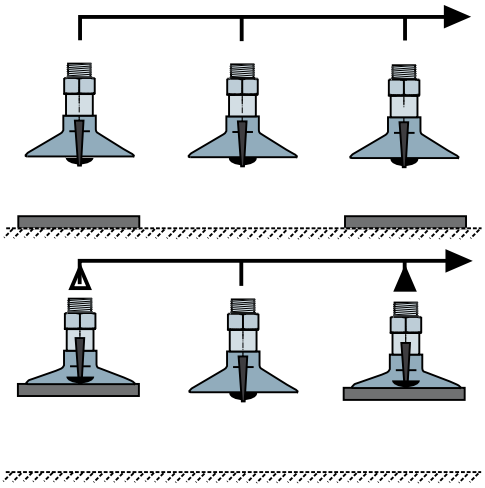
Model	ØA (mm)	ØD (mm)	B (mm)	C (mm)
IM5 MVSD1.1	M5	1.1	8	5
IM21 SP058	M5	0.45	4.5	5
IM21 SP094	M5	0.6	4.5	5
IM22 SP464	M6	0.6	5	10
IM60 SP335	M6	0.6	7	11
IM60 SP387	M6	1.2	7	11
IM60 SP461	M6	0.9	7	11
IM60 SP483	M6	1	7	11
IM60 SP510	M6	1.7	7	11
IM60 SP511	M6	2.5	7	11
IMCM5 D0.6	M5	0.6	8	5
IMCM5 SP691	M5	1.1	8	5
IMCM5 SP701	M5	1.5	8	5

Maximum suction per nozzle diameter



Da = Suction rate
D = Vacuum

Mechanical feelers



Use

The PMG2 series mechanical feelers are mounted on VP series diameter 30 to 60mm flat suction pads in all types of material (group 2 suction pads).
The mechanical feeler protrudes beyond the suction pad, thus blocking the route for the vacuum.
The feeler is actuated by the object, causing it to open and free the route for the vacuum.

Materials

Body Nickel-plated brass
Spring Stainless steel
Feeler Delrin brass

Advantages

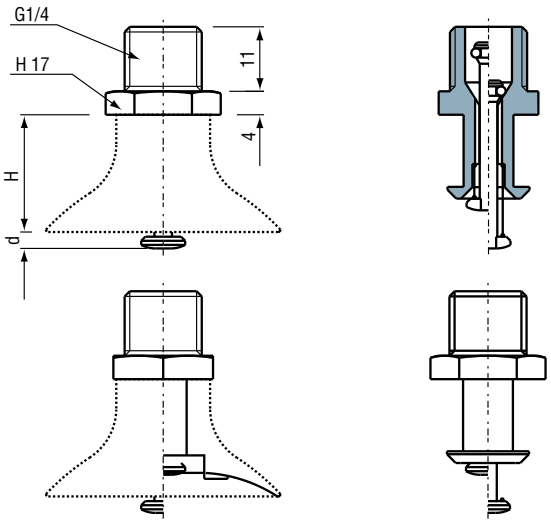
- Simple to install and operate.
- Very efficient air-tightness for non-covered suction pads.
- Little risk of marking delicate objects, as the feeler has a rounded surface.

Mounting

The feelers are mounted by press fitting. It is preferable to allow us to assemble the feeler onto the suction pad.

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



Accessories

Mounting on spring or ball-joint systems (see chapter 5).

Leakage rate

No leakage if all the suction pads are correctly placed. This represents substantial savings in power with regard to the vacuum source: pneumatic ejector or electric vacuum pumps.

IMUKGL series, **Axial ball-joints**

Use

IMUKGL series ball-joints are recommended for gripping rounded or rotating products.
Fitted on a flat suction pad, they transmit more force than a bellows-type suction pad.

Materials

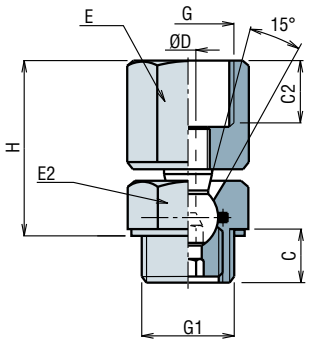
Ball-joint	Zinc-plated steel and brass
Seal	Nitrile (NBR)

Characteristics

Models	**C2** (mm)	**Ø D** (mm)	**C** (mm)	**G**	**G1**	**E** (mm)	**E2** (mm)	**H** (mm)	**FA** (1) (N)	(g)
IMUKGL 18	8.5	2	7	1/8G	1/8G	14	14	26.5	150	26
IMUKGL 14	12	3.5	10	1/4G	1/4G	19	19	37.5	750	67
IMUKGL 12	14	4	12	1/2G	1/2G	24	24	40	1250	116
IMUKGL M10	12	3.5	10	1/4G	M10x125	19	19	37.5	750	67

(1) The axial force of the ball-joint (maximum permissible load) in daN including a safety factor of 2.

IMU KGL



For all orders, please specify:

Model + suction pad fitting

1: Model
IMUKGL

2: Suction pad fitting	
18	1/8 Gas
14	1/4 Gas
12	1/2 Gas
M10	M10x125

E.g. **IMU KGL 14**
(IMUKGL axial ball-joint, 1/4 Gas suction pad fitting)

Accessories

IMU KGL series ball-joints are designed for the TS 2-3 series spring systems, see page 5/2.

Piloted safety valves

Materials

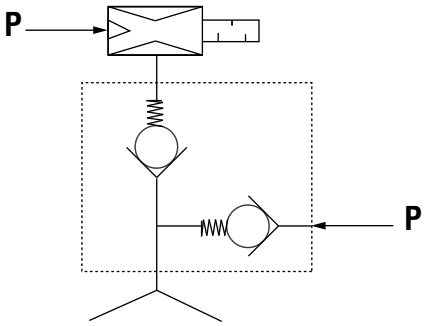
Valve	Nitrile (NBR)
Body	Anodized aluminum
Filter	Stainless steel screen 200 µ

Use

The CSP series safety valve is a useful safety device. In the event of loss of vacuum or emergency stop it maintains the vacuum in the suction pad. Release is obtained by connecting the ancillary coupling to the pressure.

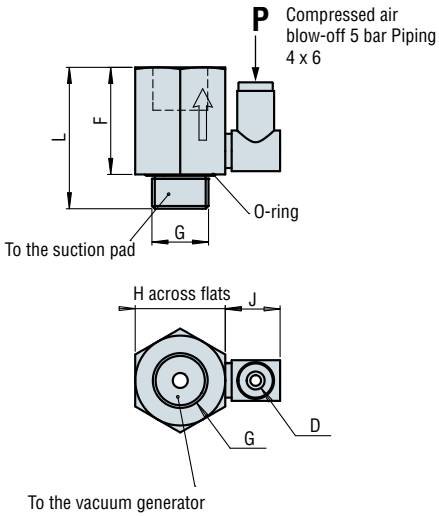
Mounting

- One safety valve per suction pad.
- Blow-off pressure, minimum 5 bar.



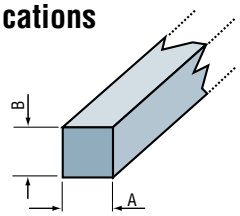
Characteristics

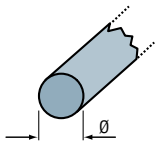
Models	**G** gas	**ØD** (mm)	**F** (mm)	**L** (mm)	**J** (mm)	**H** (mm)
CSP 14	1/4 G	4	25	33	12.8	21



Foam strips

Branch-specific applications





Nitrile foam strip: 10m roll

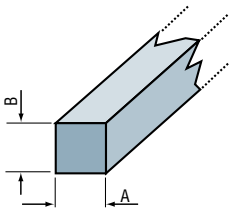
Mounting

Mounting with contact adhesive or flush-mounted at a depth adapted to the height and potential flush-mounting of the seal for the vacuum: 50% to 70% of the new height.

Support

- All supports, particularly steel, aluminum, etc.
- Closed cells.
- Closed Tube of neoprene adhesive (120 ml): ref. 095.99.006.

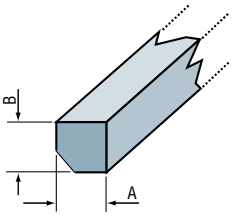
Ref.	A (mm)	B (mm)	Ø (mm)
BM 8	-	-	8
BM 1510	15	10	-
BM 1010	10	10	-
BM1515	15	15	-
BM 2020	20	20	-
BM 3030	30	30	-
BM 5050	50	50	-



Silicone Foam Strip

- Heat resistant: 160°C.
- Do not use on parts before painting.
- Closed cells.

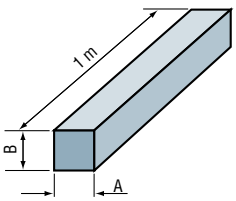
Ref.	A (mm)	B (mm)
BM 210 SI	10	2
BM 513 SI	13	5
BM SI 3030	30	30



Nitrile bevelled foam strip: 10m roll

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

Ref.	A (mm)	B (mm)
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 slabs.
- Open cells.
- Contact adhesive reference: BOSTIK 1400 (Neoprene adhesive)

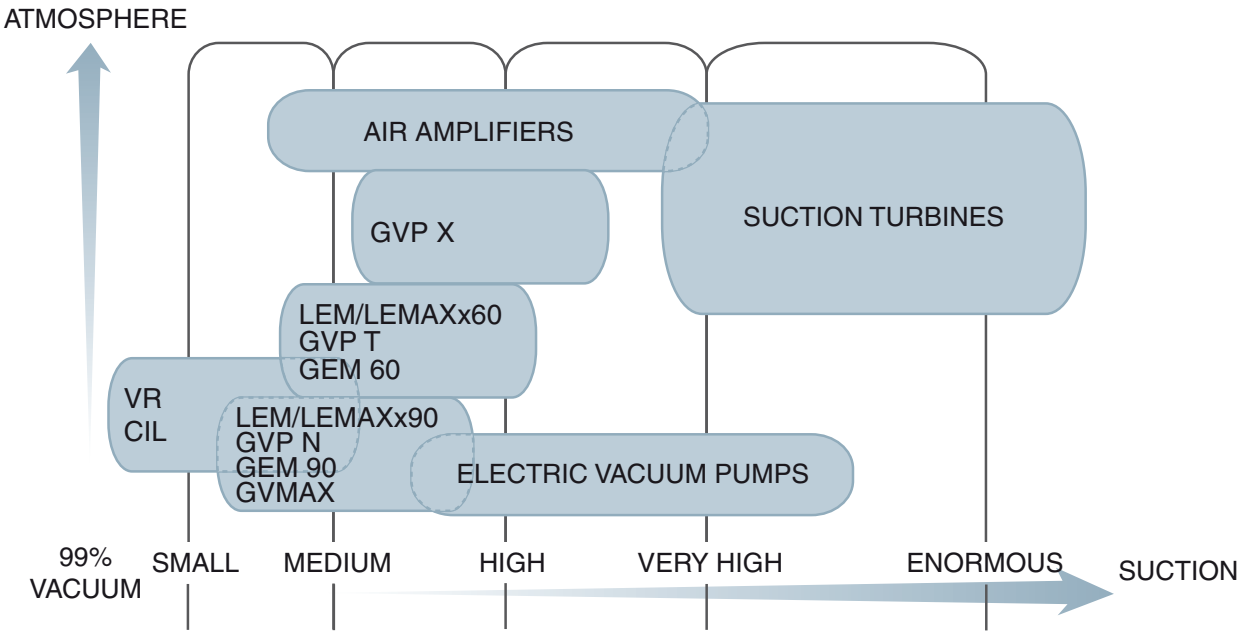
Ref.	A (mm)	B (mm)
BMS 3025	30	25

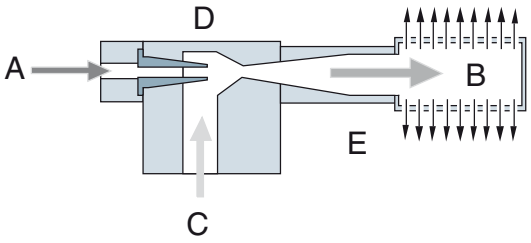
chapter 6

Vacuum pumps

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 across 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 out (C) follows the same route to finish in the silencer B

Pressure unit conversion

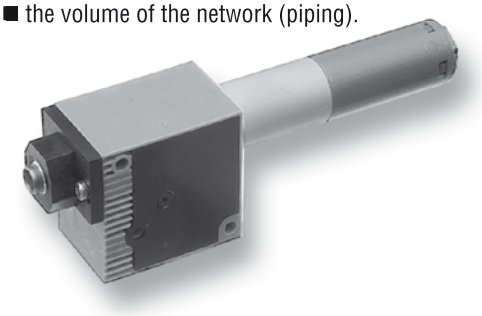
Units	Bar 10 N/cm² = 100 kPa	Atm kp/cm²	Torr mm of Hg
Bar = 10 N/cm² = 100 kPa		**0.986923**	**750.0617**
Atm = kp/cm²	**1.01325**	1	760
Torr = mm of Hg	**0.0013332**	**0.001316**	1

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**

Choosing a vacuum pump

The job of the vacuum pump is to generate a relative vacuum within a capacity. For vacuum handling, this capacity generally consists of:
■ the internal volume of the suction pads to be emptied,
■ the volume of the network (piping).



Gripping air-tight and porous objects

■ air-tight objects

This is the only capacity to be taken into consideration.
The choice of vacuum pump will be made according to the time to create the vacuum corresponding to the function.
The maximum rate of vacuum it is possible to attain. It is useful to take the 90% vacuums (version N).

■ porous objects

In this case it will not be possible to empty the capacity. The leakage rate from the suction pad network will therefore be taken into account.
The vacuum pump adapted to this type of handling is therefore a vacuum pump for which the flow will be significantly greater than the leakage in order to create sufficient pressure drop in the suction pads.
High flow rate will be chosen in preference to a high vacuum,75 % vacuum (version T), 60% vacuum, or 50 % vacuum (version X) for very porous objects such as light cardboard, or foam, etc.

Calculating the leakage rate

Apply a suction pad with a diameter suited to the object to be gripped.
Fit out a vacuum pump (for which the characteristics are known) with a pressure gauge and a vacuum gauge. Feed the vacuum pump with the optimal pressure (e.g. 5 bar).
Apply the suction pad to the surface to be tested.

Three possible cases can arise:

■ The vacuum gauge indicates the maximum vacuum achieved for this type of gauge: the object is air-tight.

■ The vacuum gauge does not measure any vacuum: choose a more efficient vacuum pump as the leakage rate is higher than the maximum vacuum pump flow.

■ The vacuum gauge displays a vacuum value, e.g. -300 mb (30% vacuum), refer to the vacuum pump curve. Read the flow corresponding to -300 mb (e.g. 75 Nl/minute)

The leakage rate is 75 Nl/minute for the surface of the suction pad used at -300mb. Using this data, calculate the forces to be applied to handle the object:

At -300mb the theoretical force of the suction pad is: F = S x 0.3 with:

S = surface of the suction pad in cm^2
F in DaN

To grip the object safely, (factor of 2 for horizontal gripping and 4 for vertical gripping), the different characteristics of the vacuum pumps must be exploited.

Things to remember

"An installation must breath properly".

The throughput for a machine includes:
■ gripping time,
■ transfer time,
■ release time.

Study of efficient vacuum handling should ensure the release of the object is processed correctly, as this is often the most difficult point to resolve.
■ place vacuum pump as close as possible to the suction pads,
■ choose suction pads with the smallest possible internal volume,
■ identify suitable sizes of piping and fittings to reduce pressure losses.

Comparison

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, light-weight products: carpet, textiles, foam, etc
Transporting small objects: granules, grains of coffee, rice, paperclips, etc.
Smoke evacuation, degassing.

Types of vacuum pumps

■ Version X, 50% vacuum

Optimal usage zone: 13 to 40% vacuum.
Maximum usage range: 0 to 50% vacuum.
Use of vacuum pumps creating 50% vacuum implies a high suction flow rate in relation to the pressure drop.

■ Version T, 75% vacuum and N, 90 % vacuum
Optimal usage zone: 41 to 90 % vacuum.
Maximum usage range: 0 to 90 % vacuum.
The interest of the vacuum pump which can create a 90% vacuum is to generate a high vacuum and therefore a high force/surface ratio.

■ Applications: HANDLING - SUCTION - EMPTYING - DOSING
Handling porous, semi-porous and air-tight products.
Programmed operations.
Air and/or liquid dosing.

- With version N, 90% vacuum:

Create a localized vacuum. Rationalize use of the vacuum in the machine functions using suction pads.

- With version T, 75% vacuum:

Create a generalized vacuum in suction tables and chambers.
Ejectors are very often integrated into automated handling equipment.

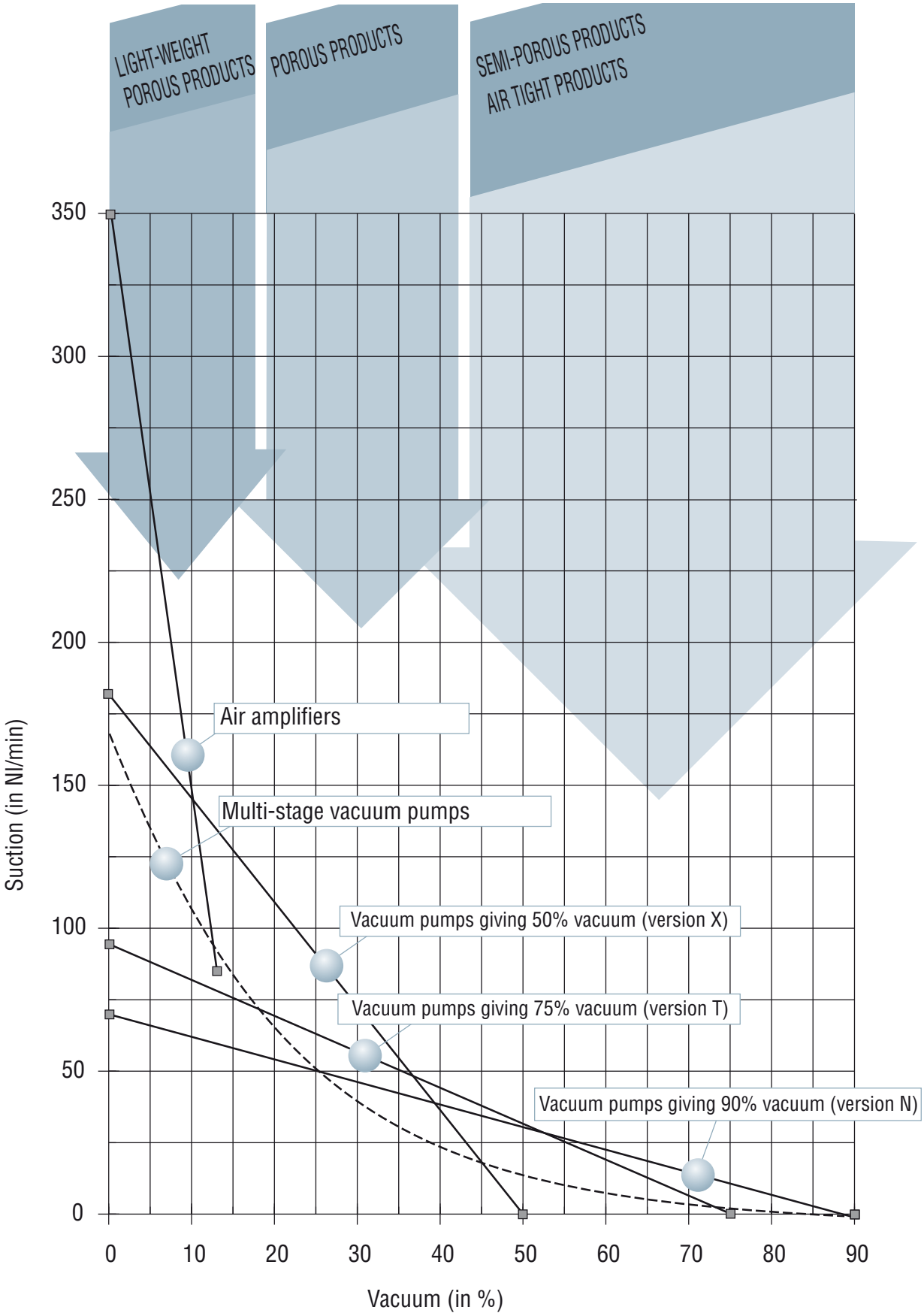
Comments

The optimal usage zones recommended above 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, whatever their market name.

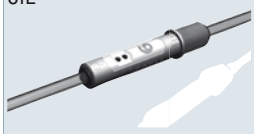
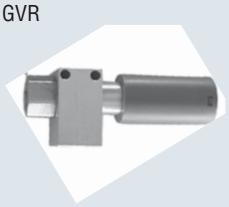
Note:

The following curves have been established using COVAL equipment:
M 10 C air amplifier, GVP 15 XK, GVP 15 NS and GVP 15 TS vacuum pumps.
The values given are values for identical compressed air consumption and optimal characteristics of each of the vacuum generation procedures.

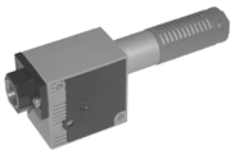
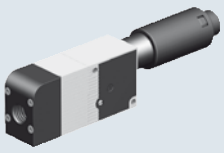
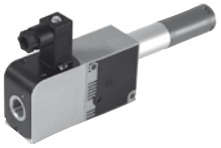

LIGHT-WEIGHT POROUS PRODUCTS
POROUS PRODUCTS
SEMI-POROUS PRODUCTS AIR TIGHT PRODUCTS
Air amplifiers
Multi-stage vacuum pumps
Vacuum pumps giving 50% vacuum (version X)
Vacuum pumps giving 75% vacuum (version T)
Vacuum pumps giving 90% vacuum (version N)
Suction (in Nl/min)
350
300
250
200
150
100
50
0
0
10
20
30
40
50
60
70
80
90
Vacuum (in %)

Vacuum pump range

Micro/mini-ejectors

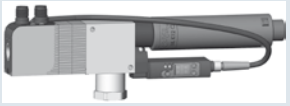
Series	Technical Data	Advantages/Applications
CIL 	- 2 sizes - 3 nozzle Ø: 0.5 ; 0.7 ; 0.9mm - Suction flow rate: 9 Nl/min to 31 Nl/min - Optimum supply pressure: 5 bar - Weight between 7 and 13g - Push fitting	- In-line connection - Easily integrated - No clogging - Installation very close to the suction pads - Very flexible installation - Can be adapted to all branches
VR 	- 2 models - Nozzle Ø: 0.5 ; 0.7 ; 0.9 ; 1.0 ; 1.2 ; 1.4mm - Suction flow rate: 7 to 64 Nl/min - Optimum supply pressure: 5 bar - Weight between 20 and 45 g - Silencer option	- Wider range - Very compact - Installed directly on the suction pads - Excellent mechanical resistance - Reduced gripping time - Blow-off option - Extended suction flow rate range - Silent operation - Can be adapted to all branches
GVR 	- 2 models - Nozzle Ø: 0.9 ; 1.0 ; 1.2 ; 1.4 mm - Suction flow rate: 21 to 64 Nl/min - Optimum supply pressure: 5 bar - Weight 45 g - Integrated silencer	- Very compact - Installed directly on the suction pads - Excellent mechanical resistance - No clogging - Reduced gripping time - Blow-off option - Extended suction flow rate range - Silent operation - Can be adapted to all branches

Modular vacuum pumps

Series	Technical Data	Advantages/Applications
GVP 	- Simple vacuum pump - Nozzle Ø: 1,2 ; 1,5 ; 2.0 ; 2.5 ; 3 mm - Suction flow rate: 150 to 450 Nl/min - Optimum supply pressure: 4 bar - Integrated silencer	- Modular design thanks to the different options - Compact - Optimized performance for handling all types of objects - Silent operation - No clogging - Can be adapted to all branches
GEMP 	- Simple energy-saving vacuum pumps - Nozzle Ø 1.2 ; 1.5 ; 2.0 ; 2.5 ; 3mm - 2 levels of vacuum: 60 % and 90 % - Suction flow rate between 150 and 450 Nl/min - Integrated pressure regulator - Integrated silencer	- Very compact and light-weight - Ideal for all applications requiring an outside pressure regulator - Exceptional energy savings thanks to automatic pressure regulation at 4 bar - Optimal performances - Silent operation - No clogging
Electric GVPS 	- Vacuum pumps with electric vacuum control - Nozzle Ø: 1,2 ; 1,5 ; 2.0 ; 2.5 ; 3 mm - Suction flow rate: 150 to 450 Nl/min - Optimum supply pressure: 4 bar - Integrated electric vacuum control - Integrated silencer	- Modular design thanks to the different options - Compact - Optimized performance for handling all types of objects - Silent operation - No clogging - Can be adapted to all branches
Electric GVPD 	- Vacuum pumps with electric vacuum control and blow-off - Nozzle Ø: 1,2 ; 1,5 ; 2.0 ; 2.5 ; 3 mm - Suction flow rate: 150 to 450 Nl/min - Optimum supply pressure: 4 bar - Integrated vacuum control and blow-off - Integrated silencer	- Modular design thanks to the different options - Compact - Optimized performance for handling all types of objects - Silent operation - No clogging - Can be adapted to all branches - Adjustable blow-off flow

Vacuum pump range

Intelligent vacuum pumps

Series	Technical Data	Advantages/Applications
LEM  twin tech Integration & Intelligence	- Integrated mini-vacuum pump with intelligent functions - Nozzle Ø: 1; 1.2; 1.4 - 2 levels of vacuum: 60% and 90% - Suction flow rate up to 96 Nl/mn - Integrated pressure regulator - All the functions required integrated in the product - M8 connections - Stand-alone or island module	- For air-tight and porous objects - Ultra compact and light-weight - Control panel for monitoring and adjustment - Energy savings in all networks > 4 bars - Reduced wiring - Reduced installation time - Can be adapted to all branches
LEMAX  twin tech Integration & Intelligence AIR Saving Control	- Integrated mini-vacuum pump with ASC (Air Saving Control) - Nozzle Ø: 1; 1.2; 1.4 - vacuum level: 90% - Suction flow rate up to 70 Nl/mn - Integrated pressure regulator - All the functions required integrated in the product - M8 connections - Stand-alone or island module	- For air-tight and slightly porous objects - Ultra compact and light-weight - Control panel for monitoring and adjustment - ASC = 75 to 99% energy savings - Reduced wiring - Reduced installation time - Can be adapted to all branches
GEM  twin tech Integration & Intelligence	- Integrated energy-saving vacuum pumps - Nozzle Ø 1.2 ; 1.5 ; 2.0 ; 2.5 ; 3mm - 2 levels of vacuum: 60 % and 90 % - Suction flow rate up to 385 Nl/mn - All the functions required integrated in the product - Integrated pressure regulator - Integrated M12 connection (Plug &Play)	- For air-tight and porous objects - Energy savings exceeding 50% - Noise levels reduced by up to 30dBa - Modular design thanks to the different options - Reduced wiring - Reduced installation time - No clogging - Can be adapted to all branches
GVMAX V3/V3R  twin tech Integration & Intelligence	- Self-regulating vacuum pumps (electric vacuum and blow-off control) - Separate inlets and outlets - M12 connections - Nozzle Ø: 3 mm - Integral blow-off - Integrated pressure regulator - Maximum vacuum level 90% - Suction flow rate up to 245 Nl/mn - Integrated vacuum check-valve - Vacuum regulation function	- Compact and light - Ideal for retaining air-tight objects in the automotive, plastics and sheet metal industries - Energy saved by automatic vacuum regulation - Safety guaranteed in case of power failure - Optimal performances - Silent operation - No clogging
GVMAX V2/V2R 	- Self-regulating vacuum pumps (electric vacuum and blow-off control) - Separate inlets and outlets - M12 connections - Nozzle Ø: 2.5 mm - Maximum vacuum level 90% - Suction flow rate up to 220 Nl/mn - Integrated vacuum check-valve - Vacuum regulation function	- Compact and light - Ideal for retaining air-tight objects in the automotive, plastics and sheet metal industries - Energy saved by automatic vacuum regulation - Safety guaranteed in case of power failure - Optimal performances - Silent operation - No clogging
GVMAX 	- Self-regulating vacuum pumps (electric or pneumatic vacuum control and blow-off) - Two versions: electric or pneumatic - Nozzle Ø: 2.5 mm - Three levels of vacuum: 50%, 75% and 90% - Vacuum regulation function - Integrated vacuum solenoid valves and blow-off - 2 integrated check valves for pneumatic version and 1 for electric version - Integrated vacuum switch to adjust the vacuum threshold and hysteresis	- Compact and light - Ideal for retaining air-tight objects in the automotive, plastics and sheet metal industries - Energy saved by the vacuum regulation function - Safety guaranteed in case of power failure - Optimal performances - Silent operation - No clogging

6

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
CIL05	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
CIL07	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
CIL09	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
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
GVP/S/D12N, GVMAX12N	0.14	0.3	0.49	0.71	0.97	1.33	1.81	2.66	3.42
GVP/S/D15, GVMAX15N	0.09	0.20	0.32	0.46	0.63	0.85	1.16	1.71	2.20
GVP/S/D20N, GVMAX20N	0.06	0.12	0.19	0.28	0.38	0.52	0.71	1.04	2.13
GVP/S/D25N, GVMAX25N	0.03	0.07	0.11	0.16	0.22	0.30	0.41	0.60	0.77
GVP/S/D30N, GVMAX30N	0.02	0.05	0.08	0.12	0.17	0.23	0.31	0.45	0.58

6

% vacuum	10	20	30	40	50	60	70
GVP/S/D12T, GVMAX12T,	0.1	0.22	0.37	0.55	0.78	1.16	1.92
GVP/S/D15T, GVMAX15T,	0.07	0.15	0.24	0.36	0.52	0.77	1.27
GVP/S/D20T, GVMAX20T,	0.04	0.09	0.14	0.22	0.31	0.46	0.76
GVP/S/D25T, GVMAX25T,	0.03	0.06	0.1	0.14	0.21	0.3	0.5
GVP/S/D30T, GVMAX30T,	0.02	0.04	0.07	0.1	0.15	0.22	0.37

% vacuum	10	20	30	35	40	45
GVP/S/D12X, GVMAX12X,	0.05	0.11	0.22	0.33	0.62	0.62
GVP/S/D15X, GVMAX15X,	0.04	0.09	0.15	0.2	0.27	0.39
GVP/S/D20X, GVMAX20X,	0.03	0.06	0.11	0.15	0.19	0.28
GVP/S/D25X, GVMAX25X,	0.02	0.04	0.08	0.1	0.14	0.19
GVP/S/D30X, GVMAX30X,	0.01	0.03	0.06	0.08	0.11	0.15

% vacuum	10	20	30	40	50	60	70	80	85
GEM60x12	0.09	0.2	0.35	0.55	0.9	-	-	-	-
GEM60x15	0.06	0.14	0.23	0.36	0.59	-	-	-	-
GEM60x20	0.04	0.08	0.13	0.21	0.34	-	-	-	-
GEM60x25	0.03	0.05	0.09	0.14	0.24	-	-	-	-
GEM60x30	0.01	0.04	0.07	0.10	0.17	-	-	-	-
GEM90x12	0.13	0.27	0.44	0.64	0.88	1.19	1.62	2.37	3.12
GEM90x15	0.09	0.18	0.29	0.42	0.58	0.79	1.08	1.59	2.08
GEM90x20	0.05	0.11	0.18	0.25	0.35	0.46	0.65	0.95	1.25
GEM90x25	0.03	0.07	0.11	0.16	0.22	0.3	0.41	0.59	0.78
GEM90x30	0.03	0.06	0.09	0.13	0.18	0.24	0.33	0.48	0.64

Note: evacuation time of GEMP = evacuation time of GEM.

Evacuation time

Evacuation time in seconds per liter (cont.)

% vacuum	**30 %**	**35 %**	**40 %**	**45 %**	**50 %**	**55 %**
LEM60X10	0.66	0.83	1.04	1.31	1.70	2.35
LEM60X12	0.41	0.52	0.66	0.83	1.07	1.49
LEM60X14	0.27	0.34	0.43	0.54	0.70	0.97

% vacuum	**55 %**	**60 %**	**65 %**	**70 %**	**75 %**	**80 %**
LEM90X10, LEMAX90X10	1.76	2.04	2.38	2.80	3.33	4.09
LEM90X12, LEMAX90X12	1.13	1.31	1.53	1.80	2.15	2.64
LEM90X14, LEMAX90X14	0.73	0.85	0.99	1.16	1.38	1.70

Weight of micro/mini-ejectors in grams

Model	Nozzle size							
	0.5	0.7	0.9	1.0	1.2	1.4	1.5	2.0
CIL (Size 1)	7	9	-	-	-	-	-	-
CIL (Size 2)			13	-	-	-	-	-
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				
	1.0 mm	1.5 mm	2.0 mm	2.5 mm	3.0 mm
GVP	100	110	160	180	265
GVPS	176.5	186.5	236.5	256.5	341.5
GVPD	208.5	218.5	268.5	278.5	363.5
LEM	80 to 120g, depending on the model.				
LEMAX	100 to 130g, depending on the model.				
GVMAXE	-	-	-	510	-
GVMAXP1	maximum weight 440				
GVMAXV2/ V2R	-	-	-	550	-
GVMAXV3	-	-	-	-	450
GEM	maximum weight 250				
GEMP	maximum weight 265				

Micro-ejectors

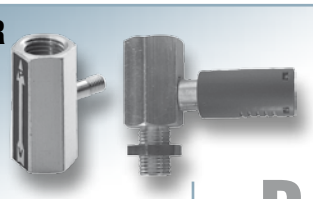
CIL

- 2 sizes
- 3 nozzle Ø: 0.5 ; 0.7 ; 0.9mm
- Suction rate: 9 Nl/min to 31 Nl/min
- Optimum supply pressure: 5 bar
- Weight between 7 and 13g
- Push fitting

P 7/2

- In-line connection
- Easily integrated
- No clogging
- Installation very close to the suction pads
- Very flexible installation
- Can be adapted to all branches

VR

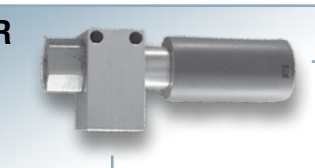


- 2 models
- nozzle Ø:
  0.5 ; 0.7 ; 0.9 ; 1.0 ; 1.2 ; 1.4mm
- Suction flow rate: 7 to 64 Nl/min
- Optimum supply pressure: 5 bar
- Weight between 20 and 45 g
- Silencer option

P 7/4

- Wider range
- Very compact
- Installed directly on the suction pads
- Excellent mechanical resistance
- Reduced gripping time
- Blow-off option
- Extended suction flow rate range
- Silent operation
- Can be adapted to all branches

GVR



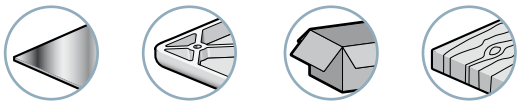
- 2 models
- nozzle Ø:
  0.9 ; 1.0 ; 1.2 ; 1.4 mm
- Suction flow rate: 21 to 64 Nl/min
- Optimum supply pressure: 5 bar
- Weight 45g
- Integrated silencer

P 7/8

- Very compact
- Installed directly on the suction pads
- Excellent mechanical resistance
- No clogging
- Reduced gripping time
- Blow-off option
- Extended suction flow range
- Silent operation
- Can be adapted to all branches

In-line ejectors

Branch-specific applications

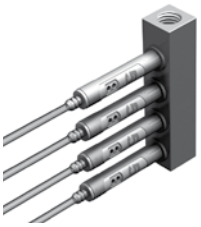


Flexible installation

Push fitting
Removable axial mounting directly on the pipe using push to connect fittings.
Available in two sizes
- For pipe calibrated 2.7 x 4 mm (size 1)
- For pipe calibrated 4 x 6 mm (size 2)

Integrated fitting
M12 (size 1) or M14 (size 2) incorporated male thread allows the CIL in-line module to be fitted easily and securely.

Manifold mounting
M12 (size 1) or M14 (size 2) incorporated male thread allows several CIL in-line vacuum modules to be integrated into a machined block to feed several suction pads simply and economically from a single source of compressed air.



Description

Due to their light weight (from 7 to 13 g depending on the version) and small dimensions, the "just plug it in" CILs can be easily integrated into the compressed air network near the suction pads, even in the most inaccessible parts of the machine.

Use

COVAL advises using CIL in-line ejectors for handling electronic components and light-weight objects, feed systems, Pick and Place applications and separating systems for machining sheet metal or plastics.

Advantages

■ Simple, efficient connection
Push fitting, M12 male or M14 male thread.
■ Improved reliability No moving mechanical parts.
■ Silent operation Nozzle-mixer combination resulting from new COVAL fluidics.
■ Optimized performance
CILs are available in 3 nozzle diameters (0.5, 0.7 and 0.9mm), max. vacuum 90%.
Size 1 (M12) : 0.5 and 0.7 nozzles
Size 2 (M14) : 0.9 nozzle

Characteristics

model	Ø nozzle (mm)	air consumed (Nl/min)	air drawn in (Nl/min)
CIL 190X05R	0.5	9.5	7
CIL 190X07R	0.7	18.5	13.7
CIL 290X09R	0.9	30.5	22.6

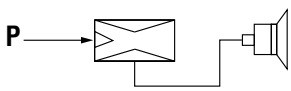
Evacuation time in seconds per liter

% vacuum	10	20	30	40	50	60	70	80	85
CIL 190X05R	0.92	1.96	3.18	4.63	6.38	8.79	12.17	18.96	27.39
CIL 190X07R	0.46	0.98	1.58	2.28	3.13	4.27	5.8	8.55	11.01
CIL 290X09R	0.31	0.65	1.05	1.52	2.09	2.85	3.87	5.7	7.34

Specifications

Supply	non-lubricated filtered air, 5 microns(ISO standard 8573-1 class 4).
Optimum operating pressure	5 bar
Weight	7 to 13 g, depending on the model.
Materials	PA6.6 15 % FV – 2017A
Operating temperature	0 to 60°C / 14 to 140°F.

Delivered with a zinc-plated steel fastening nut.



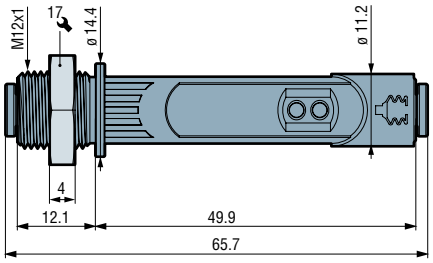
For all orders, please specify:

CIL190X05R (CIL, size 1, maximum vacuum 90%, nozzle diameter 0.5 mm, push fitting)
CIL190X07R (CIL, size 1, maximum vacuum 90%, nozzle diameter 0.7 mm, push fitting)
CIL290X09R (CIL, size 2, maximum vacuum 90%, nozzle diameter 0.9 mm, push fitting)

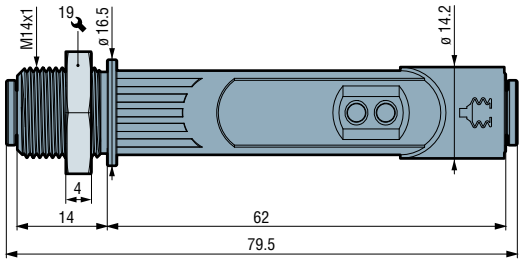
Dimensions
Curves

Dimensions

Size 1



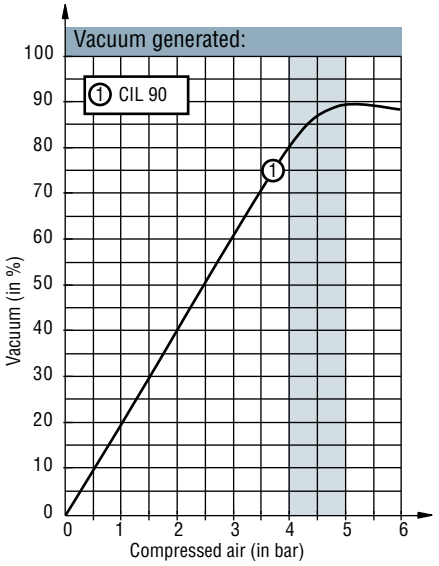
Size 2

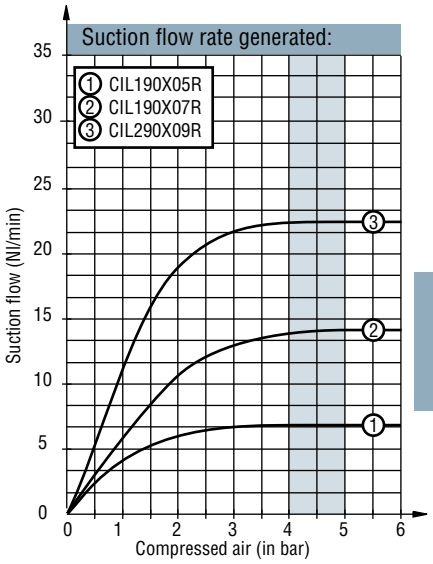


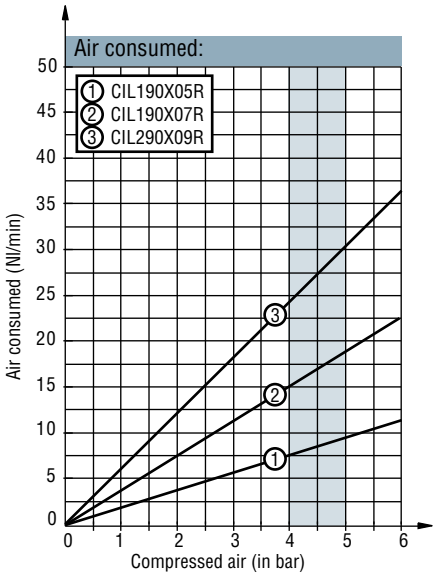
Advantages

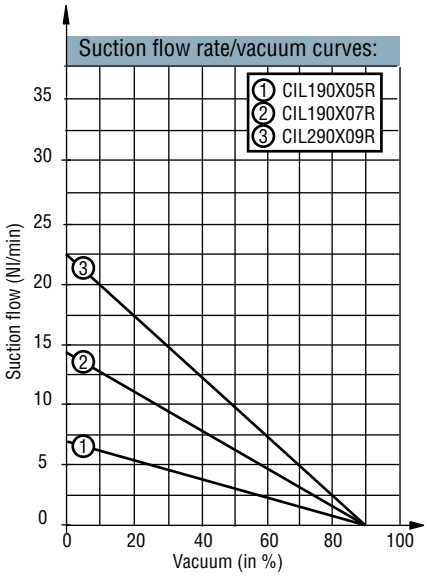
- Can be adapted to all branches
- In-line connection
- Installation very close to the suction pads
- No clogging
- Very flexible installation
- Silent operation

Curves







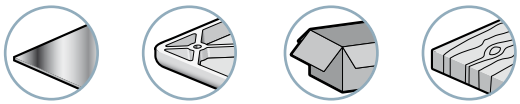


7

VR 05, 07, 09 series

Heavy duty in-line ejectors

Branch-specific applications



Description

The main advantage of the VR series in-line ejectors is that they can be mounted directly on the suction pad which simplifies wiring.
By integrating the ejector into the suction pad, 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 pads using a 1/8 Gas or 1/4 Gas T-shaped fitting.

Additional information

Mounting on spring systems

- Spring system, series TS3, available strokes: 10, 30, 50, 70mm, page 5/3.
- TSO series anti-rotation spring system-, page 5/5.
- Ball-joint systems, IMUKGL series, pages 5/10.

Special:

- Possibility of using special materials such as 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 to a vacuum switch.

New function

- Possibility of adding a silencer (ref. SILGV10M5F)
- Vacuum or blow-off switch, on request.

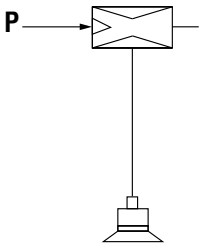
7

Characteristics

model	Ø nozzle (mm)	air consumed (Nl/min)	Maximum vacuum (%)	air drawn in (Nl/min)	at air pressure (bar)
VR 05	0.5	12	87	7	5
VR 07	0.7	21	90	14	5
VR 09	0.9	36	90	21	5

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	-10 to 80°C / 32 to 140°F

For all orders, please specify:

Model + Nozzle diameter + Vacuum outlet

1: Model
VR

2: Nozzle diameter	
05	Ø 0.5 mm
07	Ø 0.7 mm
09	Ø 0.9 mm

3: Vacuum outlet	
M6	M6 Female
M18	1/8 Gas male
M14	1/4 Gas male
F18	1/8 Gas female
F14	1/4 Gas female

silencer reference **SILGV10M5F**

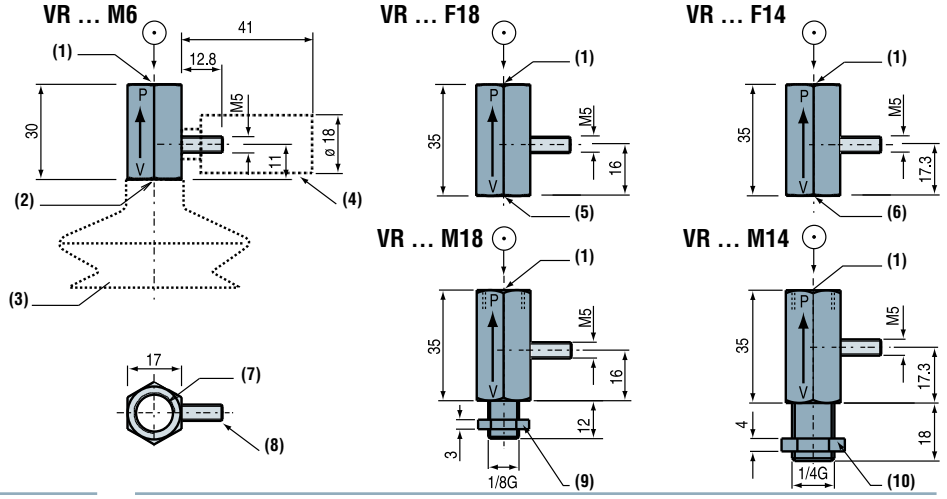
E.g. **VR 07 M6**
(VR series heavy duty in-line ejector, nozzle diameter 0.7 mm, M6 female fitting)

VR 05, 07, 09 series

Dimensions Curves

Dimensions

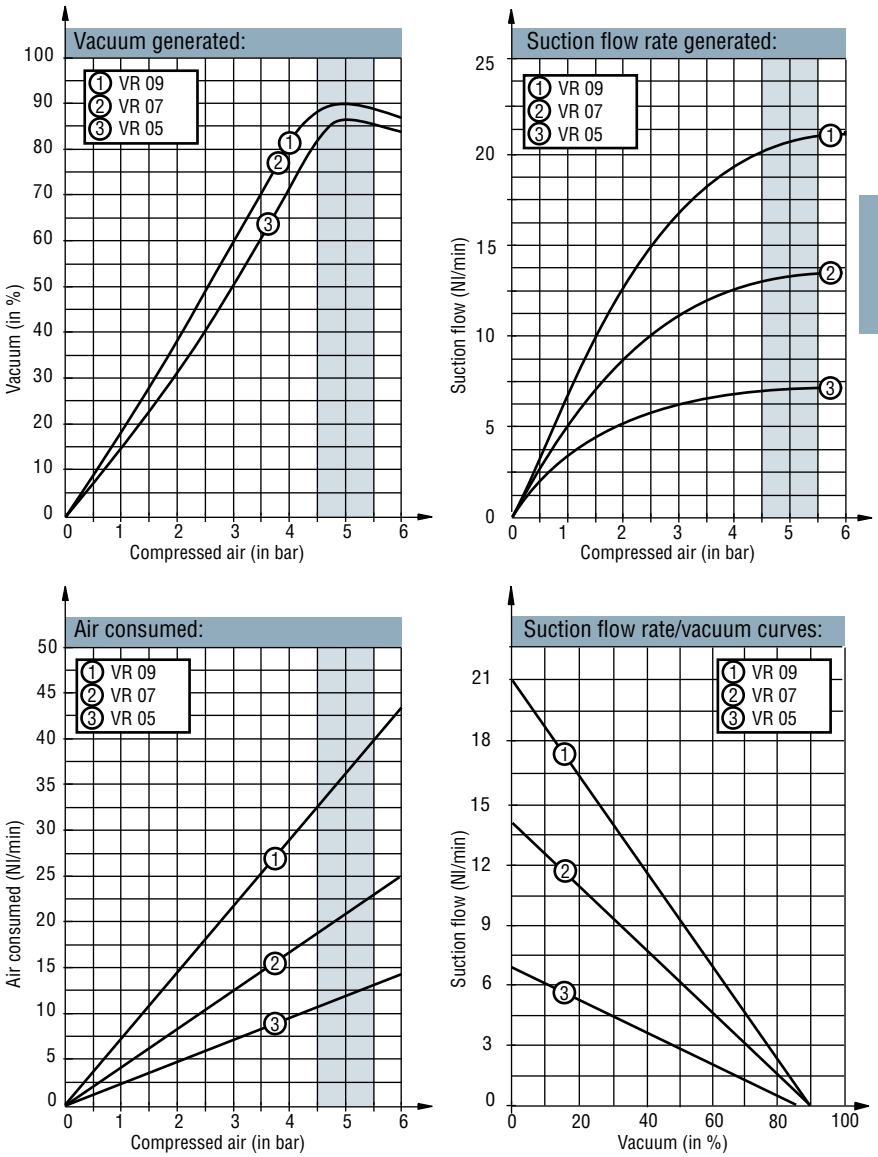
(1) C.A. 1/4 Gas inlet, depth 10 mm
(2) M6 vacuum outlet, depth 6 mm
(3) Example of suction pad
(4) Silencer
(5) 1/8 Gas vacuum outlet, depth 7.5 mm
(6) 1/4 Gas vacuum outlet, depth 10 mm
(7) Compressed air
(8) Exhaust
(9) Hexagonal nut, 14 across flats
(10) Hexagonal nut, 19 across flats



Advantages

- Wider range
- Can be adapted to all branches
- Light and compact
- Reduced gripping time
- Installed directly on the suction pads
- Excellent mechanical resistance
- Blow-off option
- Extended suction flow rate range
- No clogging
- Silent operation

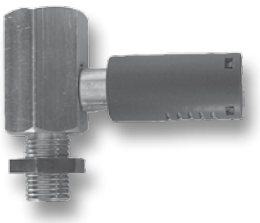
Curves



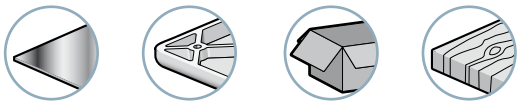
7

VR 10, 12, 14 series

Ejector fittings



Branch-specific applications



Description

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 pads due their optimum technical characteristics.
The aluminum design guarantees:
- Excellent mechanical resistance
- Light-weight
- Ideal for miscellaneous gripping.

Additional information

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

On option
- MS2M5 or MS4M5 blow-off valves with check valve on vacuum (see page 11/3).

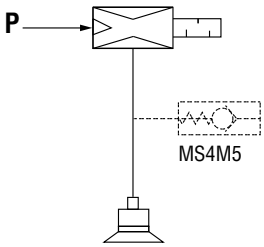
Special
- Coval offers the product best adapted to your needs based on your specifications and advises you according to your applications (material, shape, special technical characteristics).

Characteristics

model	Ø nozzle (mm)	air consumed (Nl/min)	Maximum vacuum (%)	air drawn in (Nl/min)	at air pressure (bar)
VR 10	1	44	90	27	5
VR 12	1.2	67	90	45	5
VR 14	1.4	108	90	64	5

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	-10 to 80°C / 32 to 140°F

Advantages

- Wider range
- Can be adapted to all branches
- Light and compact
- Reduced gripping time
- Installed directly on the suction pads
- Excellent mechanical resistance
- Blow-off option
- Extended suction flow rate range
- No clogging
- Silent operation

For all orders, please specify:

Model + Nozzle diameter + Vacuum outlet + Silencer

1: Model
VR

2: Nozzle diameter	
10	Ø 1 mm
12	Ø 1.2 mm
14	Ø 1.4 mm

3: Vacuum outlet	
M14	1/4 Gas male
M10 (1)	M10x125 male

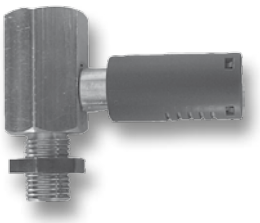
4: Silencer	
S	SILGV 10
K	SILK 18 C (2)

(1) especially for VPG 60, 80 and 95 suction pads
(2) SILK 18 C through type silencer dimensions, see page 11/2.

E.g. **VR 12 M10 S**
(VR series heavy duty in-line ejector, nozzle diameter 1.2mm, M10x125 male vacuum outlet with silencer SILGV 10).

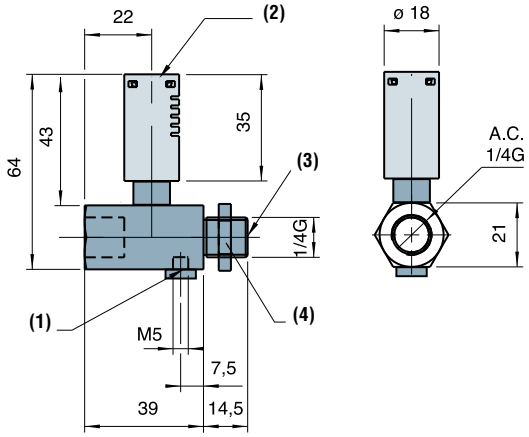
VR 10, 12, 14 series

Dimensions
Curves

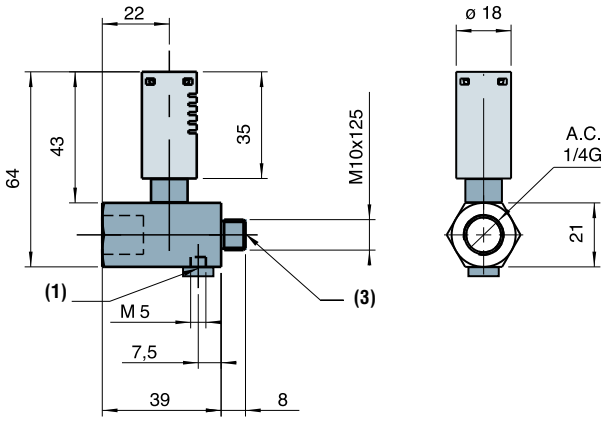


Dimensions

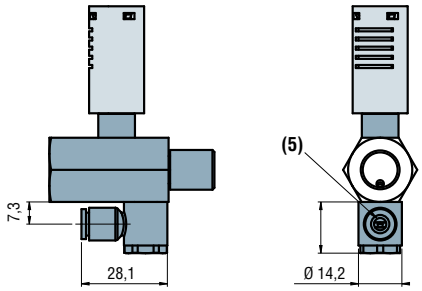
Partition pass-through version



M10 version

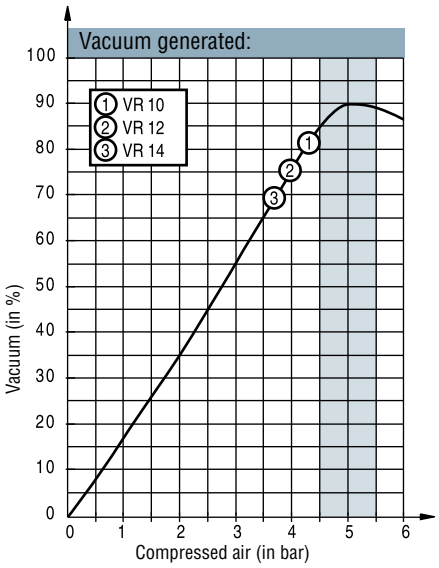


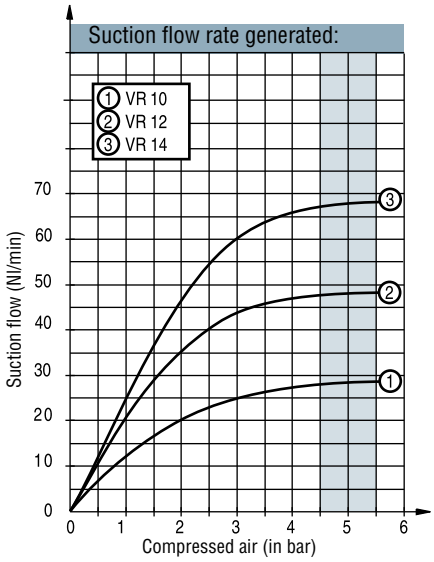
VR + MS4M5 version

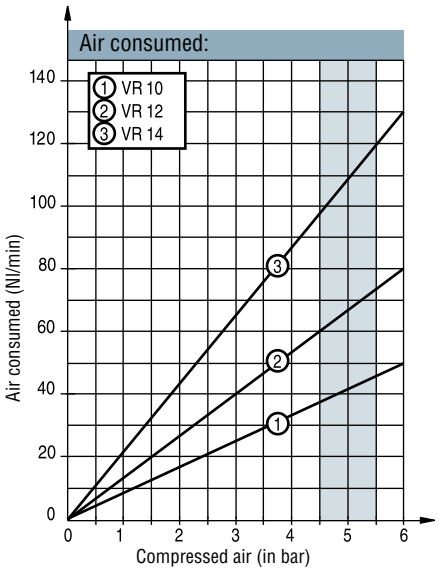


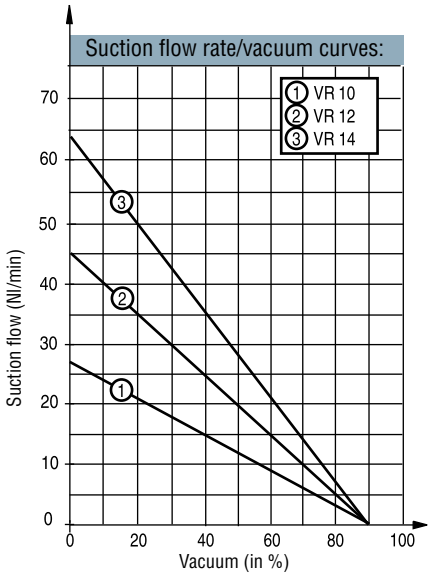
(1) Blow-off or vacuum switch
(2) Silencer
(3) Vacuum
(4) Hexagonal nut, 19 across flats
(5) Push fitting, outside Ø6

Curves





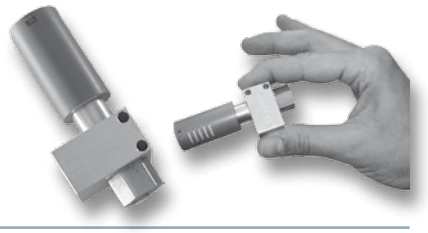




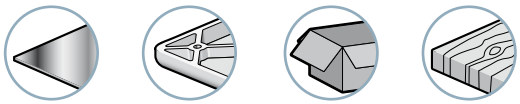
7

GVR 09 S, 10, 12, 14 series

Micro ejectors



Branch-specific applications



Description

The GVR range is designed for an industrial environment:

- Compact
- Light
- Optimized technical characteristics
- Pollution-resistant with its through type silencer (SILK 18C)
- Easy to integrate on the lifters
- Partition pass-through mounting using M10 screws (GVR 09S)

Additional information

As standard

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

On option

- MS2M5 or MS4M5 blow-off valves with check valve on vacuum (see page 11/3).

Characteristics

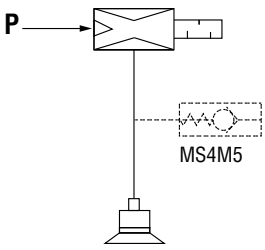
models	Ø nozzle (mm)	air consumed (Nl/min)	air drawn in (Nl/min)	vac. (%)	at air pressure (bar)
GVR 09 S	0.9	36	21	90	5
GVR 10	1	44	27	90	5
GVR 12	1.2	67	45	90	5
GVR 14	1.4	108	64	90	5

Advantages

- Can be adapted to all branches
- Light and compact
- Reduced gripping time
- Installed directly on the suction pads
- Excellent mechanical resistance
- Blow-off option
- No clogging
- Silent operation

Evacuation time in seconds per liter

% vacuum	10	20	30	40	50	60	70	80	85
GVR 09 S	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	-10 to 80 °C / 32 to 140°F

For all orders, please specify:

Model + Nozzle diameter + Silencer

1: Model
GVR

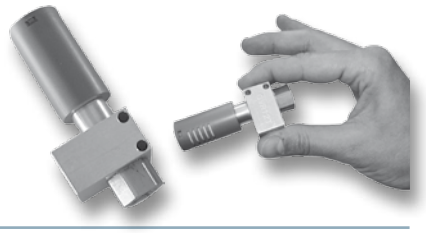
2: Nozzle diameter	
09S	Ø 0.9 mm
10	Ø 1 mm
12	Ø 1.2 mm
14	Ø 1.4 mm

4: Silencer	
–	without
S	SILGV 10
K	SILK 18 C

E.g. **GVR 12 K**
(GVR series micro ejector, nozzle diameter 1.2mm with SILK 18 C silencer).

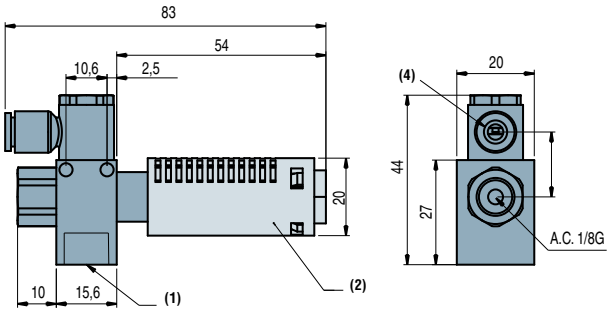
GVR 09 S, 10, 12, 14 series

Dimensions Curves

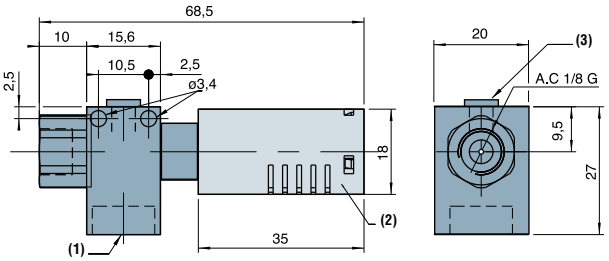


Dimensions

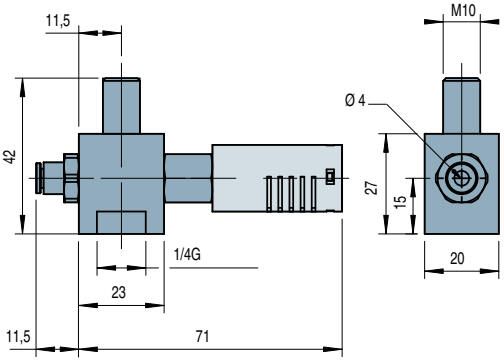
GVR 10, 12, 14 + MS4M5



GVR 10, 12, 14

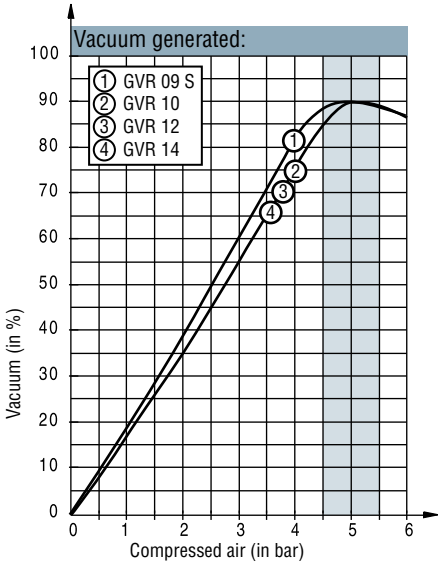


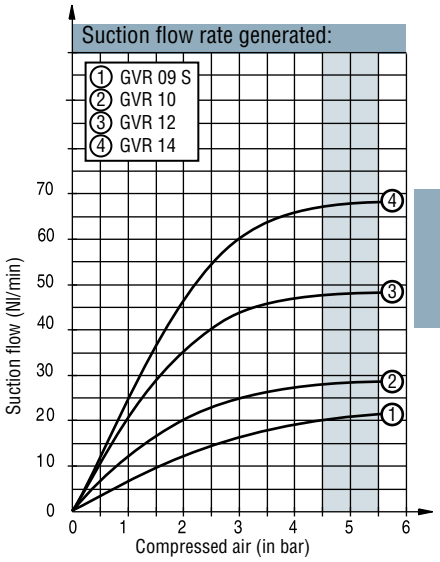
GVR 09 S

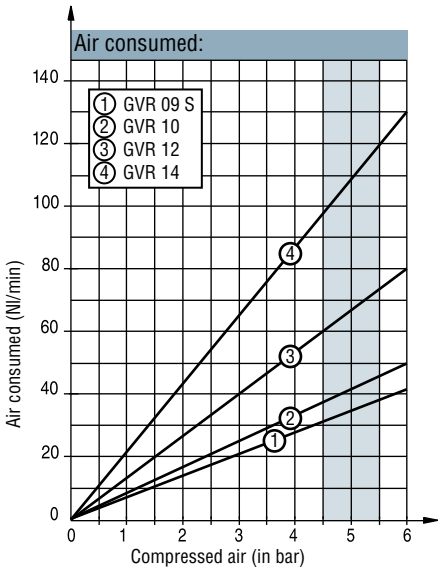


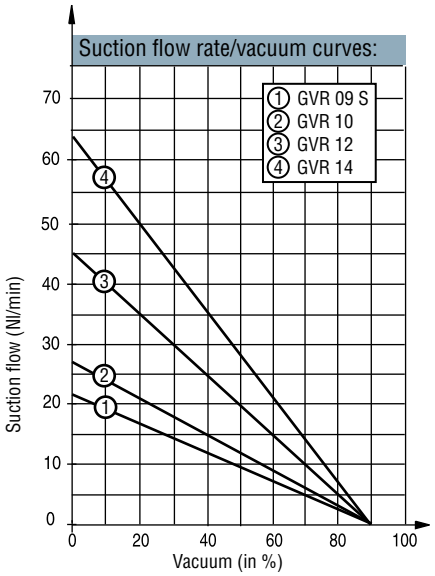
(1) Vacuum 1/4 G
(2) Silencer
(3) M5 vacuum switch
(4) Push fitting, outside Ø6

Curves









7

The range of modular and intelligent vacuum pumps

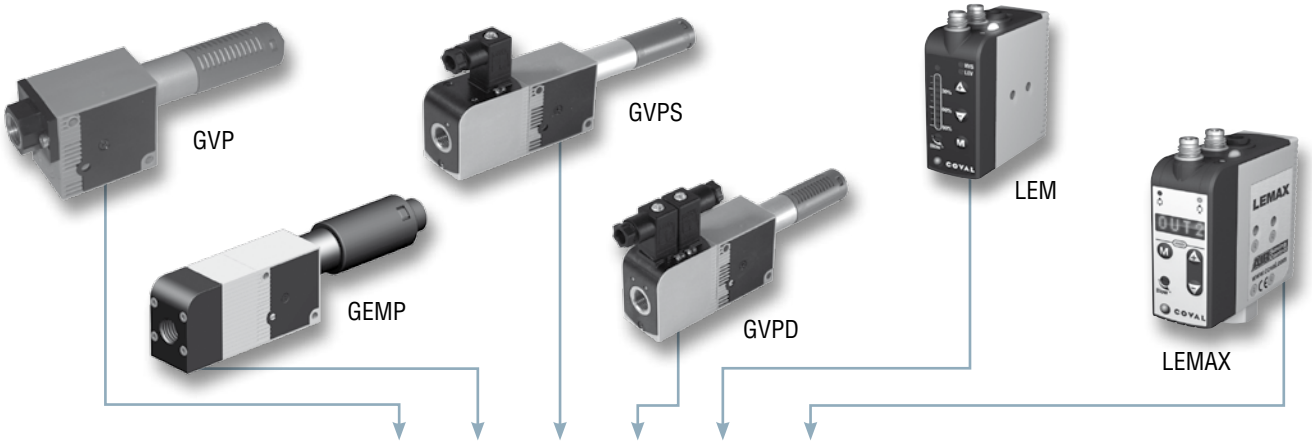
Advantages

- Reduced energy consumption
- Reduced noise levels
- Increased life expectancy
- Can be adapted to all branches
- Technical development of the Coval valve resulting from technological advances in aerospace and automotive applications.

New optimized fluidics

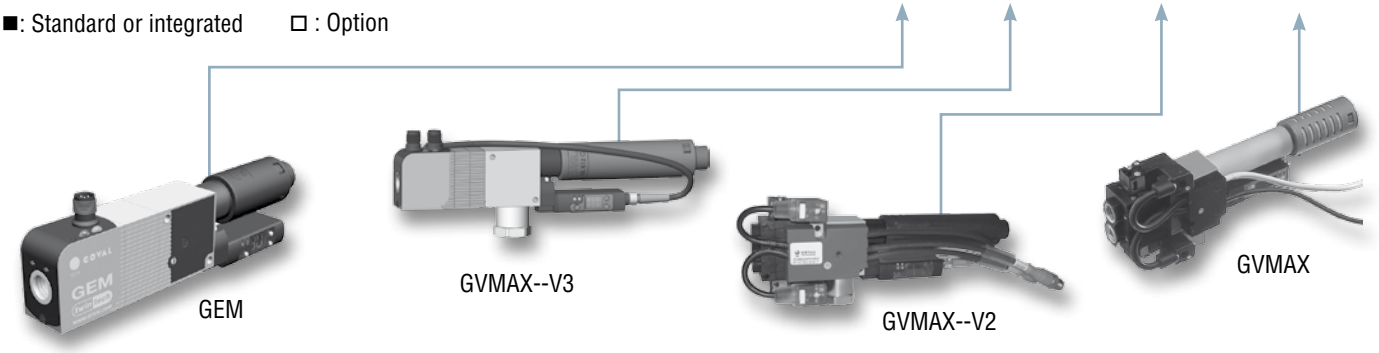
The COVAL range of modular vacuum pumps operates with a pressure supply of 4 bar.

Developed by COVAL over the years, this range is the result of research and optimized technical solutions. Thanks to the new fluidics, this range of vacuum pumps offer an optimized performance.



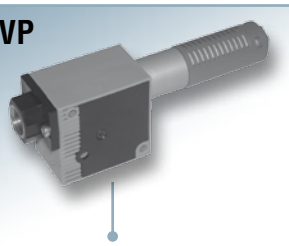
Model	MODULAR VACUUM PUMPS				INTELLIGENT VACUUM PUMPS					
	GVP	GEMP	GVPS	GVPD	LEM	LEMAX	GEM	GVMAX--V3	GVMAX--V2	GVMAX
Compressed air control (Suction)			■	■	■	■	■	■	■	■
Blow-off control				■	■	■	■	■	■	■
Integrated pressure regulator		■			■	■	■	■		
Powerful blow-off						■		■		
Electronic vacuum switch with display	□	□	□	□	■	■	■	■	■	■
Electronic vacuum switch	□	□	□	□	■	■	■			
Vacuum switch with electrical contact	□	□	□	□			■			
Vacuum check-valve	□		□	□	□	■	□	■	■	■
Electric control			■	■	■	■	■	■	■	■
Pneumatic control										■
Twin Tech (Integration & Intelligence)					■	■	■	■		
ASC (Air saving Control)						■				
Automatic vacuum regulation						■		■	■	■
M8 connections					■	■				
M12 connections							■	■	■	

■: Standard or integrated □ : Option



Modular vacuum pumps

GVP

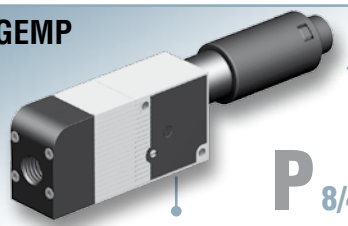


- Modular vacuum pump
- nozzle Ø: 1,2 ; 1,5 ; 2.0 ; 2.5 ; 3 mm
- Suction flow rate: 150 to 450 Nl/min
- Optimum supply pressure: 4 bar
- Integrated silencer

P 8/2

- Modular design thanks to the different options
- Compact
- Optimized performance for handling all types of objects
- Gripping time two times faster than multi-stage technology
- Silent operation
- No clogging
- Can be adapted to all branches

GEMP

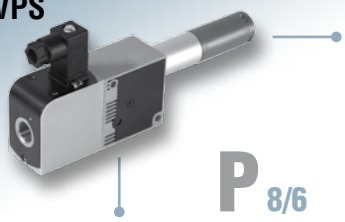


- Simple energy-saving vacuum pumps
- Nozzle Ø 1.2 ; 1.5 ; 2.0 ; 2.5 ; 3mm
- 2 levels of vacuum: 60% and 90%
- Suction flow rate between 150 and 450 Nl/min
- Integrated supply pressure regulation
- Integrated silencer

P 8/4

- Very compact and light-weight
- Ideal for all applications requiring an outside pressure regulator
- Exceptional energy savings thanks to automatic pressure regulation at 4 bar
- Optimal performances
- Silent operation
- No clogging

GVPS

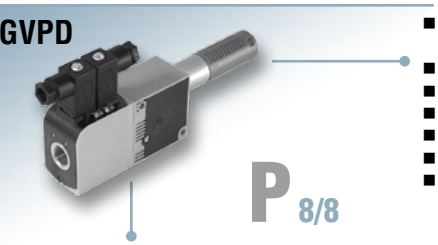


- Vacuum pump with electric vacuum control
- nozzle Ø: 1,2 ; 1,5 ; 2.0 ; 2.5 ; 3 mm
- Suction flow rate: 150 to 450 Nl/min
- Optimum supply pressure: 4 bar
- Integrated electric vacuum control
- Integrated silencer

P 8/6

- Modular design thanks to the different options
- Compact
- Optimized performance for handling all types of objects
- Silent operation
- No clogging
- Can be adapted to all branches

GVPD

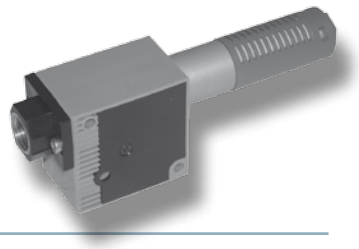


- Vacuum pump with blow-off and electric vacuum control
- nozzle Ø: 1,2 ; 1,5 ; 2.0 ; 2.5 ; 3 mm
- Suction flow rate: 150 to 450 Nl/min
- Optimum supply pressure: 4 bar
- Integrated vacuum control and blow-off
- Integrated silencer
- Adjustable blow-off flow

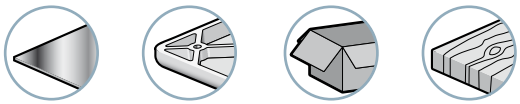
P 8/8

- Modular design thanks to the different options
- Compact
- Optimized performance for handling all types of objects
- Silent operation
- No clogging
- Can be adapted to all branches

Modular vacuum pumps



Branch-specific applications



Description

The GVP series vacuum pumps are the simplest in the modular range. They exist in 5 levels of power (evacuation time) and 3 different levels of maximum vacuum:
- Version X (50% vacuum for very porous products).
- Version T (75% vacuum for porous products).
- Version N (90% 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.

Advantages

- Can be adapted to all branches
- Optimized performance for handling all types of objects
- Modular design thanks to the different options
- Light and compact
- Silent operation
- No clogging thanks to the through type silencer

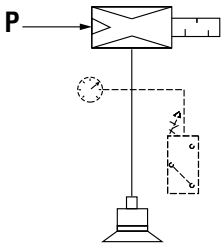
Characteristics

model	Ø nozzle (mm)	air consumed (Nl/min)	max. vacuum (%)			air drawn in (Nl/min)		
			X	T	N	X	T	N
GVP 12	1.2	67	40	75	90	150	63	45
GVP 15	1.5	100	50	75	90	180	95	70
GVP 20	2	180	50	75	90	250	160	125
GVP 25	2.5	270	50	75	90	360	240	200
GVP 30	3	400	50	75	90	450	330	265

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.

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	-10 to 80°C / 32 to 140°F

For all orders, please specify:

Model + Nozzle diameter + Characteristic + Silencer + Fitting

1: Model
GVP

2: Nozzle diameter	
12	1.2 mm
15	1.5 mm
20	2 mm
25	2.5 mm
30	3 mm

3: Characteristic	
X	50 % vacuum
T	75 % vacuum
N	90 % vacuum

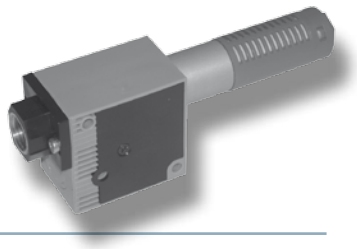
4: Silencer	
-	Without silencer
S (1)	Diffuser
K	Through-type

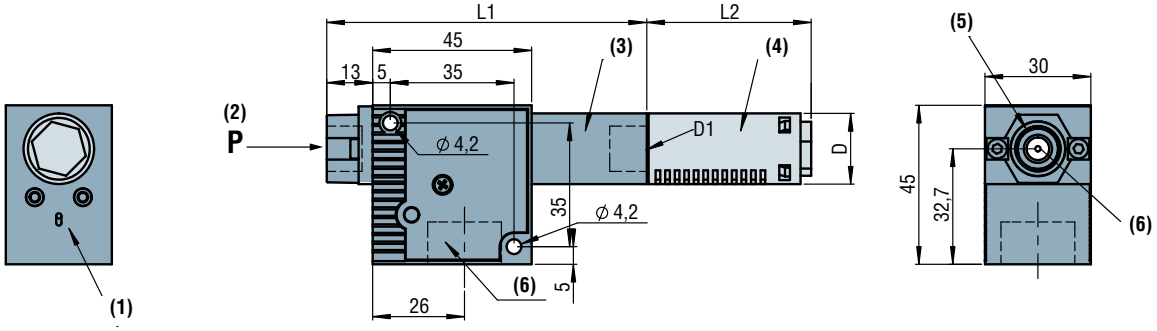
(1) no silencer for nozzle Ø 30.

5: C.A. fitting	
14	1/4 G BSPP

E.g. **GVP 30 N K 14**
(GVP series modular vacuum pump, nozzle diameter 3mm, 90 % vacuum with through type silencer and 1/4 G pressure fitting)

Dimensions





(1) Option mounting zone
(2) 4 bar compressed air tank
(3) Exhaust
(4) Silencer model S or K
(5) 1/4 Gas
(6) Vacuum 1/2 Gas

models	L1 (mm)		L2 (mm)			D (mm)		D1 (gas)	
	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	1/2	1/4
GVP15	76	91	46	68	121	30	20	1/2	1/4
GVP20	76	76	62	121	121	30	30	1/2	1/2
GVP25	76	76	62	121	121	30	30	1/2	1/2
GVP30	148	148	-	121	121	30	30	1/2	1/2

Additional information

Options

- Vacuum switches see page 8/10.
- Other options see pages 8/11 and 8/12.
- Silencer see page 11/2.

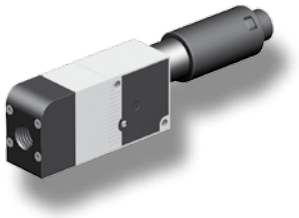
Curves

See page 8/13.

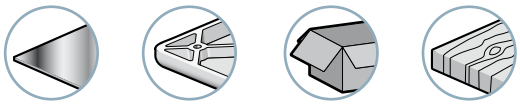
8

GEMP series

Simple energy-saving vacuum pumps



Branch-specific applications



Description

The GEMP series vacuum pumps are the simplest in the energy-saving range.
They can regulate the supply pressure automatically to an optimum pressure of 4 bar thanks to an integrated pressure regulator whatever the pressure in the compressed air network, and this without penalizing other applications which require more than 4 bar.
GEMP pumps therefore reduce both energy consumption and the noise level.

Advantages

- Modular design thanks to the different options
- Compact and light
- Exceptional energy savings
- Optimized performances for all types of applications
- Silent operation
- No clogging

Characteristics

model	Ø nozzle (mm)	air consumed (Nl/min)	Maximum vacuum (%)	air drawn in (Nl/min)	at air pressure (bar)
GEMP60	1.2	65	60	72	4
GEMP60	1.5	97	60	110	4
GEMP60	2.0	179	60	189	4
GEMP60	2.5	260	60	275	4
GEMP60	3.0	385	60	385	4
GEMP90	1.2	65	90	50	4
GEMP90	1.5	97	90	75	4
GEMP90	2.0	179	90	125	4
GEMP90	2.5	260	90	200	4
GEMP90	3.0	385	90	245	4

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

8

Vacuum switch characteristics

■ See page 9/19.

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	-10 to 80°C / 32 to 140°F

For all orders, please specify: Model + Vacuum level + X + Nozzle diameter + Vacuum switch

1: Model
GEMP

2: Vacuum level	
60	max. 60% vacuum (porous objects)
90	max. 90% vacuum (air-tight objects)

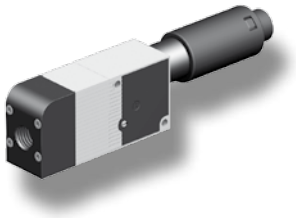
X

3: Nozzle diameter	
12	Ø 1.2 mm
15	Ø 1.5 mm
20	Ø 2 mm
25	Ø 2.5 mm
30	Ø 3 mm

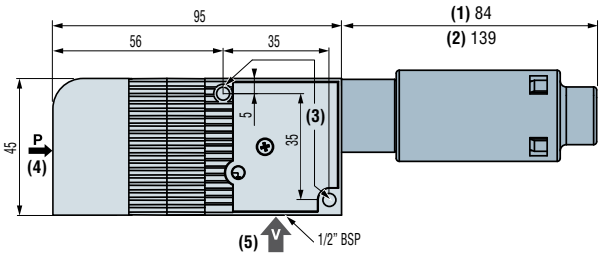
4: Vacuum switches	
VA	electronic display
VB	electronic
VC	with electrical contact
VO	without vacuum switch

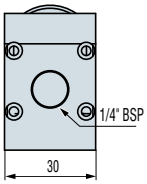
E.g. **GEMP 90 X 12 VA**
(GEMP vacuum pump, maximum 90% vacuum, nozzle diameter 1.2mm, with electronic vacuum switch with display)

Dimensions
Curves



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





Additional information

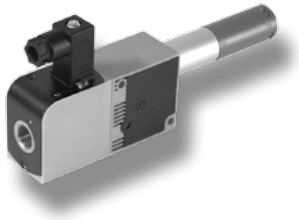
Options

■ Vacuum switches see page 9/19.

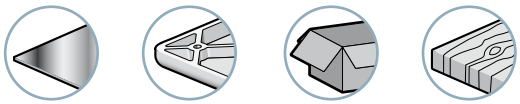
8

GVPS series

Vacuum pumps with electric vacuum control



Branch-specific applications



Description

GVPS series vacuum pumps control vacuum generation using an integrated valve. This installation simplifies wiring and reduces vacuum pump response times.

The valve is electrically controlled (24 V DC).

Advantages

- Integrated electric vacuum control
- Can be adapted to all branches
- Optimized performance for handling all types of objects
- Reduced wiring and easy-to-use
- Modular design thanks to the different options
- Light and compact
- No clogging thanks to the through type silencer
- Silent operation

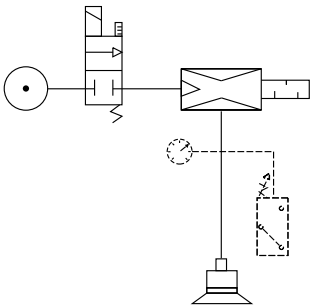
Characteristics

model	Ø nozzle (mm)	air consumed (Nl/min)	max. vacuum (%)			air drawn in (Nl/min)		
			X	T	N	X	T	N
GVPS 12	1.2	67	40	75	90	150	63	45
GVPS 15	1.5	100	50	75	90	180	95	70
GVPS 20	2	180	50	75	90	250	160	125
GVPS 25	2.5	270	50	75	90	360	240	200
GVPS 30	3	400	50	75	90	450	330	265

As standard, versions N and T are delivered with silencer S and version X with silencer K. Only exception, the GVPS 30 is fitted with silencer K.

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
GVPS 12	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
GVPS 15	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
GVPS 20	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
GVPS 25	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
GVPS 30	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, 2 to 6 bar
Optimum pressure	4 bar
Voltage	24V DC
Power	0.7 W
Materials	POM - 2017A – Cu Zn – PA6 15% FG
Temperature	0 to 60°C / 32 to 140°F
Number of valve operations	10 million
Operating frequency	Maximum 2 Hz
Function	N.C. (N.O. on request)

For all orders, please specify:

Model + Nozzle diameter + Characteristic + Silencer + Fitting + Control

1: Model
GVPS

2: Nozzle diameter	
12	1.2 mm
15	1.5 mm
20	2 mm
25	2.5 mm
30	3 mm

3: Characteristic	
X	50 % vacuum
T	75 % vacuum
N	90 % vacuum

4: Silencer	
-	Without silencer
S (1)	Diffuser
K	Through-type

5: C.A. fitting	
14	1/4 G BSPP

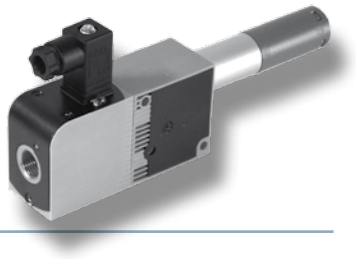
6: Controls	
E1	24 V DC N.F.
E	Other voltages on request

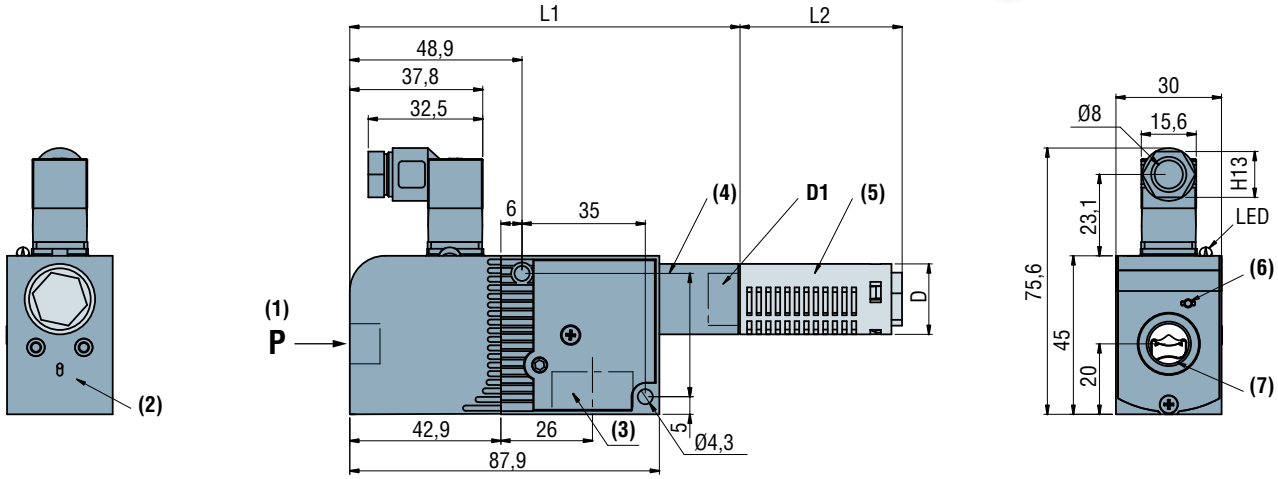
(1) no silencer (S) for nozzle Ø 30.

E.g. **GVPS 30 N K 14 E1**

(GVPS series electrically-controlled vacuum pump, nozzle diameter 3mm, 90% vacuum with through type silencer, 1/4 G pressure fitting and 24V DC N.C. control)

Dimensions





(1) 4 bar compressed air tank
(2) Vacuum switch option mounting zone
(3) Vacuum 1/2 Gas
(4) Exhaust
(5) Silencer model S or K
(6) Manual controls
(7) 1/4 Gas

models	L1 (mm)		L2 (mm)			D (mm)		D1 (gas)	
	X	N/T	S(N/T)	K(N/T)	K(X)	X	N/T	X	N/T
GVPS12	106	111	46	68	121	30	20	1/2	1/4
GVPS15	106	121	46	68	121	30	20	1/2	1/4
GVPS20	106	106	62	121	121	30	30	1/2	1/2
GVPS25	106	106	62	121	121	30	30	1/2	1/2
GVPS30	178	178	-	121	121	30	30	1/2	1/2

8

Additional information

Options

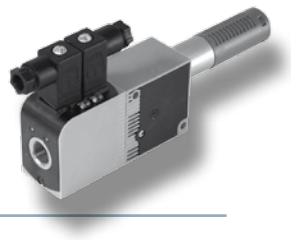
- Vacuum switches see page 8/10.
- Other options see pages 8/11 and 8/12.
- Silencer see page 11/2.

Curves

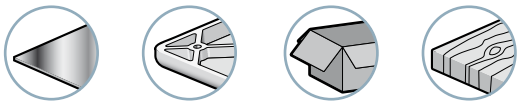
See page 8/13.

GVPD series

Vacuum pumps with blow-off and electric vacuum control



Branch-specific applications



Description

GVPD series vacuum pumps control vacuum generation and blow-off (adjustable flow). Controlling the force and duration of blow-off accelerates gripping/release rates, cleans objects before gripping and improves releasing process for large diameter suction pads.

Advantages

- Integrated electric vacuum and blow-off control
- Can be adapted to all branches
- Optimized performance for handling all types of objects
- Reduced wiring and easy-to-use
- Modular design thanks to the different options
- Light and compact
- No clogging thanks to the through type silencer
- Silent operation

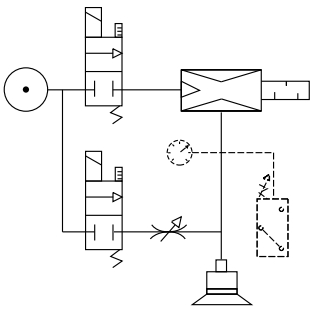
Characteristics

model	Ø nozzle (mm)	air consumed (Nl/min)	max. vacuum (%)			air drawn in (Nl/min)		
			X	T	N	X	T	N
GVPD 12	1.2	67	40	75	90	150	63	45
GVPD 15	1.5	100	50	75	90	180	95	70
GVPD 20	2	180	50	75	90	250	160	125
GVPD 25	2.5	270	50	75	90	360	240	200
GVPD 30	3	400	50	75	90	450	330	265

As standard, versions N and T are delivered with silencer S and version X with silencer K. Only exception, the GVPD 30 is fitted with silencer K.

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
GVPD 12	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
GVPD 15	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
GVPD 20	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
GVPD 25	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
GVPD 30	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, 2 to 6 bar
Optimum pressure	4 bar
Voltage	24V DC
Power	0.7 W
Material	POM - 2017A – Cu Zn – PA6 15% FG
Temperature	0 to 60°C / 32 to 140°F
Number of valve operations	10 million
Operating frequency	Maximum 2 Hz
Function	N.C. (N.O. on request)

For all orders, please specify:

Model + Nozzle diameter + Characteristic + Silencer + Fitting + Control

1: Model
GVPD

2: Nozzle diameter	
12	1.2 mm
15	1.5 mm
20	2 mm
25	2.5 mm
30	3 mm

3: Characteristic	
X	50 % vacuum
T	75 % vacuum
N	90 % vacuum

4: Silencer	
-	Without silencer
S (1)	Diffuser
K	Through-type

5: C.A. fitting	
14	1/4 G BSPP

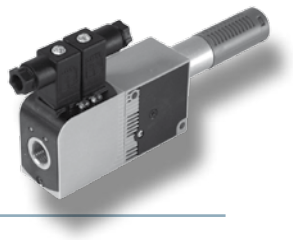
6: Controls	
E1	24 V DC N.F.
E	other voltages on request

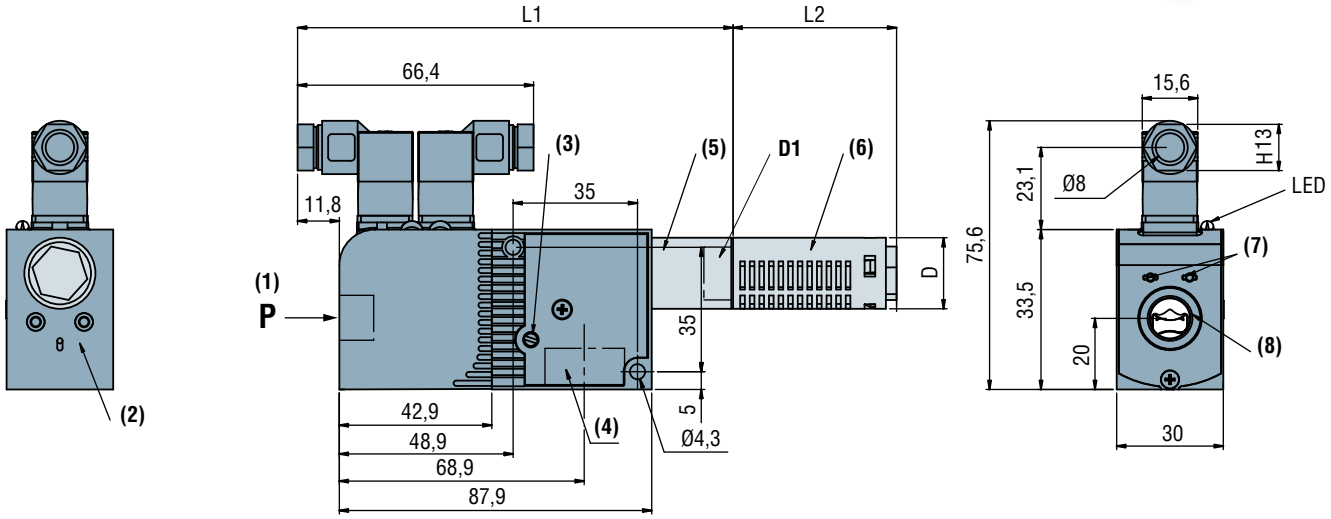
(1) no silencer (S) for nozzle Ø 30.

E.g. **GVPD 25 N K 14 E1**

(GVPD series vacuum pump, nozzle diameter 2.5mm, 90% vacuum with through type silencer, 1/4 gas pressure fitting and 24V DC N.C. control)

Dimensions





(1) 4 bar compressed air tank
(2) Vacuum switch option mounting zone
(3) Blow-off adjustment
(4) Vacuum 1/2 Gas
(5) Exhaust
(6) Silencer model S or K
(7) Manual controls
(8) 1/4 Gas

models	L1 (mm)		L2 (mm)			D (mm)		D1 (gas)	
	X	N/T	S(N/T)	K(N/T)	K(X)	X	N/T	X	N/T
GVPD12	118	123	46	68	121	30	20	1/2	1/4
GVPD15	118	133	46	68	121	30	20	1/2	1/4
GVPD20	118	118	62	121	121	30	30	1/2	1/2
GVPD25	118	118	62	121	121	30	30	1/2	1/2
GVPD30	190	190	-	121	121	30	30	1/2	1/2

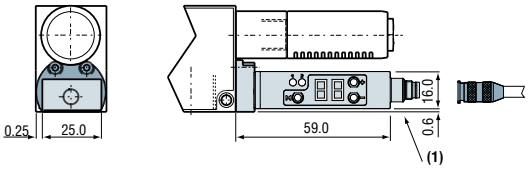
Additional information

Options

- Vacuum switches see page 8/10.
- Other options see pages 8/11 and 8/12.
- Silencer see page 11/3.

Curves

See page 8/13.



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

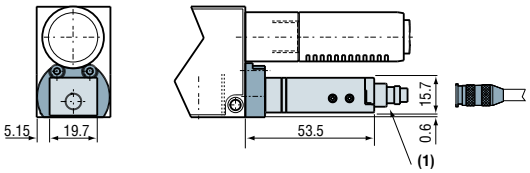
Electronic vacuum switch with display

GVO PSA 100 C option

(See exact characteristics page 12/1)

Our top-of-the-range electronic vacuum switch, the PSA 100, has an LED display showing the vacuum value in different units. It also has two separate outputs with independently regulated hysteresis, N.O. or N.C.

- PNP as standard
- M8 connector.
- Connection cable, see page 8/14.



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

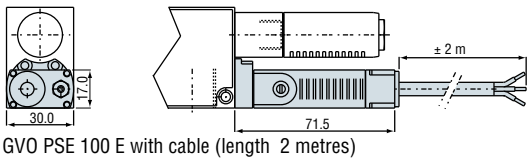
Electronic vacuum switch

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

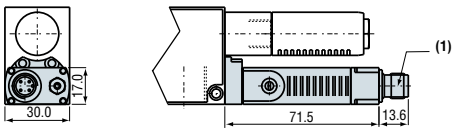
(See characteristics page 12/2)

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 8/14.



GVO PSE 100 E with cable (length 2 metres)



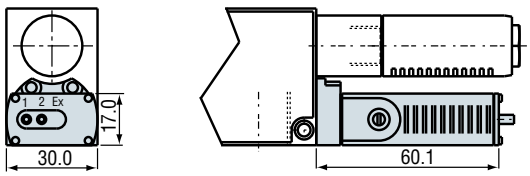
GVO PSE 100 EC with M12 connector (delivered without connection cable)
(1) M12 male connector

Vacuum switch with electrical signal

GVO PSE 100 E or EC option

(See characteristics page 12/5)

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 8/14.

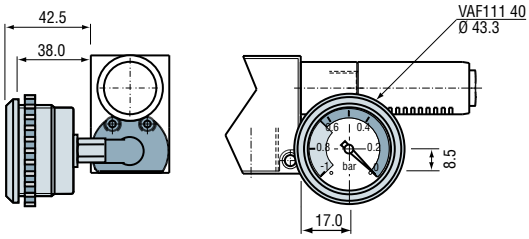


Vacuum switch with pneumatic signal

GVO PSE 100 P N.O. or N.C. option

(see characteristics page 12/6)

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.

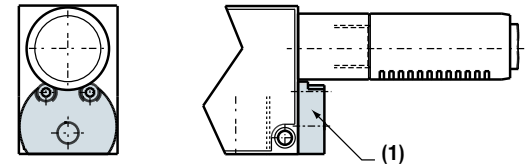


Vacuum gauge

GVO VAF 111 40 option

(See characteristics page 12/8)

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.

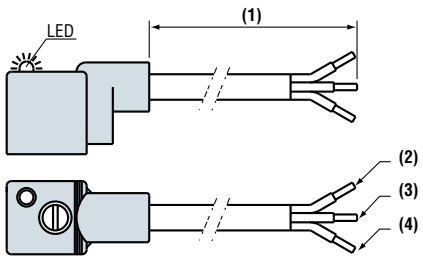


(1) Plug

Plug to shut off vacuum data

GVOB option

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.



(1) L(2 meters)
(2) Brown
(3) Blue
(4) Yellow-Green
(Earth)

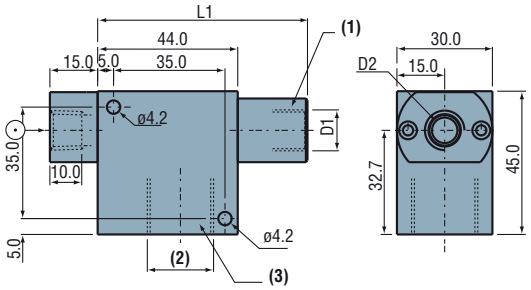
GVO CA 24 V option, (110 V or 220 V on request)

with anti-interferance on electric valve control: factory-mounted.

Use of an anti-interferance is recommended on the valve control when using electrically-controlled pumps. This anti-interferance protects the equipment and ensures the valve control is reliable in electrically polluted environments.

- As standard for 24V DC and CA control
- On request for other models

Modular vacuum pump options



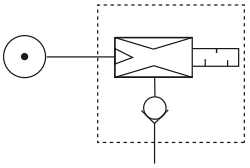
GVO AL and GVO AL NPT option (for GVP vacuum pump)

Body and flange 1/4 Gas in aluminum.

■ Note: It is no longer possible to mount vacuum gauge options.

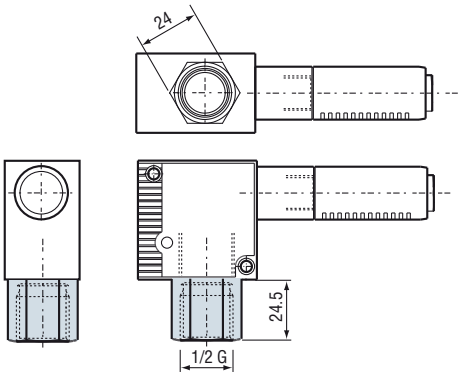
L1 =L1 GVP (plastic) - 1mm
D1 =D1 (GVP N, T and X)
D2 =1/4 Gas for GVO AL
1/4 NPT for GVO AL NPT

(1) Exhaust
(2) 1/2 Gas
(3) Vacuum



Check valve option - Ref. 02090101 (for GVPD vacuum pump)

Check valve option.
Requires blow-off downstream from the valve for release.



GVO P option

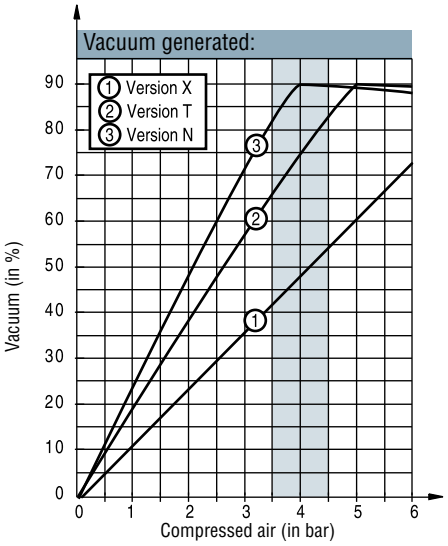
with 1/2 protective extension
The 1/2 extension is recommended for double valve models or with pneumatic vacuum switch to protect components during mounting or installation.
The extension is fitted with a 400 micron stainless steel filtration grid as standard.

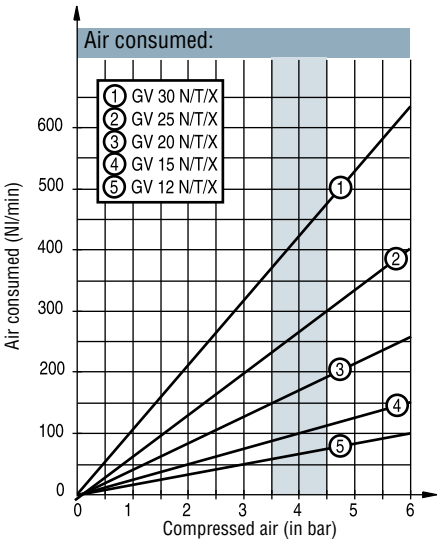
8

Performance curves for modular vacuum pumps

GVP, GVPS, GVPD

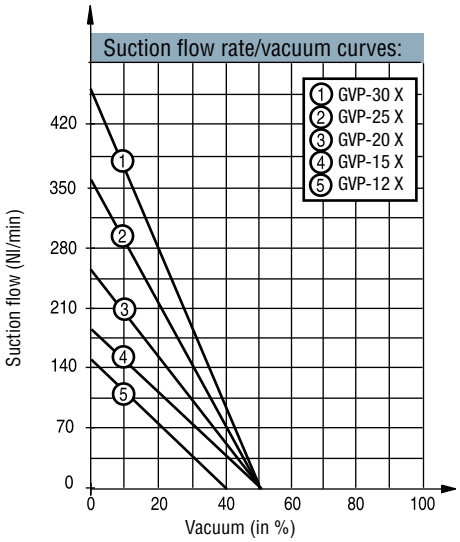
■ Pressure 4 bar

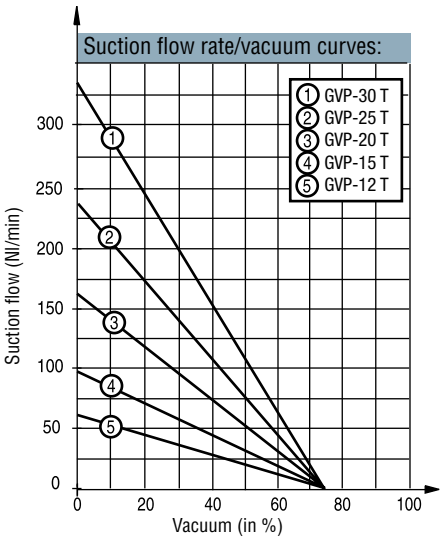


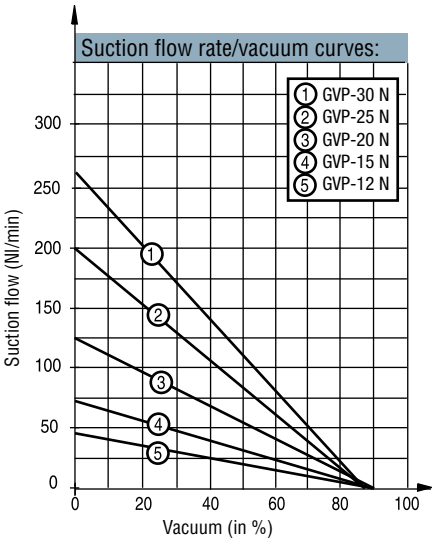


■ Supply pressure 4 bar

Version X - 50% vacuum Version T - 75% vacuum Version N - 90% vacuum

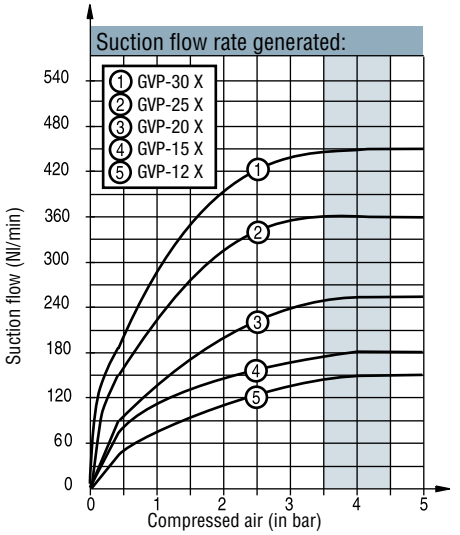


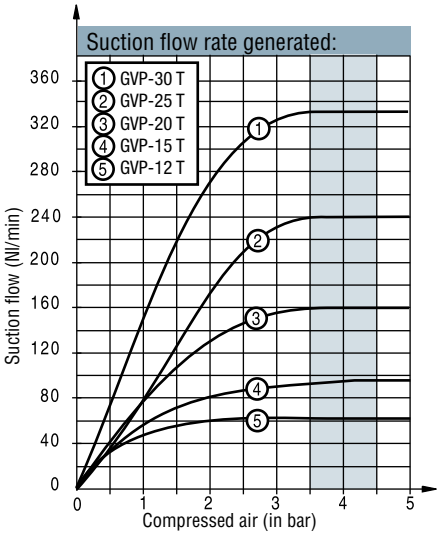


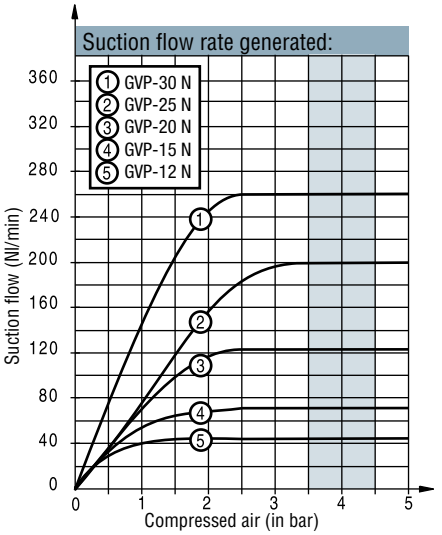


■ Supply pressure 4 bar

Version X - 50% vacuum Version T - 75% vacuum Version N - 90% vacuum

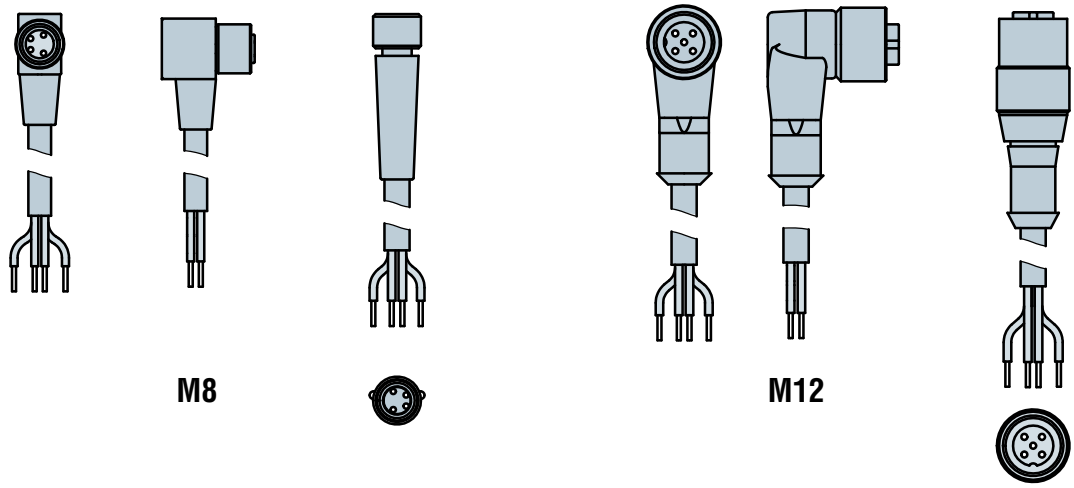






8

Screw-type electrical connectors, M8 and M12.

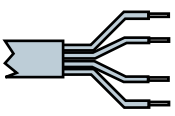


M8 connector

- Straight connector, reference CD M8.
- Elbow connector, reference CC M8.

M12 connector

- Straight connector, reference CD M12.
- Elbow connector, reference CC M12.



Specifications

- Female connector.
- PVC cable, length 2 meters, 4 strands, overmoulded.
- Connector wiring.
- Protection: IP 65

On request

- PUR cable, 5 or 10 meters.

For all orders, please specify: Model + Type of connector + Fitting

1: Model
C

2: Type of connector	
D	straight connector
C	elbow connector

3: Fitting	
M8	for M8 male
M12	for M12 male

E.g. **CC M8**
(Elbow connector for M8 male).

Intelligent vacuum pumps

Ultra-Compact series

LEM

Integrated mini-vacuum pump with intelligent functions

twin tech Integration & Intelligence

P 9/2

- Integrated mini-vacuum pump with intelligent functions
- nozzle Ø: 1; 1.2; 1.4
- 2 levels of vacuum: 60% and 90%
- Suction flow rate up to 96 Nl/mn
- Integrated pressure regulator
- All the functions required integrated in the product
- M8 connections
- Stand-alone or island module

- For air-tight and porous objects
- Ultra compact and light-weight
- Control panel for monitoring and adjustment
- Energy savings in all networks > 4 bars
- Reduced wiring
- Reduced installation time
- Can be adapted to all branches

LEMAX

Integrated mini-vacuum pump with ASC (Air Saving Control)

twin tech Integration & Intelligence

AIR Saving Control

P 9/8

- Integrated mini-vacuum pump with ASC (Air Saving Control)
- nozzle Ø: 1; 1.2; 1.4
- Levels of vacuum: 90%
- Suction flow rate up to 70Nl/minute
- Integrated pressure regulator
- All the functions required integrated in the product
- M8 connections
- Stand-alone or island module

- For air-tight and porous objects
- Ultra compact and light-weight
- Control panel for monitoring and adjustment
- ASC = 75 to 99% energy savings
- Reduced wiring
- Reduced installation time
- Can be adapted to all branches

Intelligent vacuum pumps

GEM

P 9/14

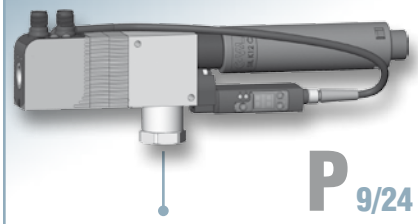
- Integrated energy-saving vacuum pumps
- Nozzle Ø 1.2 ; 1.5 ; 2.0 ; 2.5 ; 3mm
- 2 levels of vacuum: 60% and 90%
- All the functions required integrated in the product
- Integrated pressure regulator
- Integrated M12 connection (Plug &Play)

twin tech Integration & Intelligence

- Coval's "all in one" innovative solution
- Energy savings exceeding 50 %
- Noise levels reduced by up to 30dBa
- Modular design thanks to the different options
- Reduced wiring
- Reduced installation time
- No clogging
- Optimized performance for handling all types of objects
- Can be adapted to all branches

GVMAX V3 / V3R

Self-regulating vacuum pump



P 9/24

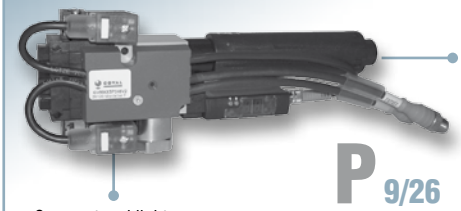
- Self-regulating vacuum pumps
- Electric vacuum and blow-off controls
- Integral blow-off
- Integrated pressure regulator
- nozzle Ø: 3 mm
- Maximum vacuum level 90%
- Vacuum regulation function
- Integrated vacuum solenoid valves and blow-off
- Integrated vacuum check-valve

twin tech Integration & Intelligence

- Compact and light
- Ideal for retaining air-tight objects in the automotive, plastics and sheet metal industries
- Energy saved by the vacuum regulation function
- Safety guaranteed in case of power failure
- Optimal performances
- Silent operation
- No clogging

GVMAX V2/V2R

Self-regulating vacuum pump



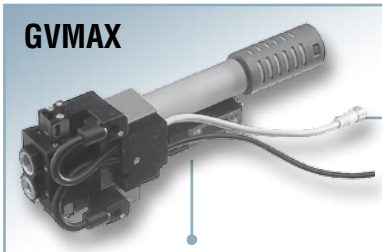
P 9/26

- Self-regulating vacuum pumps
- Electric vacuum and blow-off controls
- nozzle Ø: 2.5 mm
- Maximum vacuum level 90%
- Vacuum regulation function
- Integrated vacuum solenoid valves and blow-off
- Integrated vacuum check-valve

- Compact and light
- Ideal for retaining air-tight objects in the automotive, plastics and sheet metal industries
- Energy saved by the vacuum regulation function
- Safety guaranteed in case of power failure
- Optimal performances
- Silent operation
- No clogging

GVMAX

Self-regulating vacuum pump (electric or pneumatic control)



P 9/28

- Self-regulating vacuum pumps
- Electric or pneumatic controls
- nozzle Ø: 2.5 mm
- Three levels of vacuum: 50%, 75% and 90%
- Vacuum regulation function
- Integrated vacuum solenoid valves and blow-off
- 2 integrated check valves for pneumatic version and 1 for electric version
- Integrated vacuum switch to adjust the vacuum threshold and hysteresis
- Integrated silencer

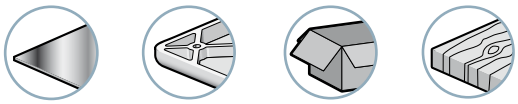
- Compact and light
- Ideal for retaining air-tight objects in the automotive, plastics and sheet metal industries
- Energy saved by the vacuum regulation function
- Safety guaranteed in case of power failure
- Optimal performances
- Silent operation
- No clogging

LEM series

twin tech Integration & Intelligence

Mini integrated-vacuum pump with smart dialogue

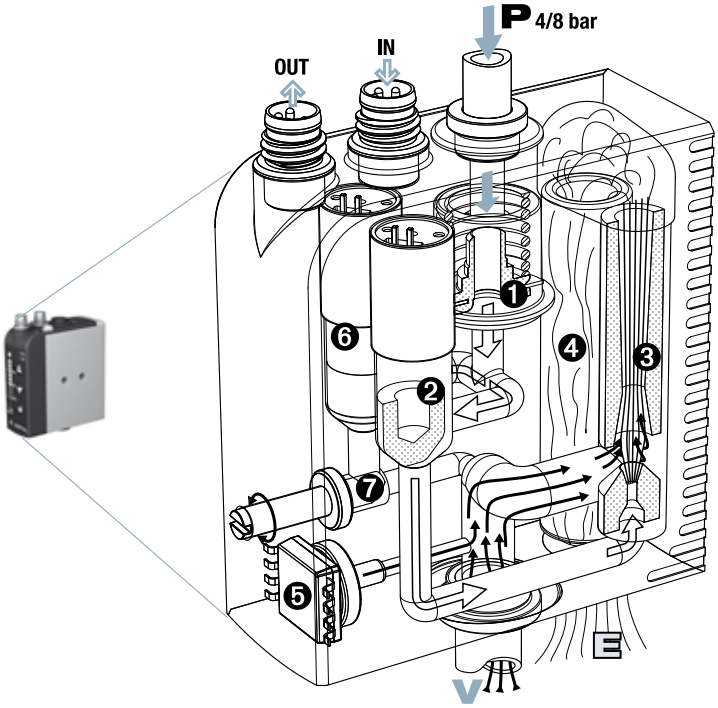
Applications



For all objects, porous or air-tight

Advantages

■ "All-in-one"solution, no more peripherals to be added.
■ Simplified installation and use thanks to the Plug & Play system
■ Unequalled compactness: Installation very close to the suction pads ➔ speed, 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, production, maintenance.



Compact integration

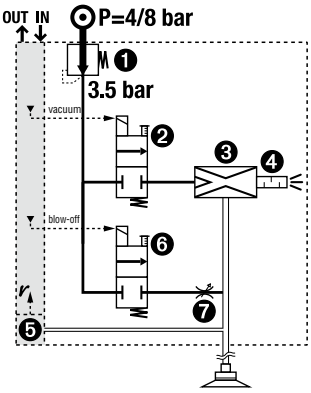
The illustrations opposite present the 7 functions integrated in the mini-module, and their respective roles in operation.

The result of this COVAL performance is:

- **A mini module** (≅ 120 g) that is easy to install as close as possible to the suction pads in order to reduce the volume to be emptied ➔ 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. Solenoid valve"blow-off"
7. Blow-off flow adjustment

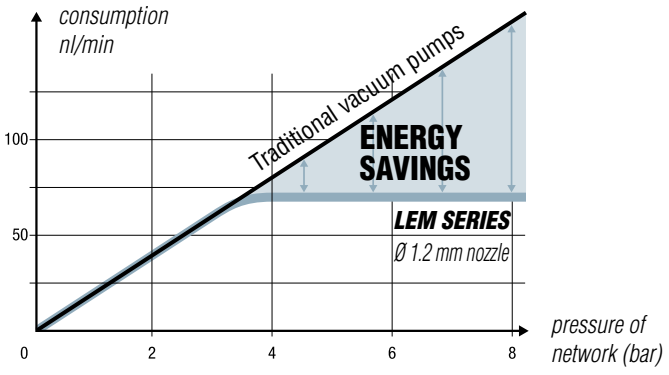


Integrated Regulation

The 4-8 bar air network is automatically reduced internally, to 3.5 bar, the optimal pressure for the venturi - Two key advantages:

1- Energy savings
The adjacent graph shows this savings in air consumed, for any network at a pressure higher than 4 bar.

2- Integrated clog-free silencer
At the venturi exhaust, the pressure does not depend on the air network pressure.
Totally controlled, it allows for the integration of an open silencer:
this silencer is clog-free, thus requiring no maintenance.



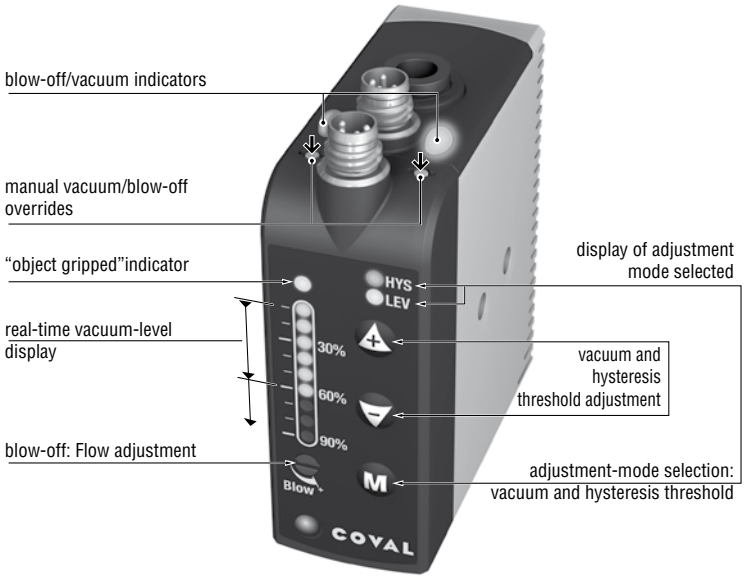
9

Smart Dialogue
Stand-alone and Island Modules

Smart Dialogue

The dialogue front panel shown opposite displays the real-time vacuum level and lets the operator set the level which triggers the “object gripped” signal allowing operations to continue.

This communications front 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.



Stand-alone or island modules?

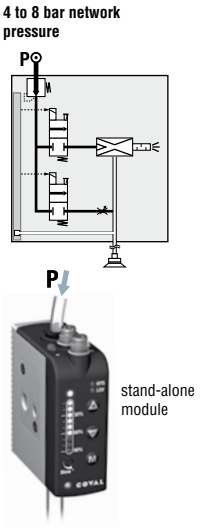
Stand-alone modules are suitable for the most common applications; one module controls one or more suction pads which all operate according to the same sequence.

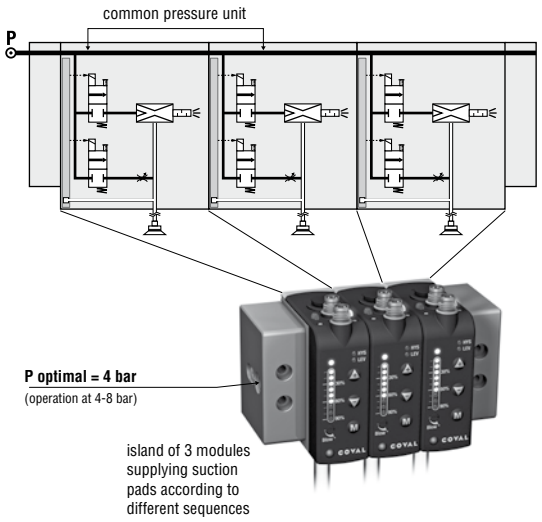
When several suction pads are operating according to different sequences, multiple modules are required, which can be:

- several stand-alone modules, OR
- an island of these modules with an internal common pressure unit.

The adjacent illustrations help in the selection:

- Stand-alone modules are complete, with the integrated pressure regulator (see p 9/2)
- in an island, the integrated regulator is absent: to maintain the advantage of economical and silent operation, it is recommended to reduce the pressure to the island's common pressure unit to 4 bar.





9

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.

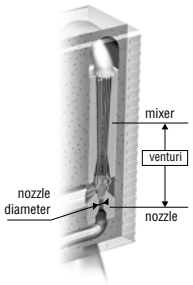
1- Select “vacuum level / nozzle diameter”

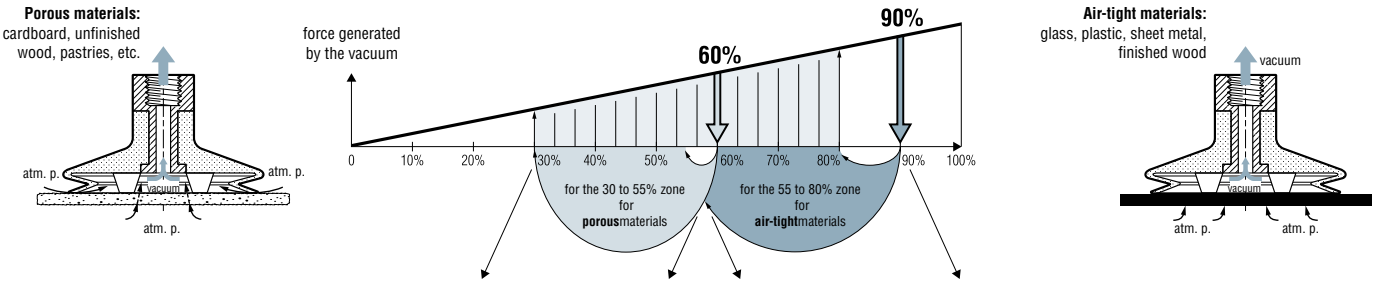
The introductory guide in this catalogue shows that for porous objects, a 30-55% vacuum is economical and effective. This is obtained with a 60% maximum vacuum pump.

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 air-tight material, the vacuum used is 55% to 80%, obtained by a 90% max. vacuum pump.

- For standard cases, with integrated blow-off the LEMAX series is preferable, and more economical due to its ASC (Air Saving Control) function ➔ see p. 9/8 to 9/13
- For special cases, the LEM series contains versions without blow-off and versions without 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							Air consumed *(Nl/min)*	Air drawn in *(Nl/min)*
vacuum achieved / *ø nozzle*	30%	35%	40%	45%	50%	55%		
1.0 mm	0.66	0.83	1.04	1.31	1.70	2.35	**44**	**38**
1.2 mm	0.41	0.52	0.66	0.83	1.07	1.49	**65**	**72**
1.4 mm	0.27	0.34	0.43	0.54	0.70	0.97	**90**	**92**

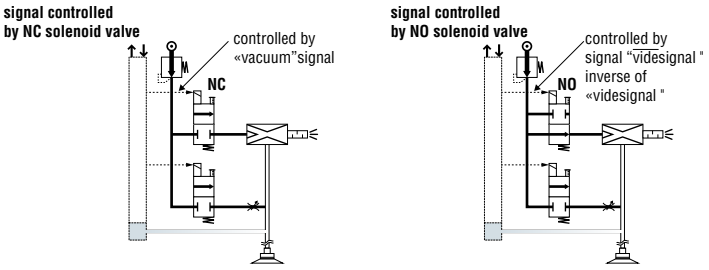
Airtight objects ▸ maximum vacuum level: 90%								
Time to create vacuum *(seconds)* for a volume of 1 liter							Air consumed *(Nl/min)*	Air drawn in *(Nl/min)*
vacuum achieved / *ø nozzle*	55%	60%	65%	70%	75%	80%		
1.0 mm	1.76	2.04	2.38	2.80	3.33	4.09	**44**	**29**
1.2 mm	1.13	1.31	1.53	1.80	2.15	2.64	**65**	**45**
1.4 mm	0.73	0.85	0.99	1.16	1.38	1.70	**90**	**70**

9

2- Select vacuum controlled by NC solenoid valve or NO solenoid valve

The vacuum controlled by the 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 the “vacuum”signal, which is noted as “$\overline{\text{vacuum}}$”.



3- 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.

4- Select with or without vacuum switch

For common applications, the vacuum switch is needed, with the dialogue face for digital display and adjustment ➔ see page p.9/3

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.

Configuring a vacuum pump

Reference composed of an assembled island or components for an island to be assembled

Reference composed of a stand-alone module

LEM	60	X	12	S	VA		B3

VACUUM LEVEL

60% max. vacuum ➔porous objects	60
90% max. vacuum ➔air-tight objects	90

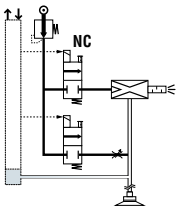
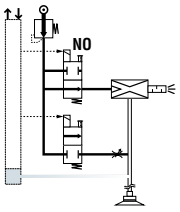
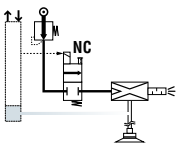
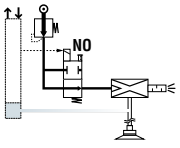
NOZZLE DIAMETER

ø 1.0 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 adjust-ment	

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 an NC solenoid valve ■ No blow-off	
U	■ Vacuum controlled by an NO solenoid valve ■ No blow-off	

Additional options: On request:

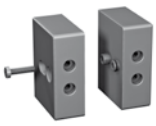
■ Modules with enhanced blow-off by integrated isolation valve
➔ see operation in the LEMAX chapter.
■ Modules with check valve will maintain vacuum in the event of a loss of pneumatic and/or electrical power, during the grip cycle.

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 delivered 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_____**B2** 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. **REF : 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.

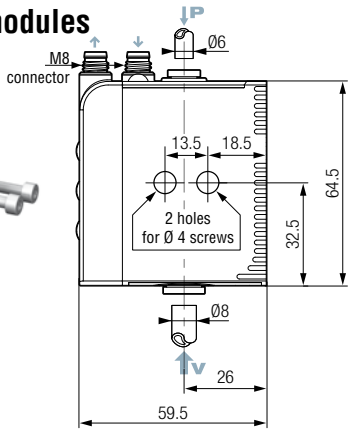
REFERENCE EXAMPLE COMPOSED OF A STAND-ALONE MODULE:

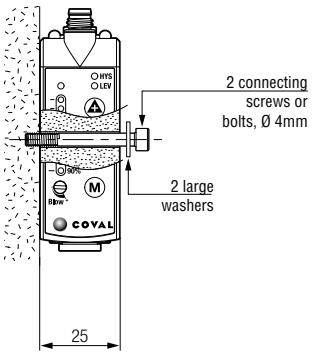
■ **LEM60X12SVA**
Stand-alone LEM Module, 60% max. vacuum, ø 1.2 mm nozzle, vacuum controlled by NC solenoid valve, blow-off and vacuum switch.

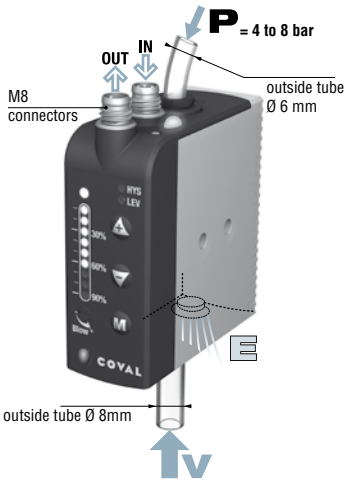
Dimensions
Mounting options

1- Stand-alone modules

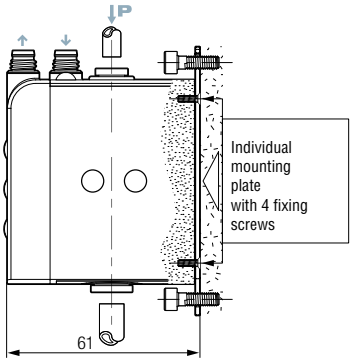
Side mounting

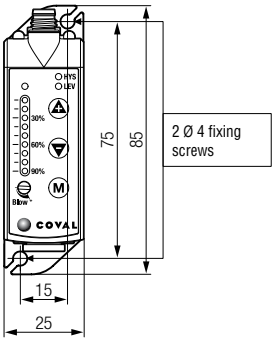






Front mounting

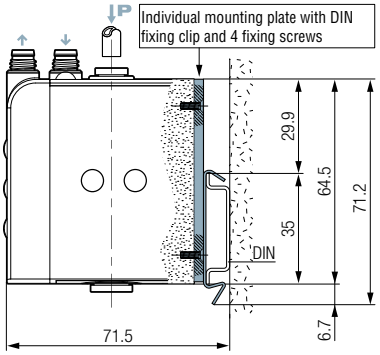


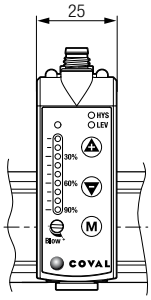


For front mounting, order the necessary kit, in addition to the module:

Front mounting kit: 1 plate + 4 screws
REF: LEMFIXA

Mounting on DIN rail



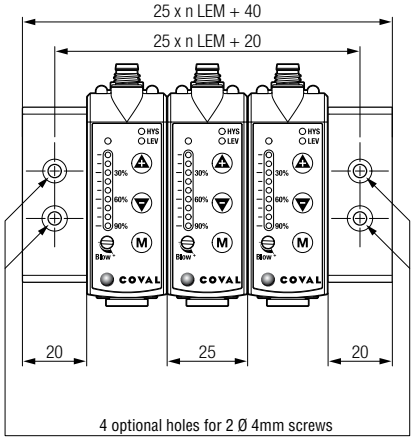


A module can be clipped onto a DIN rail.

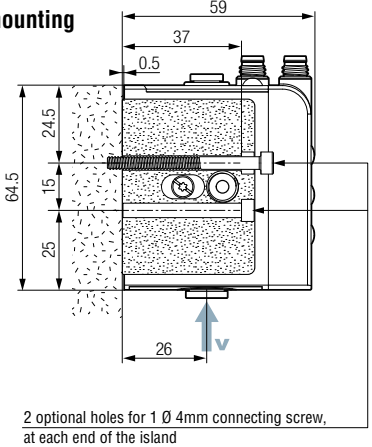
For this purpose, the module must first be equipped with an individual DIN installation plate, ordered separately:

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

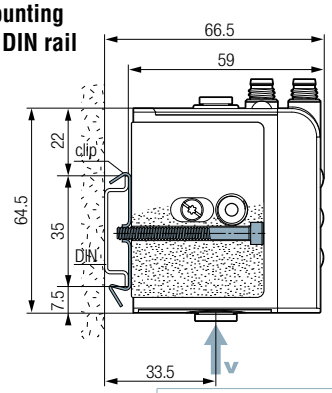
2- Islands



Front mounting



Mounting on DIN rail



DIN rail mounting kit: 2 clips + 4 screws
REF: LEMFIXC

Overall Characteristics

- Supply: non-lubricated air filtered to 5 microns according to standard ISO 8573-1 class 4.
- Operating pressure: 4 to 8 bar.
- Blow-off: adjustable flow.
- Maximum vacuum: 60% or 90% depending on model.
- Suction rate: 29 to 92 Nl/min depending on model.
- Air consumption: 44 to 90 Nl/min depending on model.
- Electrical protection level: IP65.
- Control voltage: 24 V DC (regulated ± 10%).
- Current draw: 30 mA (0.7 W) vacuum or blow-off.
- Max. operating frequency: 4 Hz.
- Endurance: 10 million cycles.
- Weight: 80 to 120 g, depending on model.
- Operating temperature: 10 to 60 °C.
- Materials: PA 6-6 15 %FV, brass, aluminium, NBR.

Integrated vacuum-switch characteristics

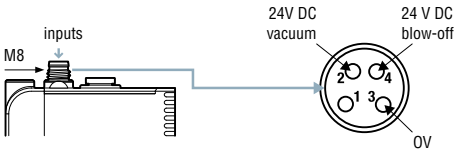
- Measuring range: -1 to 0 bar.
- Precision: ± 1.5% of the range.
- Hysteresis: adjustable from 0% to 100%.
- Output threshold: 1 x T.O.R. in NO.
- Analogue output: 1 V DC to 5 V DC on the measuring range.
- Switching power: 125 mA, PNP.
- Threshold status display: 1 green LED.
- Supply voltage 24V DC (regulated ± 10%).
- Current draw: < 20 mA.
- Protection: against polarity inversions.

Integrated-silencer characteristics

- Noise level: approximately 60 dBA.
- Clog-free silencer.

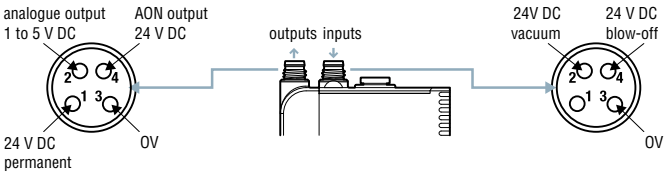
Electrical connections

MODULES WITHOUT VACUUM-SWITCH FUNCTION



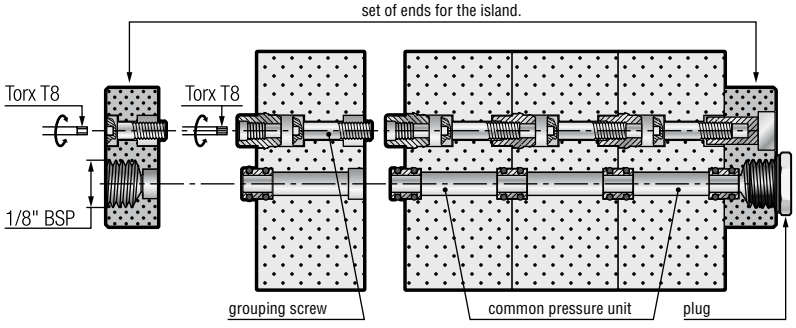
Note: straight and angled M8 connectors shown (p. 8/20)

MODULES WITH VACUUM-SWITCH FUNCTION

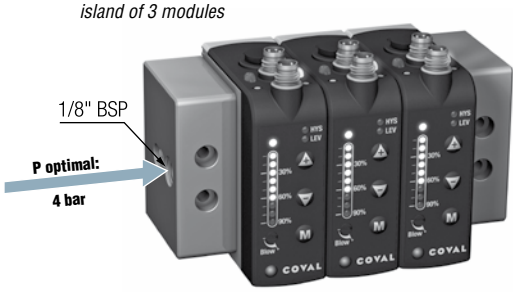


Characteristics and connecting an island

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

Note:

In the same island, it is possible to combine LEM series modules and LEMAX series modules.

LEMAX series

twin tech Integration & Intelligence

AIR Saving Control

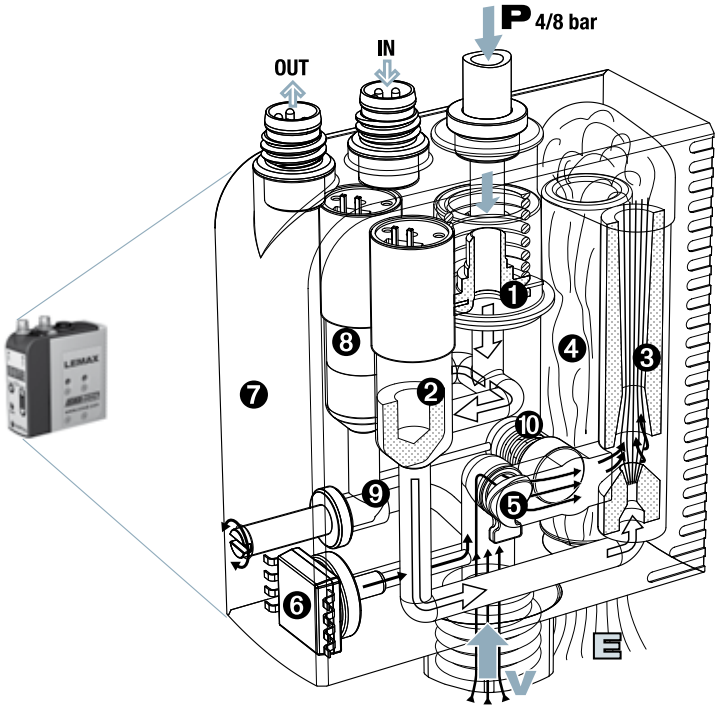
Integrated mini vacuum pump with"ASC" (Air Saving Control)

Applications

For all objects, air-tight or not very porous

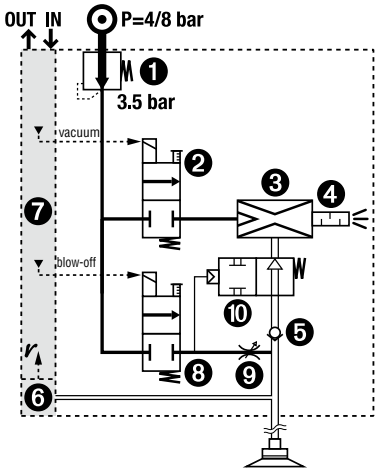
Advantages

■ 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
■ Unequalled compactness: fixing very close to the suction pads for short response times.
■ 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.



INTEGRATED FUNCTIONS

1. 3.5 bar Pressure regulator
2. Solenoid valve"vacuum"
3. 3.5 bar optimized Venturi
4. Clog-free silencer
5. Check valve on vacuum
6. Electronic vacuum switch
7. Integrated electronics
8. Solenoid valve"blow-off"
9. Blow-off flow adjustment
10. Isolation valve



Compact integration

The illustrations opposite presents the 10 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 very close to to the suction pads in order to reduce the volume to be emptied➔ short response time.
- **A complete module**, therefore not requiring any additional function or connections.

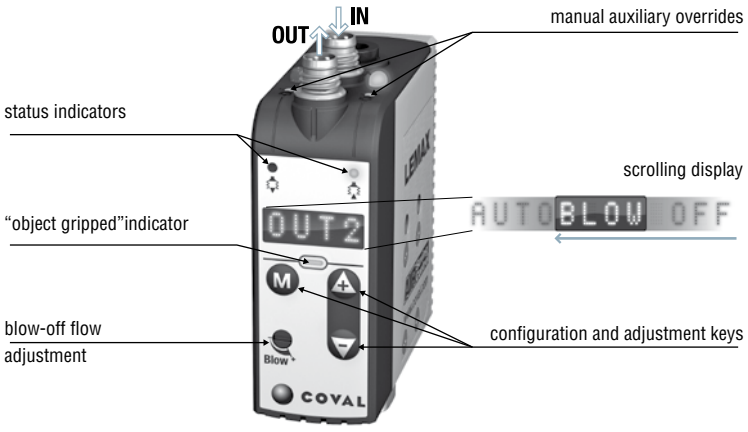
9

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.



ASC (Air Saving Control) operation

“Air Saving Control” Cycle

As illustrated in the adjacent figure, the LEMAX module automatically executes the "ASC", cycle, thus saving the maximum amount of energy, based on the 3 following phases.

1- Gripping the object

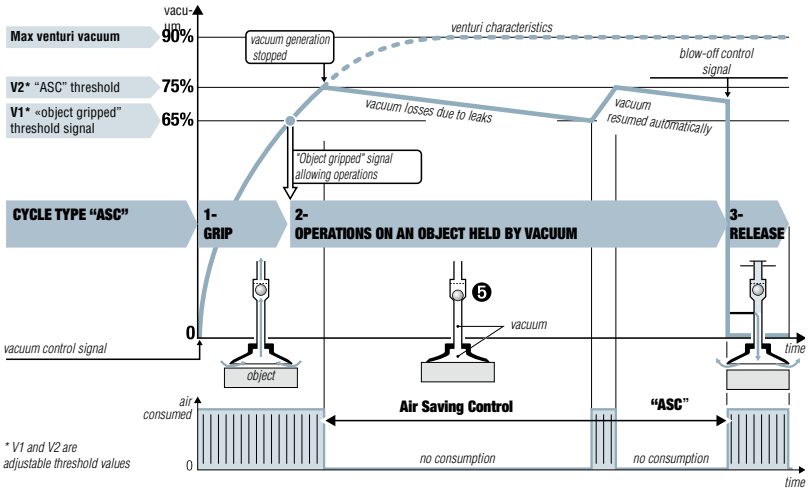
The "vacuum" solenoid ❷ starts the cycle by supplying the venturi ❸ which generates the vacuum to quickly pick up the object with the suction pad ➔ short-term consumption.

2- Operations on the object held by the vacuum

The vacuum level is constantly monitored by the vacuum switch ❻. When it reaches the V1 threshold (65%), the “gripped object” signal is generated, which allows the planned operations (transfer, machining, etc.). When the vacuum reaches threshold V2 (75%), the supply to the venturi via the solenoid valve ❷ is cut ➔ consumption is halted. The object remains held by the vacuum maintained 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 V2 (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 ❿, and, via flow regulation ❾, blows on the object to release it quickly.



“ASC” : AN ADVANTAGE WITHOUT LIMITATIONS

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

1- No specific adjustment
The initial setting (V1 = 65%, V2 = 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.

Resulting savings

Energy savings from “ASC” are major, 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 investment generally pays for itself in just a few months.

1- Grip + transfer *(Ø 1.4 mm nozzle, 0.2 l of vacuum)*

Phase	Duration	Air consumption		
		“ASC” off	“ASC” on	
Grab	0.28 s	0.4 Nl	0.4 Nl	savings made
Transfer	1.20 s	1.8 Nl	0	
Release	0.14 s	0.2 Nl	0.2 Nl	
		2.4 Nl →	0.6 Nl →	75%

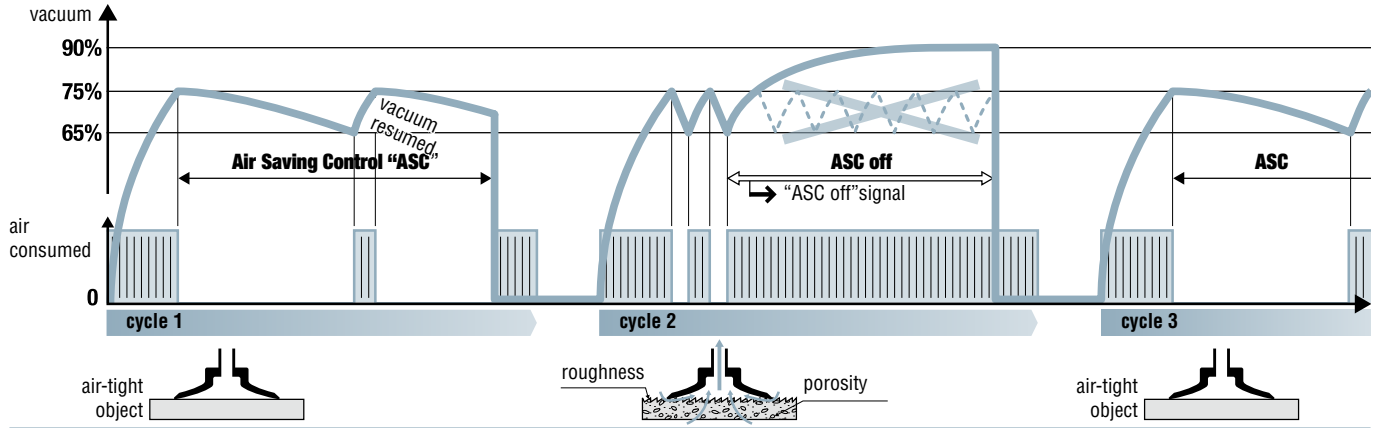
2- Clamping + operations *(Ø 1.4 mm nozzle, 0.4 l of vacuum)*

Phase	Duration	Air consumption		
		“ASC” off	“ASC” on	
Holding	0.55 s	0.8 Nl	0.8 Nl	savings made
Operations	60 s	90 Nl	0	
Release	0.14 s	0.2 Nl	0.2 Nl	
		91 Nl →	1.0 Nl →	99%

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.

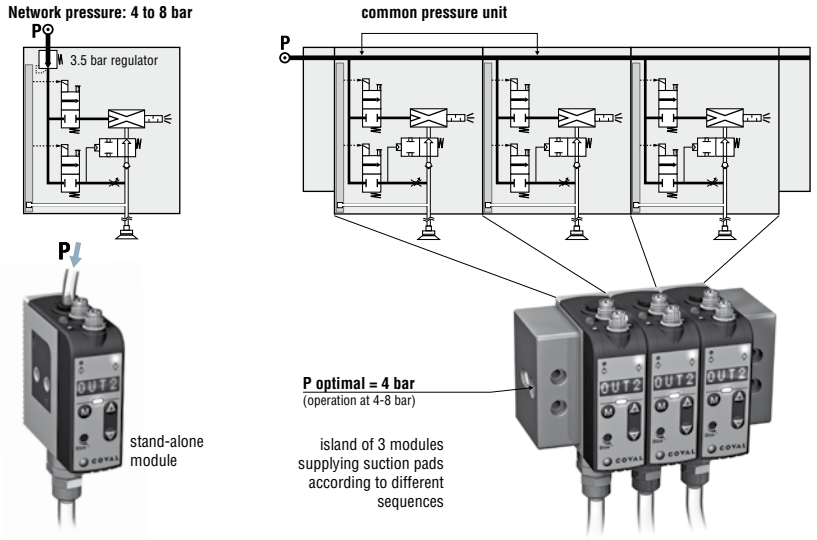


Stand-alone or island modules?

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

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

The illustrations opposite guide the selection:
- autonomous modules are coupled with integrated pressure regulators (see p. 9/8)
- 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 pressure to 4 bar.



Power determined by the venturi nozzle diameter

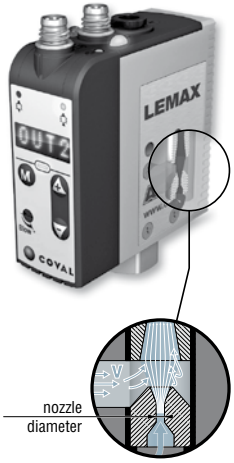
The table shows the power levels generated by each of the nozzle diameters available: when the module is operating "ASC" off, a larger nozzle draws and consumes more compressed air.

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.

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	air consumed	grip time (65% vacuum)	time to 75% vacuum	air consumed
1.4 mm	70 Nl/min	90 Nl/min	0.99 s	1.38 sec	2.2 Nl
1.2 mm	45 Nl/min	65 Nl/min	1.53 sec	2.15 sec	2.2 Nl
1.0 mm	29 Nl/min	44 Nl/min	2.38 sec	3.33 sec	2.2 Nl



9

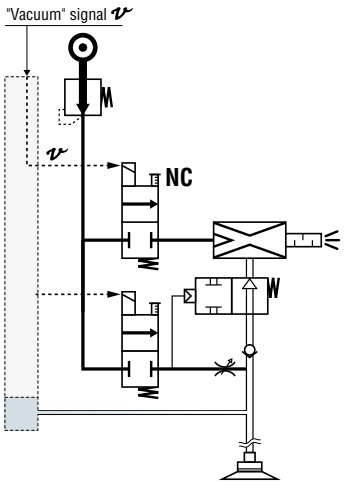
Vacuum control by NC solenoid valve or NO solenoid valve

Vacuum control by NC (Normally Closed) solenoid valve, is the most standard version: in the case of an electrical shut-off, vacuum is no longer generated. 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.

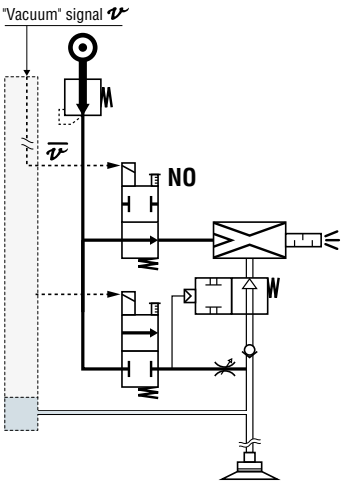
The diagrams opposite show that both versions are controlled by the same "vide" signal v :
The opposite $\overline{v}$ required for control of the NO solenoid valve is automatically obtained internally by the control electronics.

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**



Configuring a vacuum pump

Reference composed of an assembled island or components for an island to be assembled

Reference composed of a stand-alone module

LEMAX	90	X	14	S		B3

VACUUM LEVEL

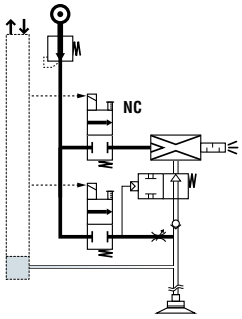
maximum 90% vacuum optimum for air-tight objects	**90**

NOZZLE DIAMETER

ø 1.4 mm nozzle	**14**
ø 1.2 mm nozzle	**12**
ø 1.0 mm nozzle	**10**

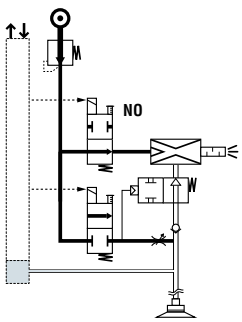
COMPOSITION OF THE MODULE

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 3 sec. (➔ a single control signal vacuum and blow-off)

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



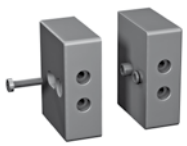
LEMAX90X--**V**--
- In the event of an electrical shut-off, the vacuum continues to be generated: gripped object held
  ➔ positive security
- Blow-off controlled by a specific signal

ISLAND ASSEMBLIES

B2		LEMAX90X___**B2** group assembly with 2 identical modules.
B3		LEMAX90X___**B3** group assembly with 3 identical modules.
B4	...	

If the planned island contains different module types, it must be delivered as separate components in order to then be assembled on site according to the arrangement suitable to the application. (see p. 9/19)

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. **REF : LEMSETA**

9

REFERENCE EXAMPLE COMPOSED OF A STAND-ALONE MODULE:

■ **LEMAX90X14S**
LEMAX, mini vacuum pump, 90% 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 90% max. vacuum modules, ø1.4 mm nozzle, controlled by NC (Normally Closed) solenoid valve.

ORDER EXAMPLE FOR AN ISLAND TO BE ASSEMBLED:

■ **LEMAX90X14VB**
■ **LEMAX90X12SB**
→ 3 LEMAX modules for an island, of different types.

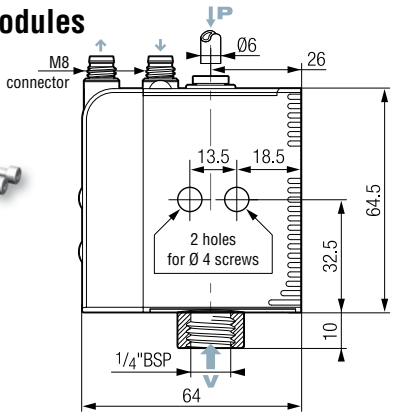
■ **LEMAX90X10VB** → Set of ends for island.

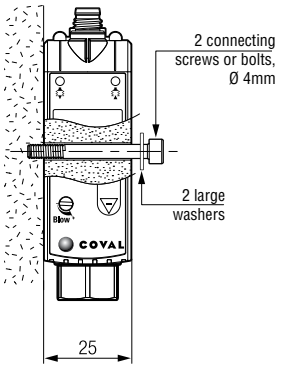
■ **LEMSETA**

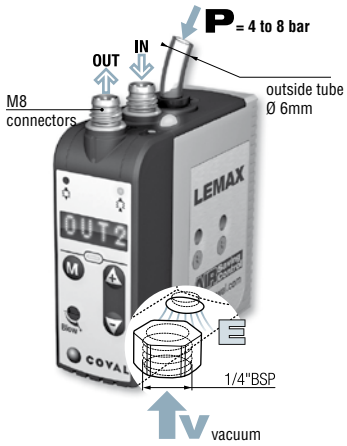
Dimensions
Mounting options

1- Stand-alone modules

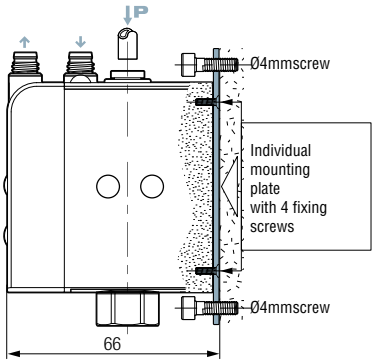
Side mounting

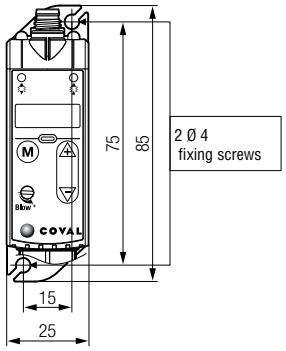






Front mounting

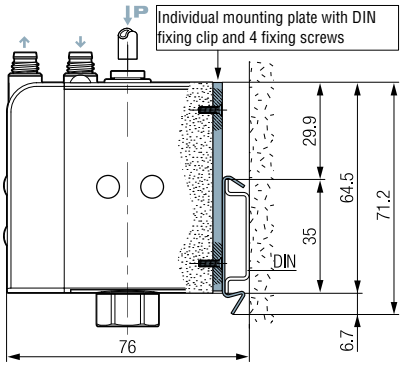


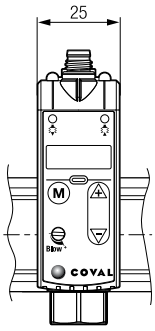


For front mounting, order the necessary kit, in addition to the module:

Front mounitng kit: 1 plate + 4 screws
REF: LEMFIXA

Mounting on DIN rail



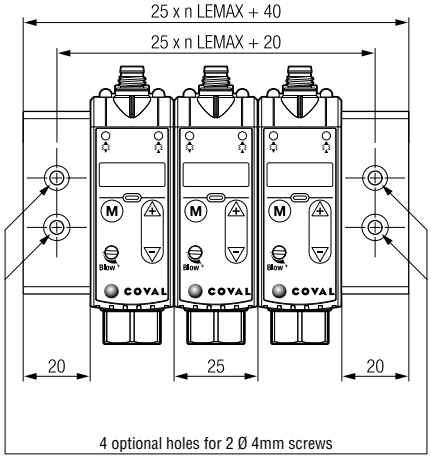


A module can be clipped onto a DIN rail.

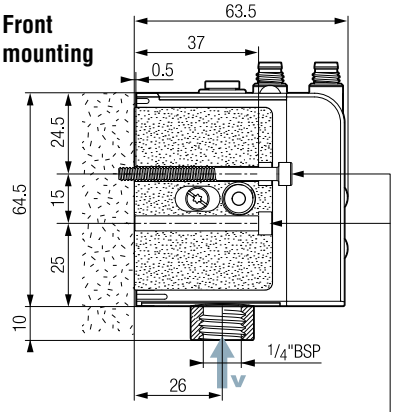
For this purpose, the module must first be equipped with an individual DIN installation plate, ordered separately:

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

2- Islands

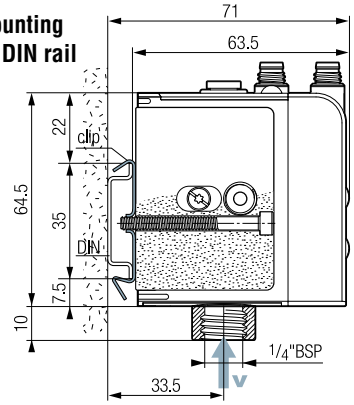


Front mounting



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
REF: LEMFIXC

Overall Characteristics

- Supply: non-lubricated air filtered to 5 microns according to standard ISO 8573-1 class 4.
- Operating pressure: 4 to 8 bar.
- Blow-off: adjustable flow: - stand-alone version: P = 3.5 bar.
  - island version: P network
- Maximum vacuum: 90%.
- Suction rate: 29 to 70 Nl/min.
- Air consumption: 44 to 90 Nl/mn during "ASC off" operation.
- Integrated clog-free silencer.
- Noise level: approximately 68 dBA "ASC off". 0 dBA with ASC.
- Electrical protection level: IP65.
- Max. operating frequency: 4 Hz.
- Endurance: 10 million cycles.
- Weight: 130 g.
- Operating temperature: 10 to 60 °C.
- Materials: PA 6-6 15%FV, brass, aluminium, NBR.

■ **Electrical controls**
- Control voltage: 24 V DC (regulated ± 10%).
- Current draw: 30 mA (0.7 W) vacuum or blow-off.

■ **Integrated electronics**
- Power supply 24V; current draw: <57mA.
- Measuring range: 0 to 99% vacuum.
- Measuring precision: ± 1.5% of the range, compensated in temperature.
- Display: 4 digit red LED matrix.

Service characteristics

■ **"Object gripped" output signal**
- 24 VDC, TOR / NO, switching power: 125 mA PNP.

■ **Configurable auxiliary output,** you can choose from:
- "ASC off" signal, +5 V TOR / NO, or.
- "vacuum level" signal , analogue 1 to 5 VDC of the measuring range.

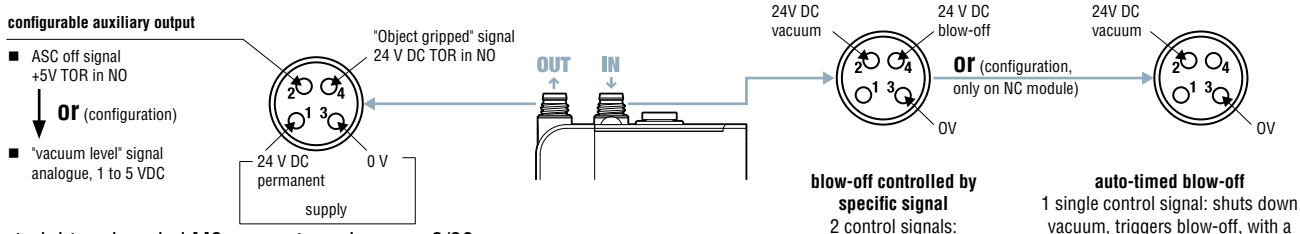
■ **Displays**
- Scrolling display: 4 digit red LED matrix.
- Configurable according to language: FR, ENG, D, IT or ES.
- Flashing if "ASC off" for maintenance.
- Status indicators: "Vacuum," green LED, "blow-off," red LED.
- "Object gripped" indicator: Green LED on front panel.

■ **Settings**
- By mechanical keys and drop-down menu (see page 9/14).
- Language selection.
- Blow-off type selection: controlled or automatic adjustable from 0 to 3 sec.

■ **Settings**
- Display of the number of cycles (vacuum cycle counter).
- If the application requires, specific adjustment of thresholds and hysteresis different from original factory settings (V1=65% H1=10%, V2=75%, H2=10%).

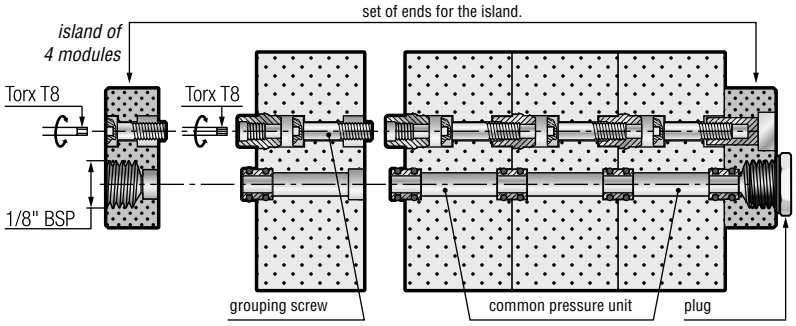
■ **Autoreactivity**
- Constant monitoring of leakage rate: abandon or automatic return to ASC operation.

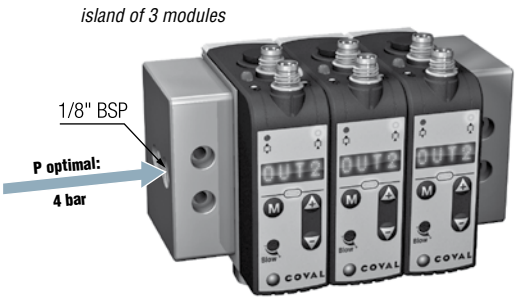
Electrical connections and corresponding configurations



Note: straight and angled M8 connecters shown p. 8/20

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 1.0 mm nozzle ➔ 9 modules

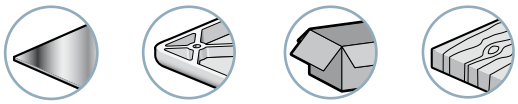
Note: In a single island, it is possible to combine LEMAX series modules and LEM series modules (p. 9/2 - 9/7).

GEM series

twin tech
Integration & Intelligence

Vacuum pump with integrated pressure regulator

Applications



For all objects, porous or air-tight

Advantages

■ " All-in-one " solution, no more peripherals to be added.
■ Simplified installation and use thanks to the Plug & Play system
■ Strong suction rate: up to 385 Nl/min.
■ A GEM for every need: a wide range, many options, and only the necessary functions are chosen.
■ No clogging, thanks to the through-type silencer.
■ Controlled or timed blow-off.
■ Smart dialogue ➔ User friendly at all stages: initial settings, production, maintenance.

Compact integration

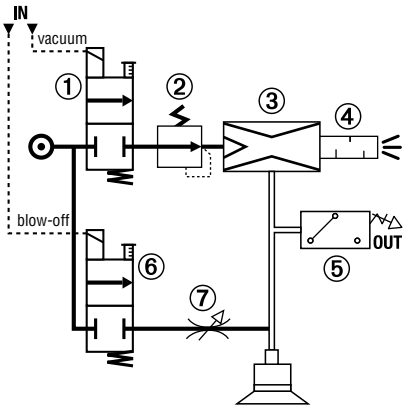
The illustrations below present the 7 functions integrated in the vacuum pump and their respective roles in operation.

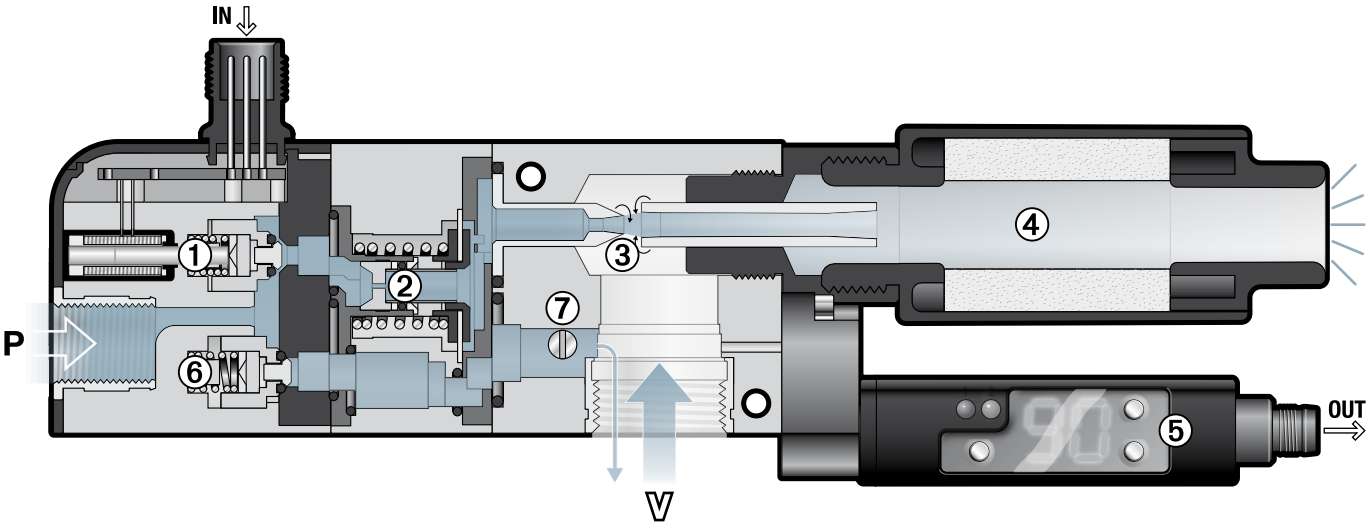
The result of COVAL's innovation is:
-**A compact vacuum pump** that is easy to install as close as possible to the vacuum pads in order to reduce the volume to purge➔ speed and energy savings.

- **A complete vacuum pump** (including integrated pressure regulator and clog-free silencer), therefore not requiring any additional function or connection.

INTEGRATED FUNCTIONS

1. Solenoid valve"vacuum"
2. 3.5 bar Pressure regulator
3. 3.5 bar optimized Venturi
4. Clog-free silencer
5. Electronic vacuum switch
6. Solenoid valve "blow-off"
7. Blow-off flow adjustment



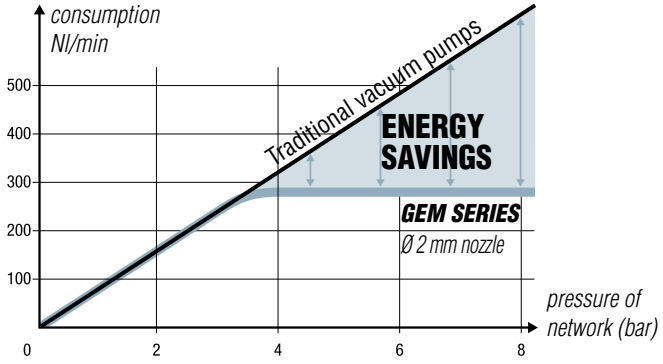


Integrated Regulation

The 4-8 bar air network is automatically reduced internally, to 3.5 bar, the optimum pressure for the venturi - Two key advantages:

1- Energy savings
The adjacent graph shows this savings in air consumed, for any network at a pressure higher than 4 bar.

2- Integrated clog-free silencer
At the venturi exhaust, the pressure does not depend on the air network pressure. Totally controlled, it allows for the integration of an open silencer: this silencer is clog-free, thus requiring no maintenance.



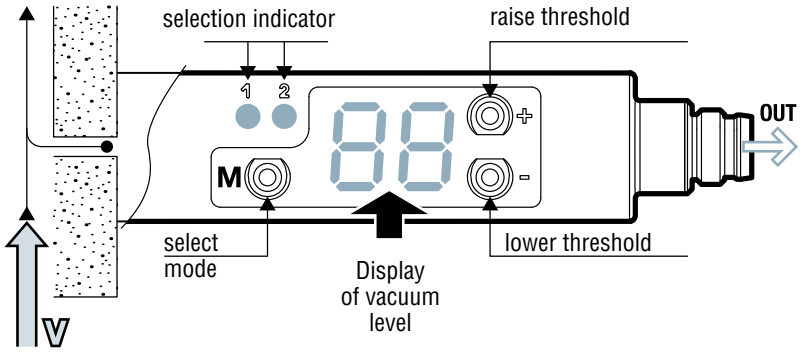
COVAL
vacuum managers

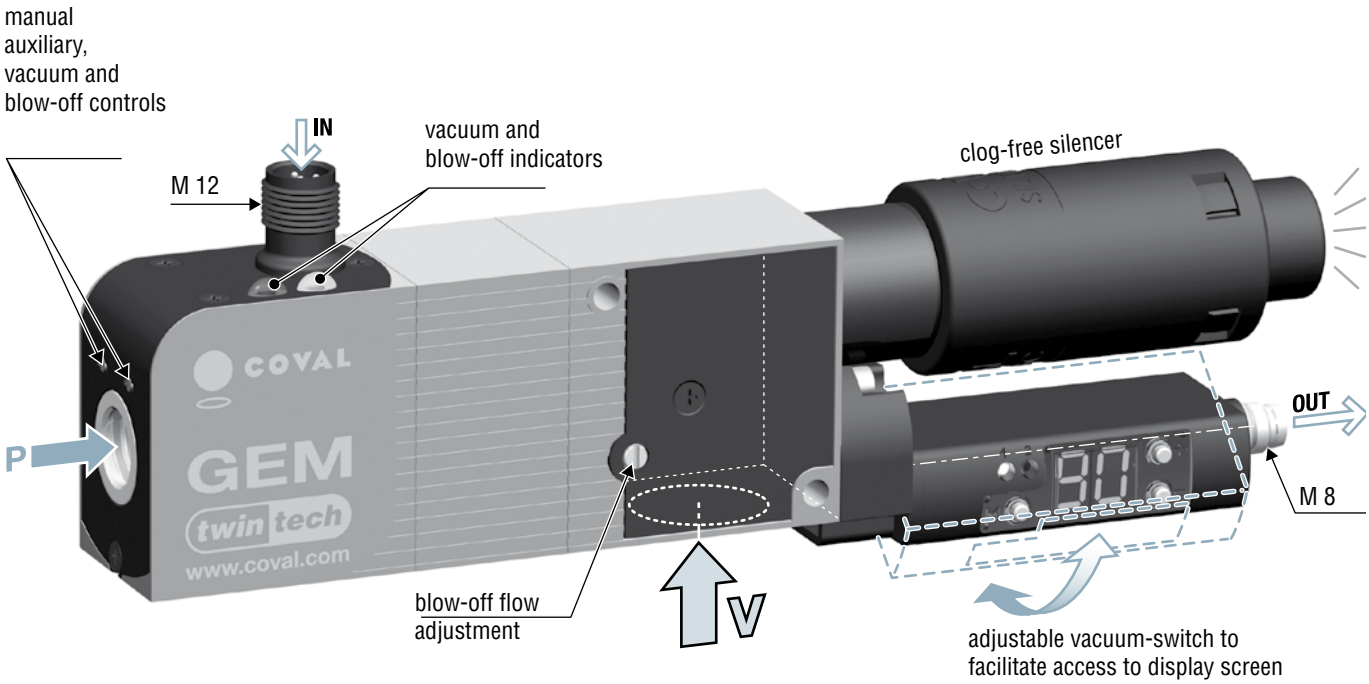
Programmable vacuum switch with display

In its version with electronic vacuum switch with display, GEM presents a particularly high-performance smart dialogue.

The vacuum switch (figure opposite) measures the vacuum level measured at the input V connected to the vacuum pads and operates it as follows:

- Real-time display for monitoring production.
- Adjustment of the vacuum level generating the "object gripped" signal allowing operations to continue.





Adjustable face for easy access

Mounted as close as possible to the vacuum pads, the GEM vacuum pump can take on various positions.

Depending on the position selected for the pump, the vacuum switch can be oriented so as to optimize access to its display screen. The different orientations possible are described (p. 9/19).

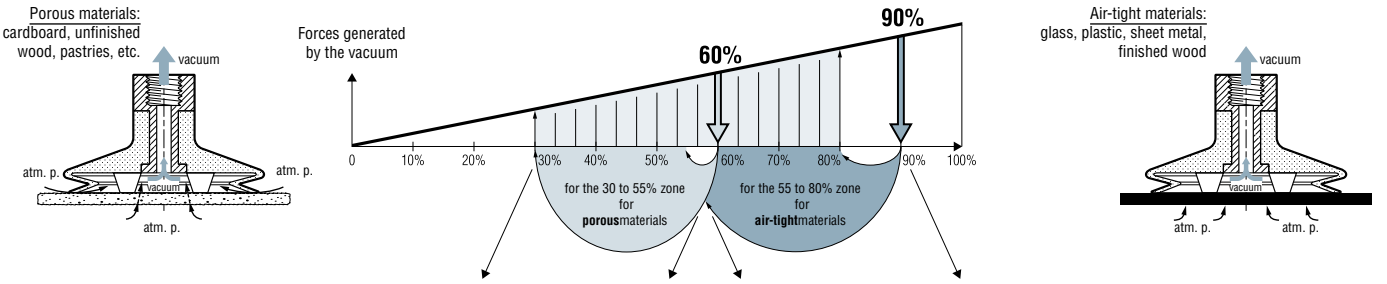
1- Select "maximum vacuum level / nozzle diameter"

The introductory guide in this catalogue 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 basic nozzle diameter which generates enough vacuum flow to respond in the time required by the application, based on a measurement of the material's leakage rate.

On the contrary, with air-tight objects, the economical and effective vacuum used is 55% to 80%, obtained by a 90% max. vacuum pump.

The table below then helps to select the nozzle diameter which generates enough vacuum flow to respond in the time required by the application.



Porous objects ▸ maximum vacuum level: 60%

Time to create vacuum *(seconds)* for a volume of 1 liter								Air consumed *(Nl/min)*	Air drawn in *(Nl/min)*
vacuum achieved / *ø nozzle*		30%	35%	40%	45%	50%	55%		
also see LEM	1.2 mm	0.35	0.43	0.55	0.72	0.9	1.09	65	72
	1.5 mm	0.23	0.25	0.36	0.46	0.59	0.73	97	110
	2 mm	0.13	0.16	0.21	0.27	0.34	0.42	179	189
	2.5 mm	0.09	0.11	0.14	0.18	0.24	0.31	260	275
	3mm	0.07	0.08	0.10	0.13	0.17	0.22	385	385

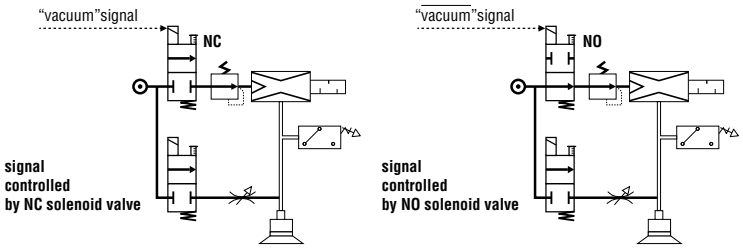
Air-tight objects ▸ maximum vacuum level: 90%

Time to create vacuum *(seconds)* for a volume of 1 liter								Air consumed *(Nl/min)*	Air drawn in *(Nl/min)*
vacuum achieved / *ø nozzle*		55%	60%	65%	70%	75%	80%		
also see LEMAX	1.2 mm	1.01	1.19	1.40	1.62	1.98	2.37	65	50
	1.5 mm	0.66	0.73	0.93	1.08	1.33	1.59	97	75
	2 mm	0.38	0.46	0.55	0.65	0.80	0.95	179	125
	2.5 mm	0.26	0.30	0.35	0.41	0.50	0.59	260	200
	3mm	0.21	0.24	0.28	0.33	0.40	0.48	385	245

2- Select vacuum controlled by NC solenoid valve or NO solenoid valve

The vacuum controlled by the NC (Normally Closed) solenoid valve remains the simplest standard option to use. In the event of an electricity shut-off, 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 the “vacuum”signal, which is noted as “$\overline{\text{vacuum}}$”.

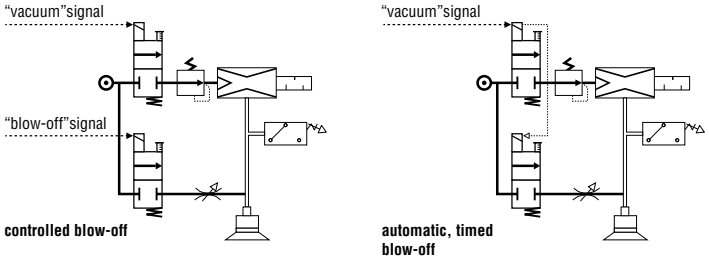


3- Select blow-off control

The GEM range offers a choice between 2 types of blow-off control:

- **Controlled blow-off**
  A specific signal controls blow-off, out of 2 control signals, “vacuum” and “blow-off” .
- **Automatic, timed blow-off**
  Interruption of the”vacuum” signal automatically triggers blow-off, the duration of which is adjustable from 0 to 3 seconds.

In both cases, flow is adjustable by a screw



4- Select a vacuum-switch type

In addition to the electronic vacuum switch with display that supplies the full smart dialogue described on the previous page, the GEM range offers a selection of simplified vacuum switches for certain applications ➔see their descriptions p. 9/19.

Configuring a vacuum pump

Composite part numbers

GEM	90	X	12	S		VA

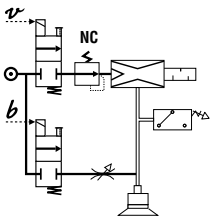
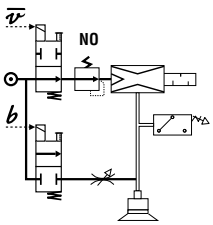
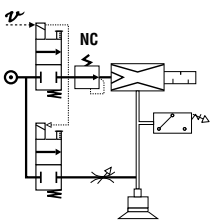
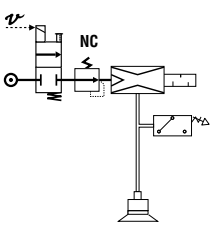
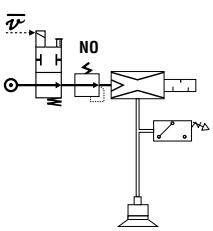
VACUUM LEVEL

maximum 60% vacuum optimum for porous objects	**60**
maximum 90% vacuum optimum for air-tight objects	**90**

NOZZLE DIAMETER

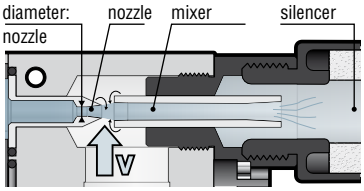
ø **1.2 mm nozzle**	**12**
ø **1.5 mm nozzle**	**15**
ø **2 mm nozzle**	**20**
ø **2.5 mm nozzle**	**25**
ø **3 mm nozzle**	**30**

COMPOSITION OF THE MODULE

S	■ Vacuum controlled by an NC solenoid valve ■ Controlled blow-off ➔ 2 control signals	
V	■ Vacuum controlled by an NO solenoid valve ■ Controlled blow-off ➔ 2 control signals	
T	■ Vacuum controlled by an NC solenoid valve ■ Automatic, timed blow-off ➔ 1 single control signal	
R	■ Vacuum controlled by an NC solenoid valve ■ No blow-off ➔ 1 single control signal	
U	■ Vacuum controlled by an NO solenoid valve ■ No blow-off ➔ 1 single control signal	

VACUUM SWITCH

VA	**Electronic vacuum switch with display** 2 outputs on M8 connector
VB	**Electronic vacuum switch** 1 output on M8 connector
VC	**Vacuum switch with electrical contact** 1 output on M12 connector
VO	**No vacuum switch**



Venturi: max. vacuum level and nozzle diameter.

The stream of compressed air draws on ambient air, which generates the vacuum.

- The mixer determines the maximum vacuum level: 60% or 90%.
- The nozzle diameter determines the power expressed in vacuum flow rate and in air flow consumed, on the tables on the previous page.

COMPLETE REFERENCE EXAMPLES:

GEM60X30SVA

GEM vacuum pump, 60% max. vacuum, 3 mm nozzle diameter, vacuum controlled by NC solenoid valve and blow-off controlled by external signal, electronic vacuum-switch with display.

GEM90X20VVA

GEM vacuum pump, 90% max. vacuum, 2mm nozzle diameter, vacuum controlled by NO solenoid valve and blow-off controlled by external signal, electronic vacuum-switch with display.

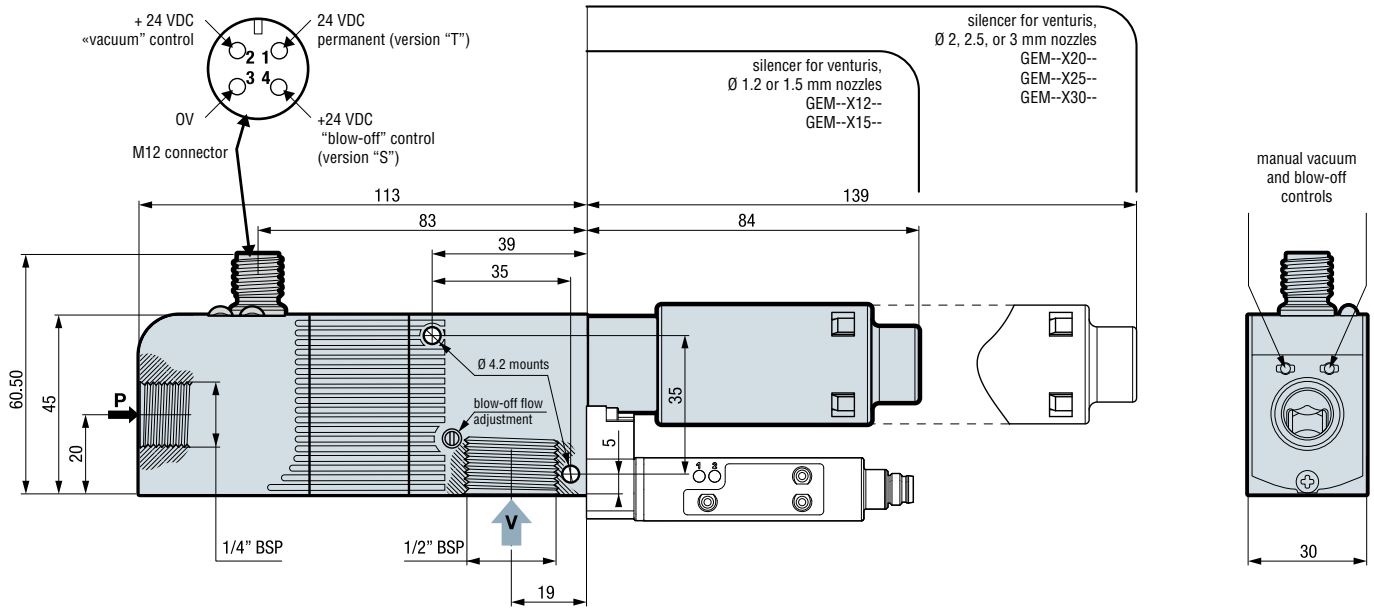
Characteristics and dimensions

(excluding vacuum switch)

Overall Characteristics

- Supply: non-lubricated air filtered to 5 microns according to standard ISO 8573-1 class 4.
- Electrical protection level: IP65.
- Optimum operating pressure: 4 to 8 bar.
- Blow-off: - network supply pressure,
  - adjustable flow
- Maximum vacuum: 60% or 90% depending on model.
- Suction rate: 50 to 385 Nl/min depending on model.
- Air consumption: 65 to 385 Nl/min depending on model.
- Noise level: depending on the nozzle diameter selected:
  - ø 1.2, 1.5, and 2mm nozzle → 57 dBA
  - ø 2.5 mm nozzle → 65 dBA
  - ø 3 mm nozzle → 67 dBA
- Control voltage: 24 V DC (regulated ± 10%).
- Current draw: 30 mA (0.7 W) vacuum or blow-off.
- Max. operating frequency: 2 Hz.
- Number of operations: 10 million cycles.
- Weight: 250 g (depending on version).
- Materials: PA 6-6 15% FV, POM, PC 15% FV, brass, aluminum, NBR.
- Operating temperature: 10 to 60 °C

Dimensions and connections

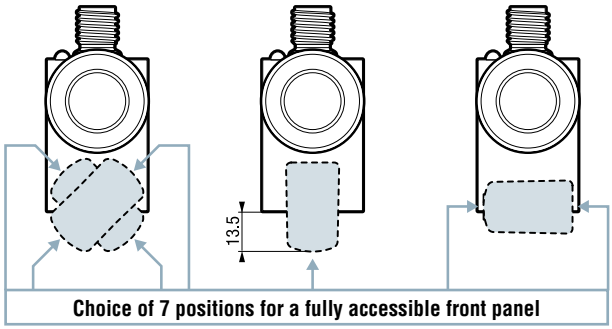


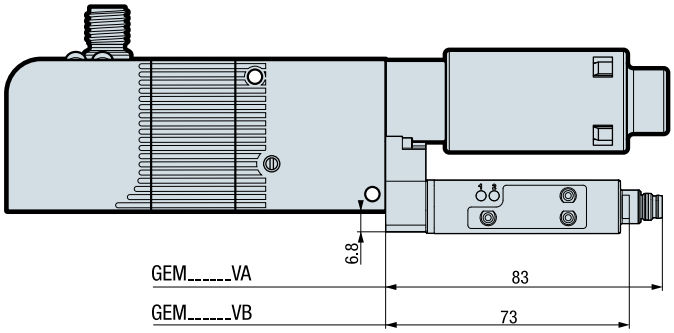
Note: Straight and angled M8 and M12 connectors shown (p. 8/14).

GEM series

Vacuum switch functions and connections

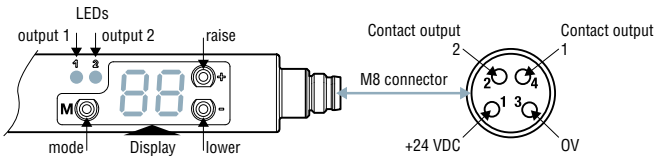
1 - Modules with electronic indexable vacuum switch GEM------**VA** or GEM------**VB**

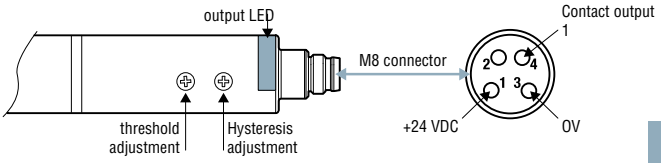




VACUUM SWITCH WITH DISPLAY, 2 OUTPUTS, GEM------VA
- compatible fluids: non-corrosive gas, dry, non-lubricated air.
- measuring range: -1 ... 0 bar
- hysteresis: configurable from 0 to 99%.
- maximum overpressure:: 3 bar.
- repetitivity: +/- 1% of the range.
- output thresholds: 2 x NO / NC.
- switching power: 125 mA transistor PNP
- threshold status display: 2 x LEDs.
- display unit: % vacuum (2 digits).
- Electrical connection: M8 (4 pins).
- supply voltage: 18 - 30 VDC (regulated).
- current draw: < 100 mA.
- protection level: IP65.
- working temperature: 0 to 50 °C

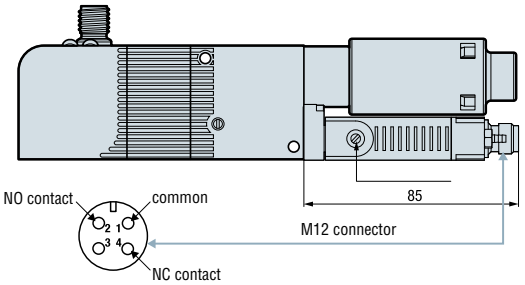
ELECTRONIC VACUUM SWITCH, 1 OUTPUT, GEM------VB
- compatible fluids: non-corrosive gas, dry, non-lubricated air.
- measuring range: -1 ... 0 bar
- hysteresis: configurable from 0 to 30%.
- maximum overpressure: 3 bar.
- repetitivity: +/- 1% of the range.
- output thresholds: 1 x NO.
- switching power: 125 mA transistor PNP
- threshold status display: 1 x LED.
- Electrical connection: M8 (4 poles).
- supply voltage: 18 - 30 VDC (regulated).
- current draw: < 20 mA.
- protection level: IP50.
- working temperature: 0 to 50 °C





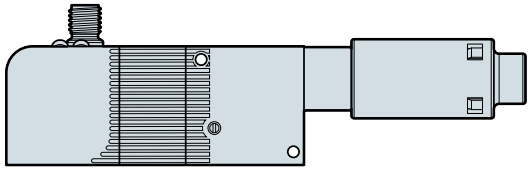
2 - Modules with electrical contact vacuum switch GEM------**VC**

CONTACT VACUUM SWITCH, GEM------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.
- output thresholds: 1 x NO, 1 x NC.
- switching power: 3 A (breaker)-
- Electrical connection: M12 (4 poles).
- supply voltage: up to 125 V.
- protection level: IP40.
- working temperature: -10 to 50° C.
- number of operations: 5 million cycles.
- maximum throughput: 30 cycles per minute.



3 - Modules without vacuum switch GEM------**V0**

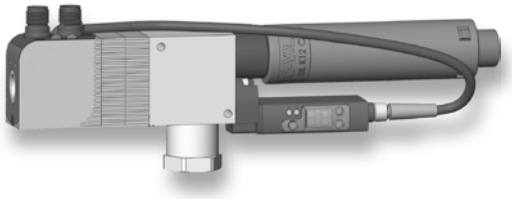
This model without vacuum switch must be accompanied by an independent vacuum switch on the vacuum circuit or a vacuum gauge for manually-controlled vacuum capacity.



Note:
Screw-on electrical connectors, straight and angled M8 and M12
shown (p. 8/14).

9

Self-regulating vacuum pumps GVMAX series



Description

COVAL's innovative GVMAX series of pumps are designed for gripping, handling and retaining air-tight objects.

The principle is simple: as soon as the required level of vacuum is reached, the compressed air supply is stopped and the vacuum is maintained in the installation thanks to the check valve. Thus, the self-regulating system guarantees an optimum level of vacuum.

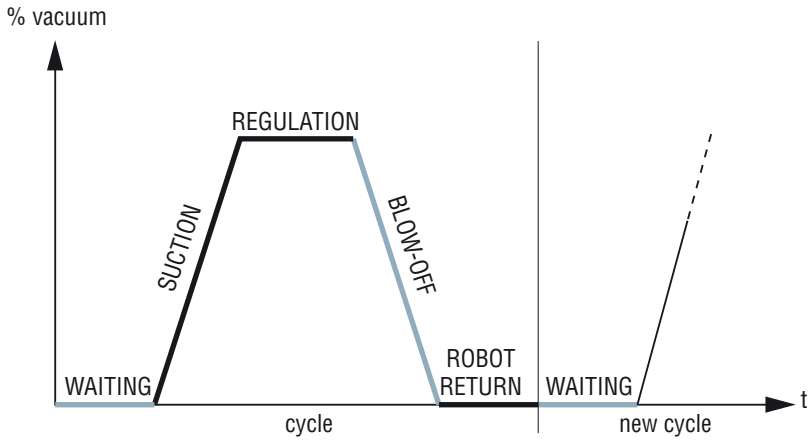
This approach considerably reduces both compressed air consumption and the noise level. Moreover, thanks to their intelligent functions, they guarantee safety and optimum vacuum management for the application. COVAL recommends these pumps for applications involving air-tight objects.

The specific functions of vacuum-regulating vacuum pumps

They have the following characteristics:

- Vacuum generation by venturi effect (maximum pressure drop - 900mbar or 90% vacuum).
- Air-saving, vacuum-regulating function.
- Adjustable blow-off.
- Visual and switching output control of vacuum level by digital electronic vacuum switch.
- Positive safety holds objects in case of electrical emergency stop (electrical outlets switched off) via its NO vacuum supply valve, maintenance can be carried out in complete safety.

Operating principle of a GVMAX series vacuum pump



The cycle shows the three stages of a GVMAX: Waiting - Suction - Blow-off.

Regulation is automatically performed by the equipment's internal loop. The interest of the GVMAX vacuum pump is based on these three stages:

- Waiting: no consumption, no clogging, no noise.
- Suction-regulation: the object is gripped and the vacuum pump automatically stops.
- Blow-off: automatically timed for release and return to neutral position in readiness for the next cycle.

Note: in addition to silent operation and energy savings, status 1 allows to perform the operation without an upstream solenoid valve cutting off the air inlet in "waiting" mode.

Self-regulating vacuum pumps GVMAX series

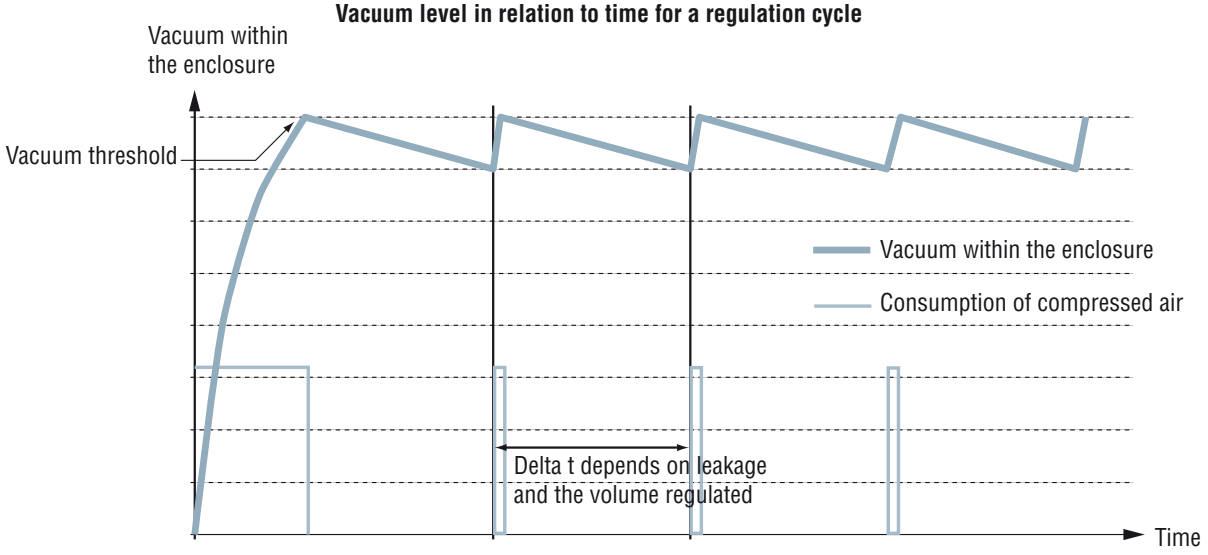
Regulating system in an air-saving vacuum pump

The GVMAX vacuum pump is designed to save compressed air during a gripping cycle. The equipment stops consuming compressed air when the vacuum threshold pre-set in the vacuum switch is reached in the network. This is known as "regulation".

The curve below shows the regulating system of a vacuum pump. As soon as optimum vacuum (vacuum threshold 1) is reached, the pumps maintain the vacuum until the level of vacuum descends to the hysteresis value after a period of time "t" due to leakage.

The self-regulating system guarantees that an optimum level of vacuum is maintained and reduces both air consumption and the noise level throughout the cycle.

Vacuum level in relation to time for a regulation cycle



GVMAX vacuum pump yield

Volume of air consumed and time to create a vacuum in a 5 liter tank with a 4 bar GVMAX vacuum pump:

vacuum (%)	time to create a vacuum (s)	air consumed (Nl)
10	0.2	0.9
20	0.3	1.8
30	0.6	2.9
40	0.8	4.2
50	1.1	5.9
60	1.5	7.8
70	2.1	10.9
80	3.0	15.7
85	4.0	21.0

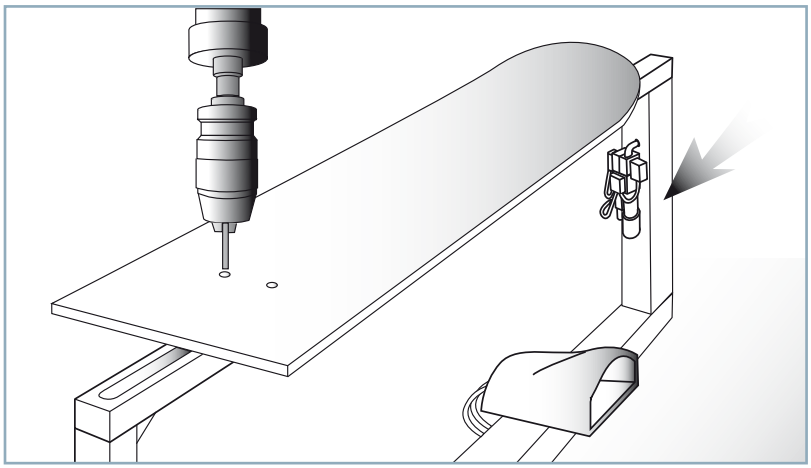
Self-regulating vacuum pumps GVMAX series

Holding

During the final phase of manufacture a snowboard must be held in position for many minutes.

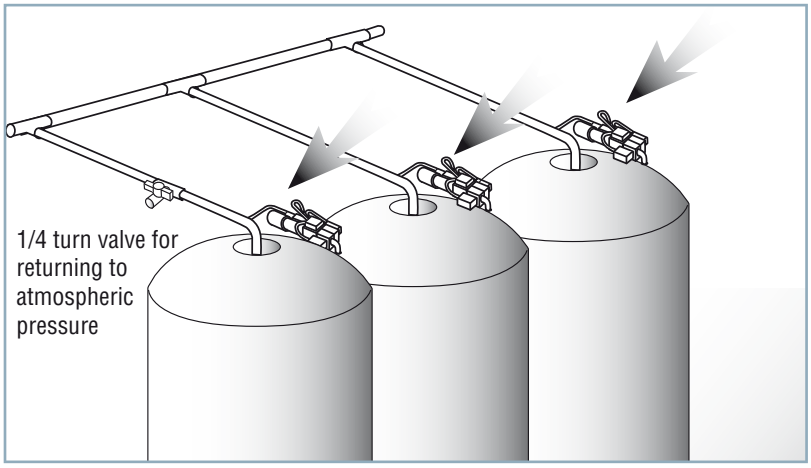
Using vacuum pumps with air-saving function generates significant energy savings.

Also see the LEMAX series, pages 9/8 - 9/13.



Emptying a tank

The regulation function of the vacuum pumps are used in this type of application. Hysteresis of the switching output regulation is adjustable between 1 and 25% vacuum on electric models.



Note: For regulation of the vacuum level in tanks of more than 10 liters, consult us for the pneumatic versions.

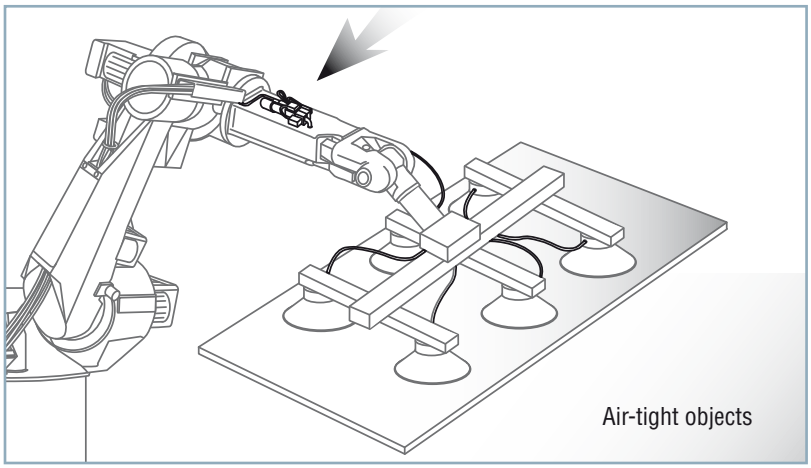
Grip is maintained safely

■ Electric GVMAX

Grip is maintained on the object (air-tight object) if there is a power failure.

■ Pneumatic GVMAX

Grip is maintained on the object (air-tight object) if the pneumatic power is interrupted.



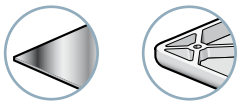
Grip is maintained if the electrical power or compressed air supply is interrupted.

GVMAX V3 series

Self-regulating vacuum pumps

(electric vacuum and blow-off control)

Branch-specific applications



Applications

The two solutions, GVMAX SP345V3 and GVMAX SP345V3R are used for gripping air-tight objects in the stamping, sheet-metal/bodywork and mounting industries for handling, transfer and holding operations. The GVMAX SP345V3 was designed and developed for the Automotive sector.

Presentation

The GVMAXSP345V3/V3R series of vacuum pumps feature the Twintech™ technology combining Intelligence and Integration.

These pumps provide an "all-in-one" solution integrating all the required functions, such as pressure regulators, controls, valves, vacuum regulation, powerful integrated blow-off, Object presence detection by vacuum switch and silencer in a single compact, light-weight module.
The M12 connections dramatically simplify installation and use. They are available in two versions:

- GVMAXSP345V3: non-adjustable vacuum switch (factory configured)
- GVMAXSP345V3R: adjustable vacuum switch

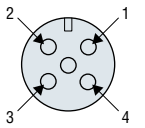
Characteristics

model	Ø nozzle (mm)	maximum vacuum (%)	flow consumed at 4 bar (Nl/s)	max. suction power (Nl/min)	dynamic supply pressure	(g)
GVMAX SP345V3/V3R	3	90	6.4	245	5 bar relative pressure	450

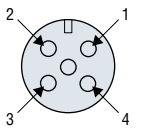
Evacuation time in seconds per liter

% vacuum	10	20	30	40	50	60	70	80	85
GVMAX SP345V3/V3R	0.03	0.06	0.09	0.13	0.18	0.24	0.33	0.48	0.64

Electrical connections



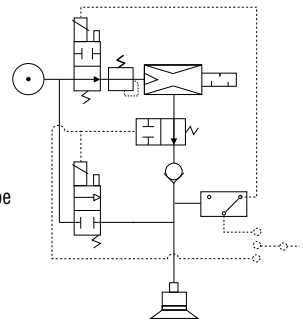
- Automaton inlet
5-pole M12 connector
(1) Inlet connector - brown, 24 V DC
(3) 0 Volt (or –) - blue
(4) Vacuum switch threshold 2 outlet - black



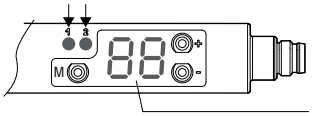
- Automaton outlet
5-pole M12 connector
(2) Blow-off control - white, 24 V DC
(4) Vacuum immobilization in waiting position (neutral position) - black, 24 V DC

- Pneumatic supply maintained on the "compressed air" inlet of the vacuum pump.

- Electric power supply
Suction:
24V DC N.O. solenoid valve.
From rest to suction (must be powered to stop suction).
Blow-off:
24V DC N.C. solenoid valve



Red LED Green LED



2 digit display in % vacuum(e.g. 75 for 75% vacuum)

Advantages

- Safety: vacuum generation in case of power failure by air inlet solenoid valve in normally open operation (24 V DC).
- Strong suction reduces time to create a vacuum.
- Powerful, controllable integral blow-off.
- Data processing circuit (connection cable)
- Connection by 2 male 5 pin M12 connectors, (Input/ Output)
- Integrated pressure regulator.
- Silent operation
- Non-adjustable vacuum switch with the GVMAX SP345 V3 and adjustable vacuum switch with the GVMAX SP345 V3R.
- In case of interruption in the network supply pressure, the vacuum network is brought to atmosphere.

Specifications

Base body	Aluminum (AU 4 PB)
Valve body	POM (black polyacethal)
Silencer	Black PC with felt internal element
Vacuum switch	PA66, PC, brass, NBR seal
Electric wiring	PA66
Screw	Zinc-plated steel
Inside parts	Brass; Aluminum; Desmopan
Seals	NBR
Membrane	NBR with nylon substrate
Protection level	IP 65

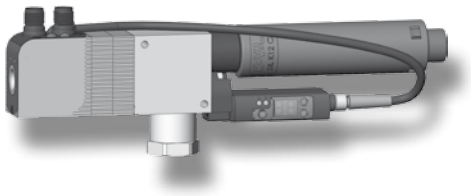
Vacuum switch display legibility

The GVMAX is fitted with an indexable vacuum switch (45°, 90°, 180°). This vacuum switch is set to the following values (values used in the automotive industry): 65% (object present) and 75% (regulation).

For all orders, please specify: **GVMAX SP345 V3** (Non-adjustable vacuum switch)
GVMAX SP345 V3R (Adjustable vacuum switch)

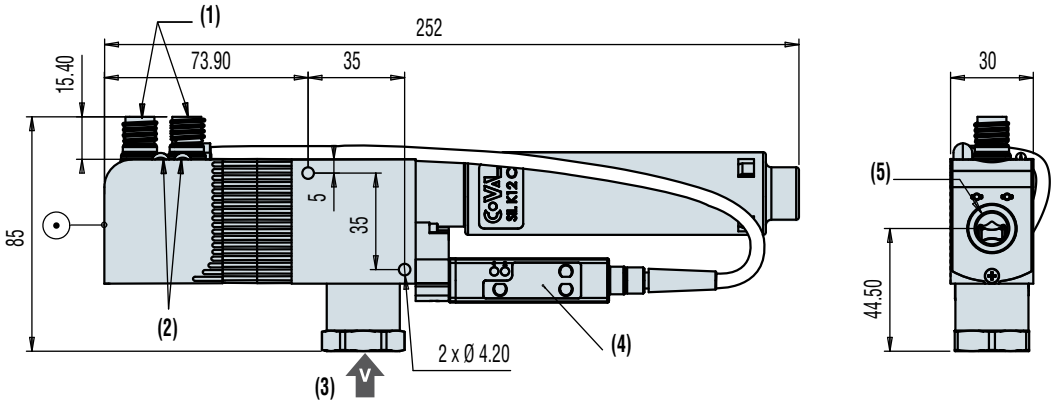
GVMAX V3 series

Dimensions
Curves
Options

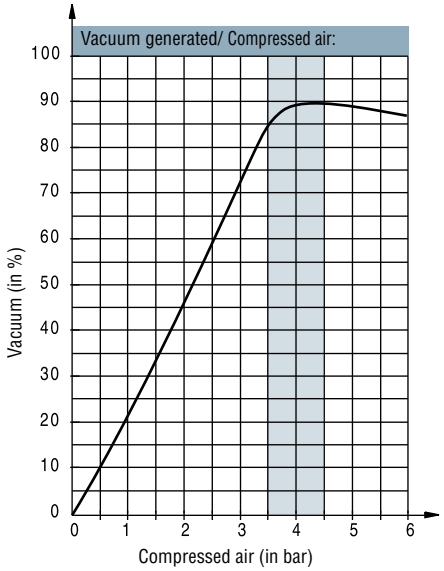


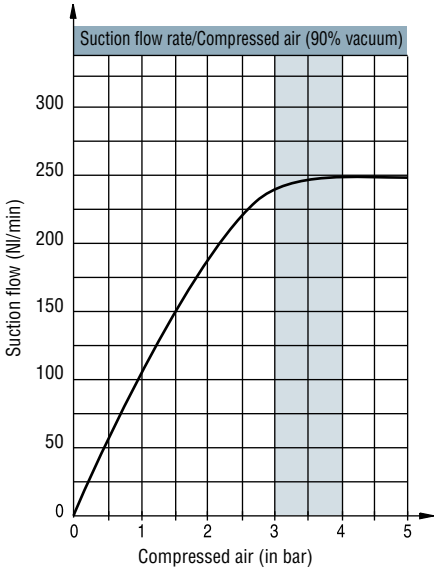
Dimensions

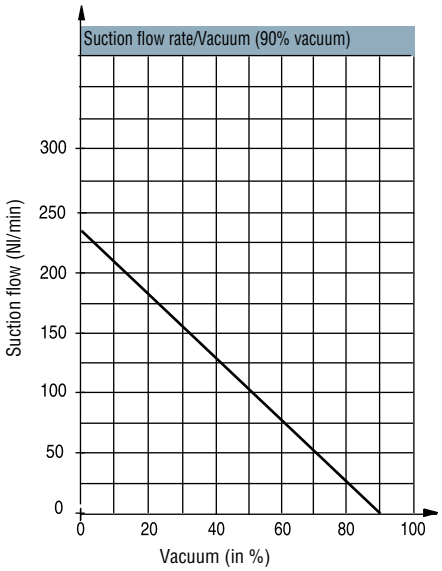
(1) 5-pole M12 connector automation input and output
(2) Blow-off and vacuum display LED
(3) Vacuum 1/2 Gas
(4) PSA100 B or BU
(5) Compressed air network inlet 1/4G (5 to 8 bar)

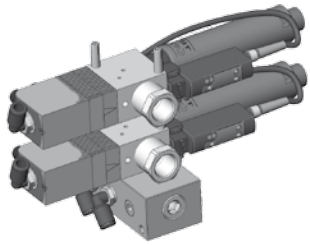


Curves

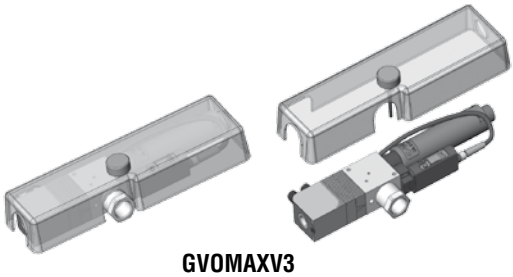








GVMAX SP 345V3 B2



GVOMAXV3

Options

■ Manifold mounting

The GVMAXSP345V3 and V3R can also be manifold-mounted.

Up to 4 vacuum pumps can be installed on one base.

Manifold references (example with GVMAX SP 345 V3)
GVMAX SP 345V3 B1 (Base + 1 x GVMAX SP 345V3)
GVMAX SP 345V3 B2 (Base + 2 x GVMAX SP 345V3)
GVMAX SP 345V3 B3 (Base + 3 x GVMAX SP 345V3)
GVMAX SP 345V3 B4 (Base + 4 x GVMAX SP 345V3)

Also see the new Quick Change, GVOQC1, page 9/30.

■ Protective housing for GVMAX SP345V3/V3R, ref. GVOMAXV3

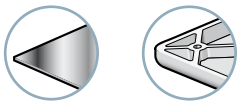
The protective housing for the GVMAX is transparent and removable. Coval recommends using a protective housing to protect the vacuum pump.

GVMAX V2 series

Self-regulating vacuum pumps

(electric vacuum and blow-off control)

Branch-specific applications



Description

With GVMAXSP345 V2 and GVMAX SP345 V2R, COVAL offers two types of solutions based on a standard GVMAX electric vacuum pump. The GVMAXSP345V2 type vacuum pump is fitted with the non-adjustable PSA 100BU vacuum switch (factory set) and GVMAXSP345V2R regulated vacuum pump fitted with the PSA 100B adjustable vacuum switch.
Principle of self-regulation, see pages 9/20 to 9/22.

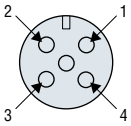
Characteristics

model	Ø nozzle (mm)	maximum vacuum (%)	flow consumed at 4 bar (Nl/s)	max. suction power (Nl/min)	dynamic supply pressure	(g)
GVMAX SP345V2	2.5	90	4.5	200	4 bar relative pressure	550
GVMAX SP345V2R	2.5	90	4.5	200	4 bar relative pressure	550

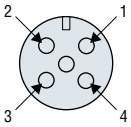
Applications

The two solutions, GVMAX SP345 V2 and GVMAX SP345V2R are used for gripping air-tight objects in the stamping, sheet-metal/bodywork and mounting industries for handling, transfer and holding operations. The GVMAXSP345 V2/V2R is designed for the Automotive sector.

Electrical connections



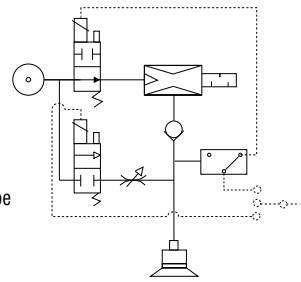
■ Automaton inlet
5-pole M12 connector
(1) Inlet connector - brown, 24 V DC
(3) 0 Volt (or –) - blue
(4) Vacuum switch threshold 2 outlet - black



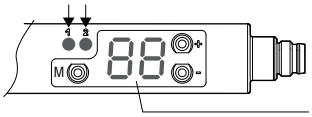
■ Automaton outlet
5-pole M12 connector
(2) Blow-off control - white, 24 V DC
(3) 0 Volt (or –) - blue
(4) Vacuum immobilization in waiting position (neutral position) - black, 24 V DC

■ Pneumatic supply maintained on the "compressed air" inlet of the vacuum pump.

■ Electric power supply
Suction:
24V DC N.O. solenoid valve.
From rest to suction (must be powered to stop suction).
Blow-off:24V DC N.C. solenoid valve



Red LED Green LED



2 digit display in % vacuum(e.g. 75 for 75% vacuum)

Evacuation time in seconds per liter

% vacuum	10	20	30	40	50	60	70	80	85
GVMAX SP345V2/V2R	0.03	0.07	0.11	0.16	0.22	0.30	0.41	0.60	0.77

Advantages

In relation to the standard GVMAX, the GVMAX SP345 V2 and GVMAX SP345 V2R solutions offer the following advantages:
■ Safety: vacuum generation in case of power failure by air inlet solenoid valve in normally open operation (24 V DC).
■ Powerful, controllable blow-off.
■ Data processing circuit (connection cable)
■ Connection by 2 male 5 pin M12 connectors, (Input/ Output)
■ Non-adjustable vacuum switch (factory-set) with the GVMAX SP345 V2 and adjustable vacuum switch with the GVMAX SP345 V2R.

Specifications

Base body	Aluminum (AU 4 PB)
Valve body	POM (black polyacethal)
Silencer	Black PC with felt internal element
Vacuum switch	PA66, PC, brass, NBR seal
Electric wiring	PA66
Screw	Zinc-plated steel
Inside parts	Brass; Aluminum; Desmopan
Seals	NBR
Membrane	NBR with nylon substrate

Vacuum switch display legibility

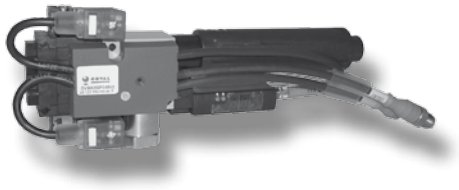
The GVMAX is fitted with an indexable vacuum switch (45°, 90°, 180°). This vacuum switch is set to the following values (values used in the automotive industry):

GVMAX SP345 V2 or V2R	Function	Threshold	Hysteresis
Threshold 1: vacuum regulation	NO	H1: 75 %	h1: 10 %
Threshold 2: object detected	NO	H2: 65 %	h2: 10 %

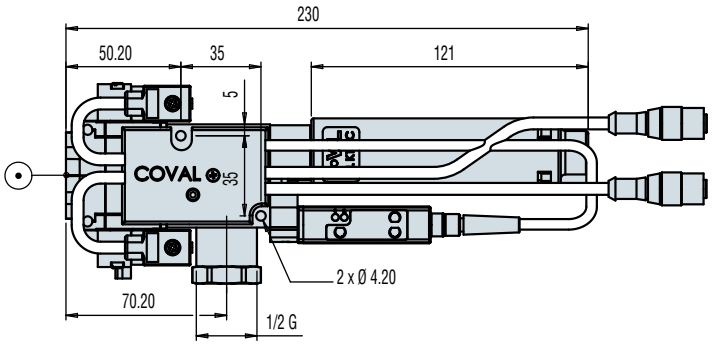
For all orders, please specify: **GVMAX SP345 V2** (Non-adjustable vacuum switch)
GVMAX SP345 V2R (Adjustable vacuum switch)

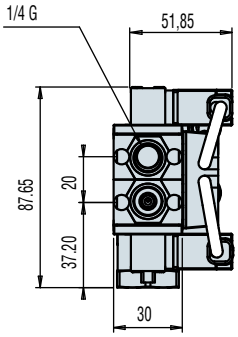
GVMAX V2 series

Dimensions
Curves
Options

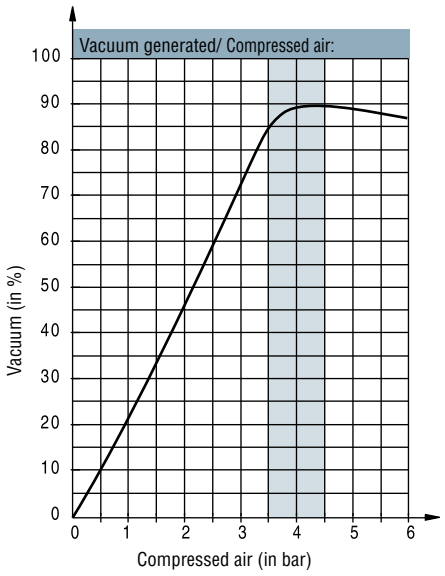


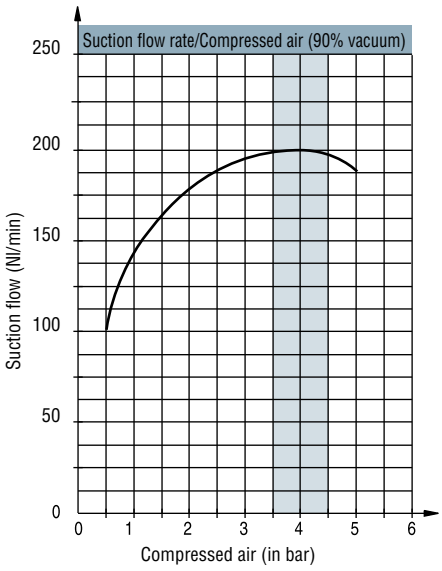
Dimensions

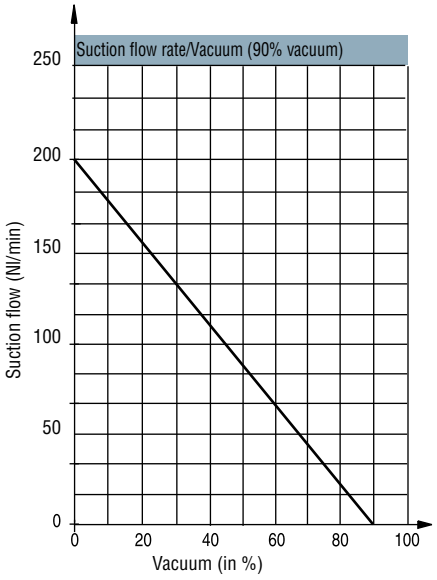


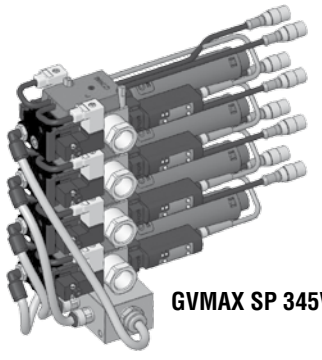


Curves

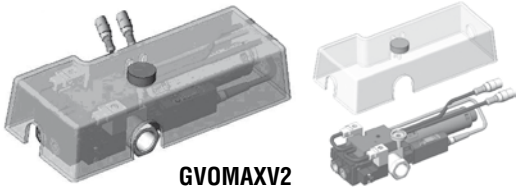








GVMAX SP 345V2 B4



GVOMAXV2

Options

■ Manifold mounting

The GVMAXSP345V2 and V2R can also be manifold-mounted.

Up to 4 vacuum pumps can be installed on one base.

Manifold references (example with GVMAX SP 345 V2)
GVMAX SP 345V2 B1 (Base + 1 x GVMAX SP 345V2)
GVMAX SP 345V2 B2 (Base + 2 x GVMAX SP 345V2)
GVMAX SP 345V2 B3 (Base + 3 x GVMAX SP 345V2)
GVMAX SP 345V2 B4 (Base + 4 x GVMAX SP 345V2)

■ Protective housing for GVMAX, ref. GVOMAXV2

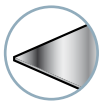
The protective housing for the GVMAX is transparent and removable. Coval recommends using a protective housing to protect the vacuum pump.

9

Self-regulating vacuum pumps

(electric vacuum and blow-off control)

Branch-specific applications



Safety

The GVMAX E1 has a check valve installed as standard which enables it to maintain the vacuum within the circuit if there is a power failure. This function guarantees maximum safety conditions for operators during handling.

Materials

Similar to GEM (see page 9/18).

Description

The communication between both elements, electronic vacuum switch and gripping valve control allows the consumption of compressed air to be regulated and in particular significantly reduced. This range of vacuum pumps is strongly recommended for gripping air-tight objects, holding and for medium or long cycles. Electrically controllable blow-off is integrated for release.

Characteristics

model	Ø nozzle (mm)	max. vacuum (%)			air drawn in (Nl/min)			L2 (mm)		(g)
		X	T	N	X	T	N	S	K(1)	
GVMAX E1	2.5	50	75	90	360	240	200	60	121	510

(1) delivered as standard on version X.

Evacuation time in seconds per liter

% vacuum	Ø nozzle (mm)	10			20			30			35	40			45	50		60		70		80	85
versions		X	T	N	X	T	N	X	T	N	X	X	T	N	X	T	N	T	N	T	N	N	N
GVMAX E1	2.5	0.02	0.03	0.03	0.04	0.06	0.07	0.08	0.10	0.11	0.01	0.14	0.14	0.16	0.19	0.21	0.22	0.30	0.30	0.50	0.41	0.60	0.77

Operating principle

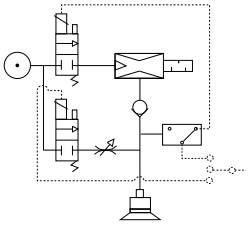
When the selected vacuum level is reached, the compressed air supply stops. This interruption does not have any effect as the check valve maintains the vacuum and thus the grip. The vacuum switch continually analyzes the vacuum requirements. As soon as the minimum threshold is reached, it actuates the vacuum generation valve to return to the pre-set value.

See pages 9/21 and 9/23.

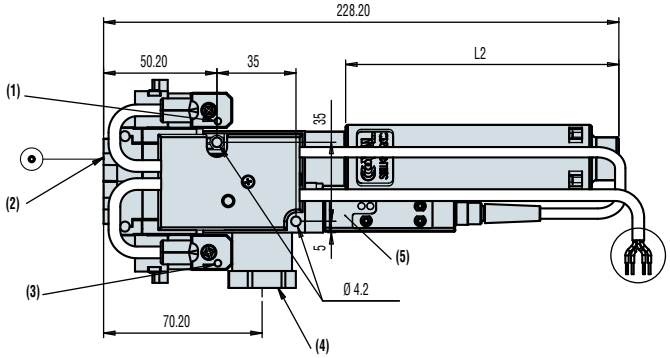
Specifications

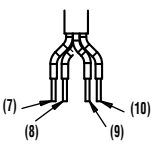
Supply	Non-lubricated filtered air, 2 to 6 bar, optimum at 4 bar
Temperature	0 to 60°C / 32 to 140°F
Contact output	PNP all-or-nothing NO or NC, adjustable hysteresis
Anti-parasite function	Integrated with display LED
Suction rate	Adjusted by flow restrictor

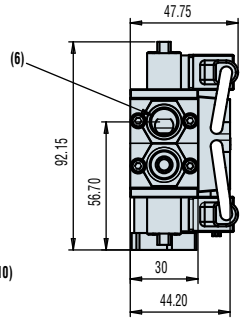
Curves: see page 9/27



Dimensions







(1) LED gripping display
(2) Compressed air inlet
(3) LED blow-off display
(4) Vacuum 1/2 Gas
(5) PSA100C vacuum switch
(6) 1/4G
(7) White: Contact output
(8) Brown: 24V DC (gripping)
(9) Blue: common
(10) Black: 24V DC (blow-off)

For all orders, please specify: Model + Characteristic + Silencer + C.A. fitting + E1

1: Model
GVMAX

2: Characteristic	
X	50% vacuum
T	75% vacuum
N	90% vacuum

3: Silencer	
-	Without silencer
S	Diffuser
K	Through-type

4: C.A. fitting	
14	1/4 G BSPP

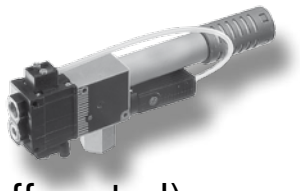
E1

E.g. **GVMAX NK 14 E1**

(GVMAX vacuum pump with electric self-regulation, 90% vacuum with through type silencer and C.A. 1/4G fitting)

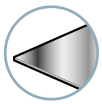
GVMAX series

Self-regulating vacuum pumps



(pneumatic vacuum and blow-off control)

Branch-specific applications



Safety

The GVMAX P1 has two check valve functions installed as standard which enables it to maintain the vacuum within the circuit if the pneumatic power is interrupted. This function guarantees maximum safety conditions for operators during handling.

Materials

Similar to GEM (see page 9/18).

Description

The communication between both elements, pneumatic vacuum switch and gripping valve control allows the consumption of compressed air to be regulated and in particular significantly reduced. This range of vacuum pumps is strongly recommended for gripping air-tight objects, holding and for medium or long cycles in explosive environments. Pneumatically controllable blow-off is integrated for release.

Note: The volume of the piping must not exceed 10 liters. For higher volumes, please consult us.

Characteristics

model	Ø nozzle (mm)	max. vacuum (%)			air drawn in (Nl/min)			L2 (mm)		(g)
		X	T	N	X	T	N	S	K(1)	
GVMAX P1	2.5	50	75	90	360	240	200	60	121	440

(1) delivered as standard on version X.

Evacuation time in seconds per liter

% vacuum	Ø nozzle (mm)	10			20			30			35	40			45	50		60		70		80	85
versions		X	T	N	X	T	N	X	T	N	X	X	T	N	X	T	N	T	N	T	N	N	N
GVMAX P1	2.5	0.02	0.03	0.03	0.04	0.06	0.07	0.08	0.10	0.11	0.01	0.14	0.14	0.16	0.19	0.21	0.22	0.30	0.30	0.50	0.41	0.60	0.77

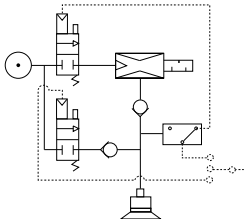
Operating principle

When the selected vacuum level is reached, the compressed air supply stops. This interruption does not have any effect on the current operation as the check valve maintains the vacuum and thus the grip. The vacuum switch continually analyzes the vacuum requirements. As soon as the minimum threshold is reached, it actuates vacuum generation valve. The chosen level of vacuum is immediately re-established. See pages 9/21 and 9/23.

Note: to ensure optimum operation, we advise you to ensure the vacuum network is air-tight. For this purpose we recommend using NVS vacuum feeders and screwed vacuum fittings with O-rings (RDV, RCOV).

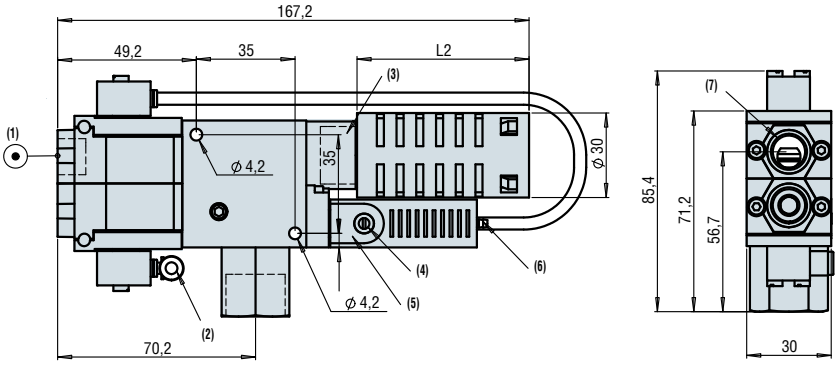
Specifications

Supply	Non-lubricated filtered air, 2 to 6 bar, optimum at 4 bar
Temperature	0 to 60°C / 32 to 140°F
Vacuum switch	PSE100PKNO
Pressure at the vacuum switch	Equal to or greater than vacuum pumps supply pressure
Hysteresis	100mbar max.



Curves: see page 9/27

Dimensions



(1) 5.5 bar compressed air inlet
(2) Fast 2.7x4 blow-off control
(3) 1/2 Gas Exhaust
(4) Regulation threshold adjustment
(5) PSE100PKNO vacuum switch
(6) Hollow shaft for vacuum control
vacuum switch pressurization
(7) 1/4G

For all orders, please specify: Model + Characteristic + Silencer + C.A. fitting + P1

1: Model
GVMAX

2: Characteristic	
X	50% vacuum
T	75% vacuum
N	90% vacuum

3: Silencer	
-	Without silencer
S	Diffuser
K	Through-type

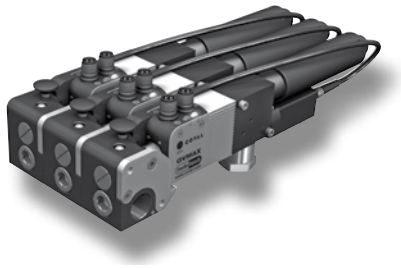
4: C.A. fitting	
14	1/4 G BSPP

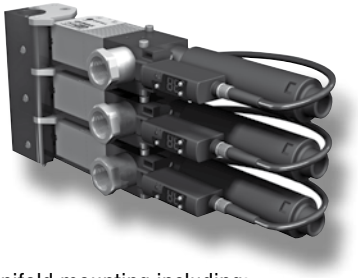
P1

E.g. **GVMAX NK 14 P1**
(GVMAX vacuum pump with pneumatic self-regulation, 90% vacuum with through type silencer and C.A. 1/4G fitting)

Quick-Change GVMAX - GEM

Applications





Ex. Manifold mounting including:
3 x GVO QC1
3 x GVMAXSP345V3

Material

Anodized aluminum

Nickel-plated brass

Presentation

Designed for COVAL GVMAX and GEM series vacuum pumps, the GVO QC1 quick-change series allows for compact, simple, and effective integration on robotic installations.

The COVAL Quick Change system can be used on GVMAXSP345V3 (V3R) and GEM series vacuum pumps.

Advantages of the GVO QC1 Quick Change series

- Connection to Compressed air via coupler
- Compact and light (350 g) system
- Simple and reliable
- Adapts to standard vacuum pumps without modifications
- Modular and flexible
- Manifold mounting

Characteristics

With a sturdy design, the COVAL Quick Change lets you combine multiple modules for manifold mounting with a common compressed-air supply.

Unlocking via button/Automatic locking via spring return.

Automatic compressed air supply via coupler.

Security

The module is equipped with a Pressure safety check valve making it possible to remove the vacuum pump without having to shut off the compressed-air supply.

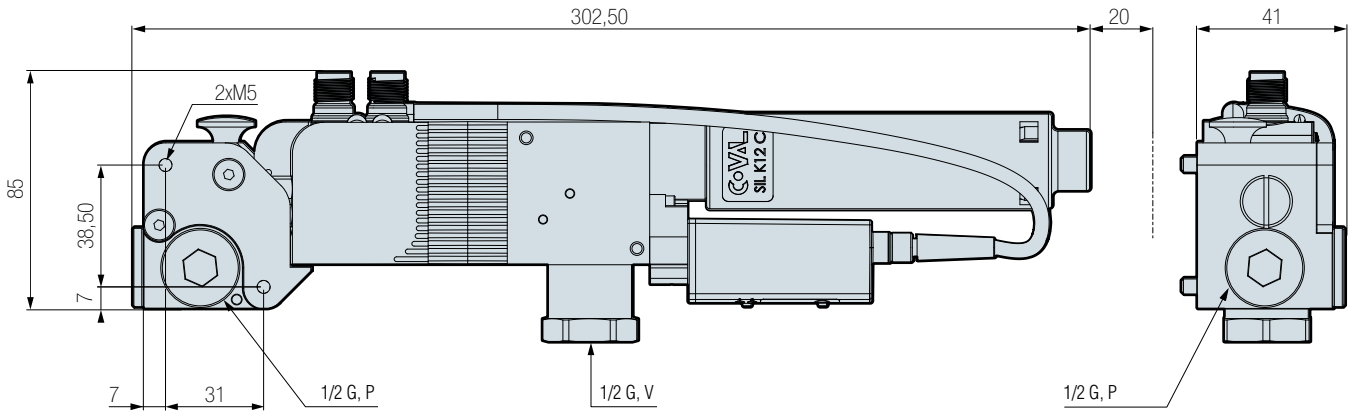
Part No. to order: GVO QC1

The GVO QC1 series module is composed of:

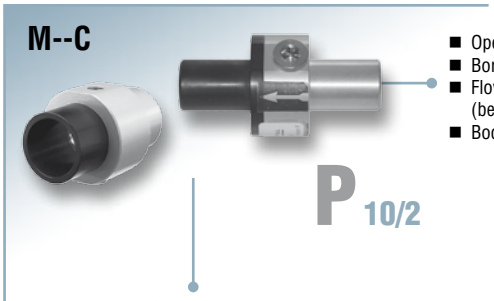
- One fixed support (to fix on the rack)
- One fixing plate with 2 centre finders (to fix on the vacuum pump)
- A compressed-air coupler in ¼ G to mount on the vacuum pump.

9

Diagram (with representation of a GVMAXSP345V3)



High flow vacuum generator

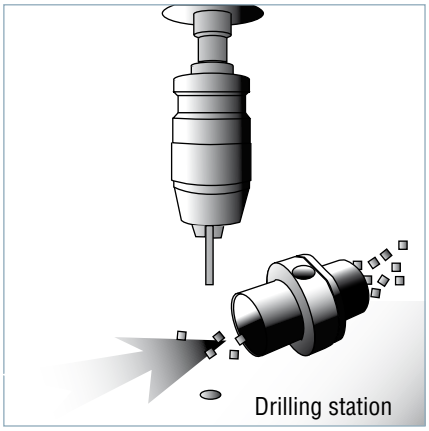


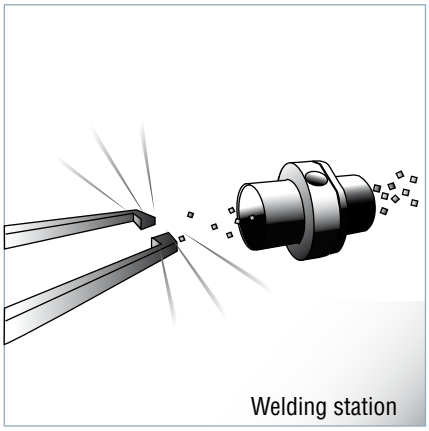
- Operating principle based on the COANDA effect
- Bore diameter (Ø): 6, 10, 20, 30, 40mm
- Flow rate: between 200 and 5000 Nl/min depending on the supply pressure (between 1.5 and 6 bar)
- Body material: aluminum

- Recommended for gripping light-weight, porous products: foam, carpet, cakes, leather, etc.
- Transport of powdery materials: powders, granules,etc.
- Transporting small, light-weight objects: paper clips, rice, coffee, etc.
- Smoke evacuation, depressurizing chambers

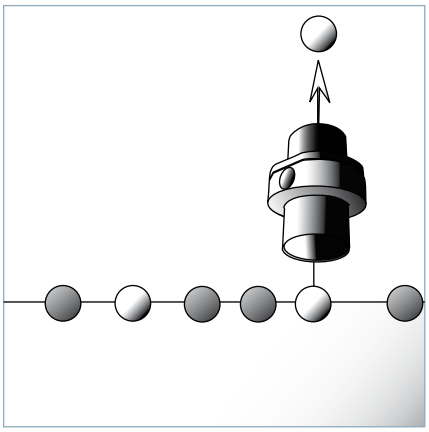
Air amplifiers
Applications

Blow-off, cleaning, waste suction

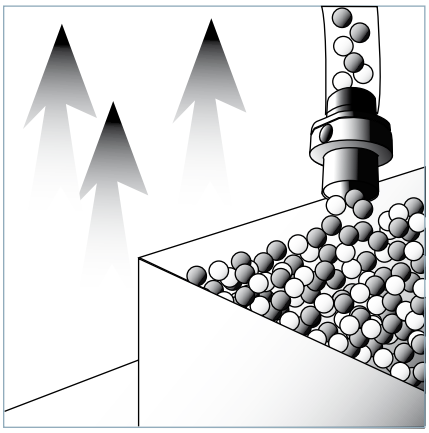




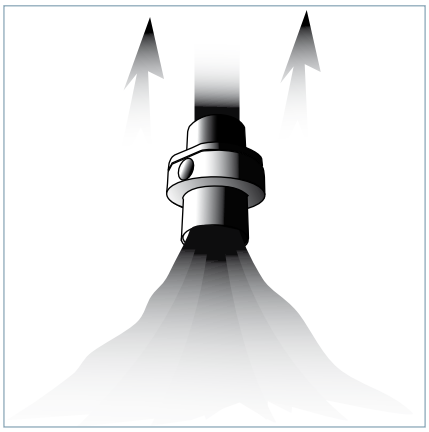
Sorting by weight



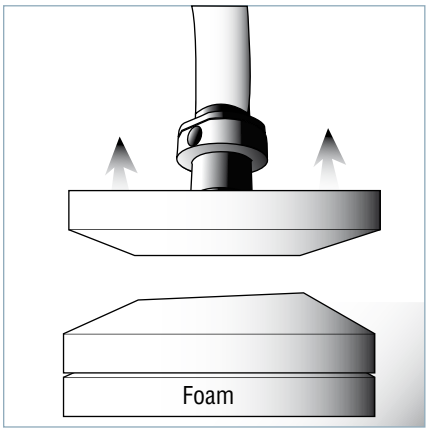
Transport of granules (rice, grains of wheat or coffee, etc.)



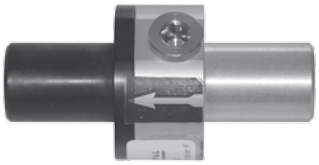
Degassing, smoke evacuation



Gripping and / or unstacking very porous loads



Air amplifiers



Description

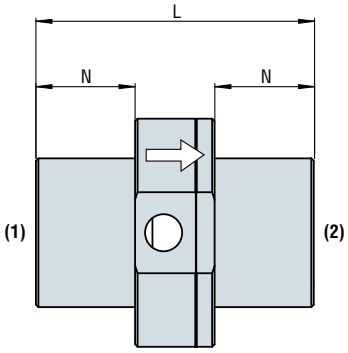
By virtue of the COANDA effect (boundary effect), the motor flux draws in air at room temperature. This physical phenomenon greatly amplifies the flow which results in very high suction produced with low consumption.

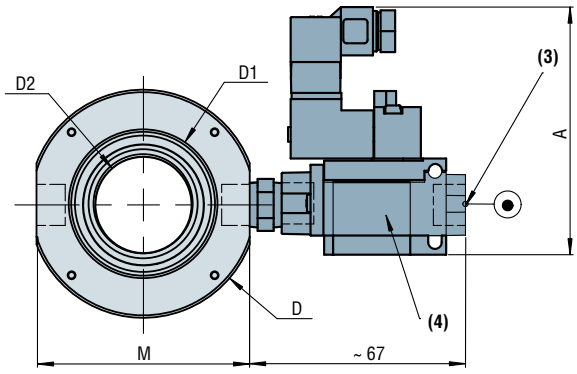
- Gripping of very porous, light-weight products: foam, carpet, cakes, leather, etc.
- Transport of powdery materials: powders, granules,etc.
- Transporting small, light-weight objects: paper clips, rice, coffee, etc.
- Smoke evacuation, depressurizing chambers, etc.

operating requirement

Compressed air filtration at 5 microns for the M6C model and 20 microns for the other models.

(1) Suction
(2) Discharge
(3)1/4 Gas or fast 6x8
(4) Control valve, on option.
Note: the valve is incompatible with the M40C model.
A = - 77mm for an AP2 valve + DIN connection (connector supplied)
- 68mm for an AP2 valve + M12 connection (connector not supplied)
- 44mm for an AP2 + pneumatic connection for 2.7x4 tube.





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.

Characteristics

models	L (mm)	N (mm)	M (mm)	C.A. (Gas)	D (mm)	D1 (mm)	D2 (mm)	Weight (g)
M 6 C	60	20	36	1/8	40	20	6	80
M 10 C	60	20	36	1/8	40	25	10	80
M 20 C	90	30	55	1/4	60	40	20	210
M 30 CL	105	35	66	1/4	70	50	30	1200
M 40 CV	114.5	40	86	3/8	92	60	40	470

Specifications

Compressed air	Dry non-lubricated 1.5 to 5 bar
Maximum pressure drop	see table page 10/3.
Materials	Aluminum body for "C" version and brass body for "CL" version
Temperature	-20°C to 80°C / -40 to 212°F

For all orders, please specify: M + bore Ø + C.A. control + C.A. fitting + valve controls

M

1: bore Ø	
6 C	6 mm
10 C	10 mm
20 C	20 mm
30 CL	30 mm
40 CV	40 mm

2: C.A. controls	
-	Without control valve
AP2	C.A. control valve

3: C.A. fitting	
14	1/4G BSPP

4: Valve controls	
P1	Pneumatic
E1	24 V DC DIN

E.g. **M 30 CL AP2 14 E1** (Air amplifier with bore Ø M 30 CL and C.A. control valve, 1/4G pressure fitting and 24 V DC electrical control).

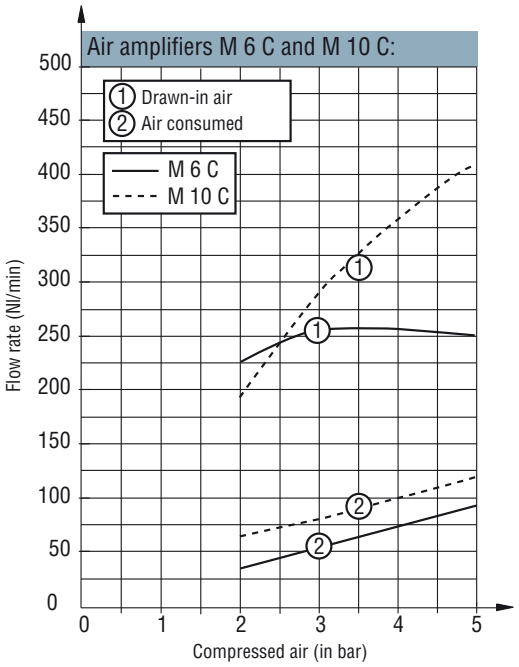
Air amplifiers
Curves

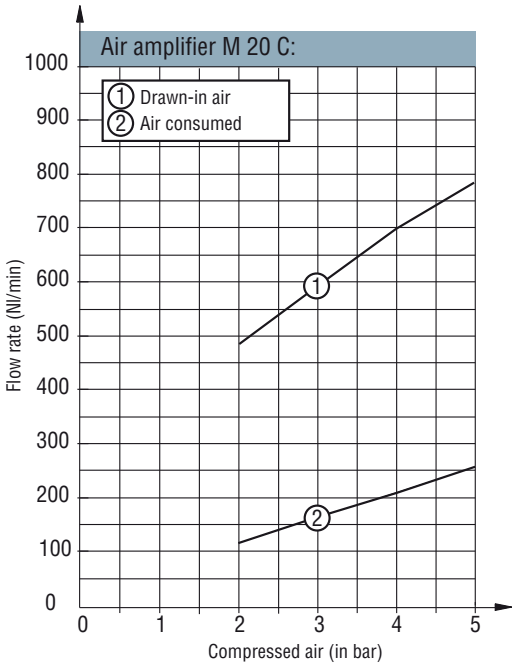
Maximum vacuum / Supply pressure

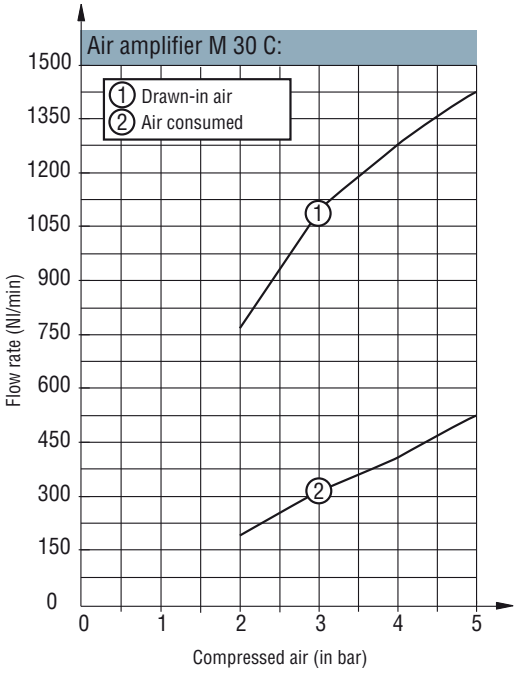
Models	Supply pressure / Maximum vacuum in bar		in mm CE	
	2	3	4	5
M 6 C	900	1500	2000	2600
M 10 C	200	500	700	1000
M 20 C	207	310	400	510
M 30 CL	90	130	220	280
M 40 CV	140	200	284	360

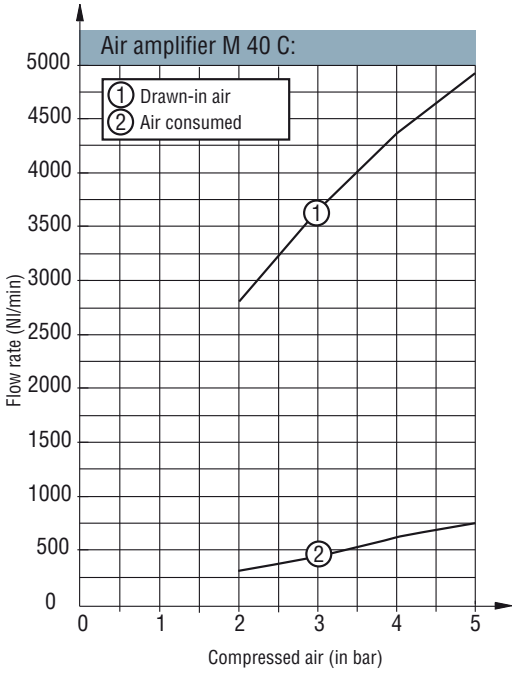
Maximum overpressure/ Supply pressure

Models	Supply pressure / Maximum vacuum 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 CL	45	70	100	160
M 40 CV	96	145	199	290









Pipe for air amplifiers

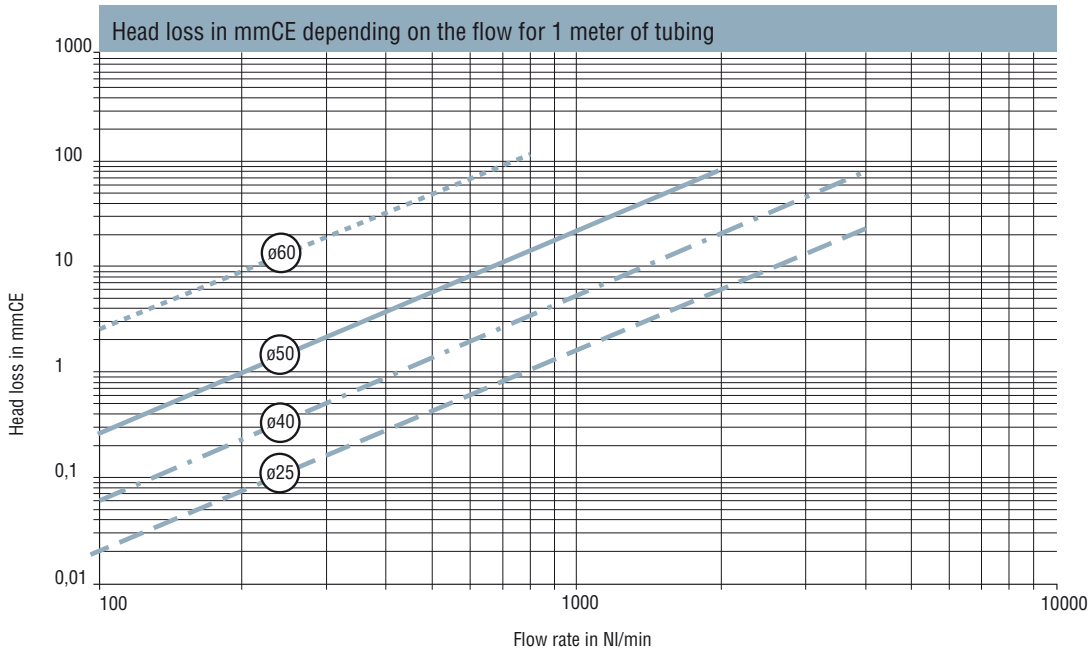
Specifications

Diameter D	Ø 25 - Ø 40 - Ø 50 - Ø 60
Bend radius	10 x D
Maximum pressure drop	–250 mbar
Maximum pressure	1 bar
Temperature	-40°C to 100°C / -40 to 212°F
Anti-static	R < 108 Ohm

Description

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.
- Delivered with two Cerflex type clamps in standard format.



For all orders, please specify: Model + Diameter + Length

1: Model
TVM

2: Diameter	
25	Ø 25 mm
40	Ø 40 mm
50	Ø 50 mm
60	Ø 60 mm

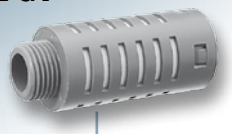
3: Length (m)	
-	In meters
10	A ring

E.g. **TVM 50 10** (TVM model spiral pipe, ring diameter 50mm).

10

Vacuum pump accessories

SIL GV



- Diffuser-type silencer
- Noise reduction of between 30 and 39 dBA
- Passage of air through a sound-proof material
- Available in 4 sizes
- 4 types of fitting, M5F, 1/8 G, 1/4 G, ½ G

P 11/2

- Very good sound reduction
- Air outlet gently diffused
- Reduced size

SIL K--C

- 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, 1/8 G, 1/4 G, ½ G

P 11/2

- Sound reduction mastered
- No clogging
- No head loss
- Ideal for dusty environments
- Possibility of collecting the exhaust

MS

- Blow-off device
- Direct connection on the micro- and mini-ejectors via an M5 fitting
- Pressure connection by push fitting for Ø 4x6 or 2.7x4 tube
- 100 Nl/min blow-off flow at 5 bar

P 11/3

- Allows direct blow-off on the VR type micro-ejectors or any other M5 fitting
- Reduces cycle times
- Avoids using a vacuum-proof distributor

FVI

- 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: 3/8 G, 1/2 G, 3/4 G, 1"1/4 G, 1"1/4 G and 2" G.

P 11/4

- 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

FVUM, FVUG

- Vacuum filter
- A range of 4 models
- 2 sizes and 3 types of fittings: 1/4G, 3/8G and 1/2G
- Transparent tank

P 11/6

- Transparent tank, visual checking on clogging possible
- Different models mean you can select a solution adapted to your application

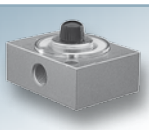
FVL12

- In-line vacuum filters
- 400 micron stainless steel screen

P 11/6

- Easy to mount in-line on the vacuum network or directly on the vacuum pump

FVG



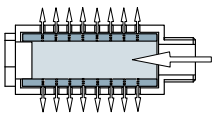
- Mini vacuum filters
- A range of 4 models

P 11/7

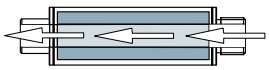
- Ideal for mounting with micro and mini in-line ejectors
- Easy-to-replace cartridges in case of clogging

SIL GV, SIL K -- C series

Diffuser type silencer, through type silencer



Diffuser type silencer
- Very good sound reduction
- Air outlet gently diffused.



Through type silencer
- Sound reduction mastered.
- No clogging.
- No head loss.

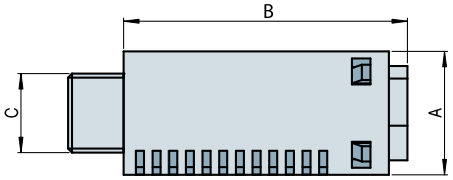
From when it was founded, COVAL has always given particular attention to reducing the noise of vacuum pumps and improving their performance.

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 sound-proof materials used for the silencers.

SIL GV series diffuser-type silencer

Principle

Sound reduction by breaking up the air jet in a baffle inside the diffuser. Passage of air through a sound-proof material.



Characteristics

models	ØA (mm)	ØB (mm)	ØC (Gas)	Weight (g)	Medium-level sound reduction (dBA)
SIL GV 10 M5 F	18	36	M5F	5	30
SIL GV 10	18	36	1/8	5	30
SIL GV 15	20	46	1/4	10	35
SIL GV 20	30	62	1/2	29	39

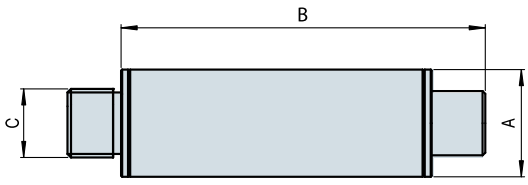
Specifications

Material	POM (Polyoxymethylene)
Temperature	-10 to 50°C / 14 to 140°F.

SIL K -- C series through-type silencer

Principle

- Noise absorbed laterally by sound-proof textile.
- Free outlet without head loss or clogging.



Characteristics

models	ØA (mm)	ØB (mm)	ØC (Gas)	Weight (g)	Medium-level sound reduction (dBA)	Materials
SIL K 18 C	20	68	1/8	22	33	thread: aluminum
SIL K 14 C	20	68	1/4	25	31	tube: polycarbonate
SIL K 38 C	30	121	3/8	90	33	polycarbonate
SIL K 12 C	30	121	1/2	92	33	
SIL K 12 CS	30	54	1/2	61	28	

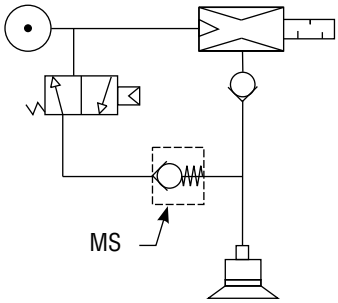
Specifications

Material	Black anodized aluminum or black polycarbonate (according to Ø)
	interior: Textile sound-proof material
Temperature	-10 to 50°C / 14 to 140°F.

Special: COVAL develops tailor-made through-type silencers according to specifications, male of female fitting, length, diameter, characteristics on request.

Quick release device

Pneumatic diagram



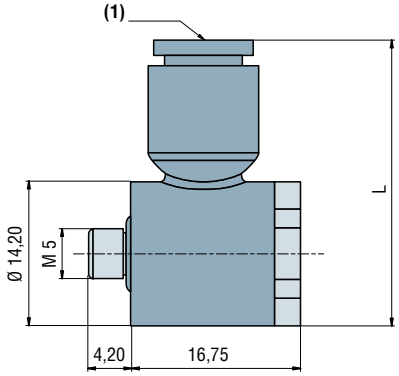
Description

Economical solution developed especially for the Coval micro-ejectors to satisfy applications requiring blow-off combined with small size and light weight. This device allows the user to connect the compressed air network directly onto the M5 fitting.

Advantages

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

Dimensions



(1) Push fitting

Technical characteristics

- 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 at 5 bar: 100 Nl/min
- Materials: polyamide PA 6.6 + brass (CuZn) + nitrile (NBR)

model	push fitting (mm)	L (mm)
MS2M5	Ø 2.7x4	25.8
MS4M5	Ø 4x6	28.10

For all orders, please specify:

Model + Push fitting + M5

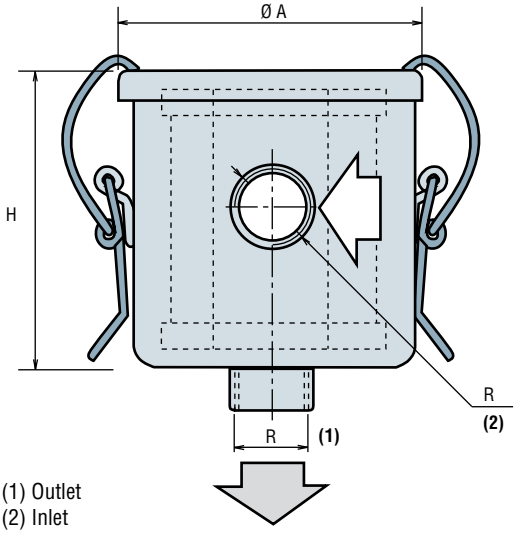
1: Model
MS

2: Push fitting	
2	Ø 2.7x4 pipe
4	Ø 4x6 pipe

M5

E.g. MS4M5
(Quick release device for Ø 4x6 mm pipe, M5 fitting)

Vacuum filter



(1) Outlet
(2) Inlet

Description

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.

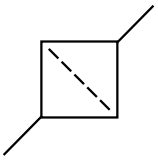
Filter cartridge available in 3 versions: paper, polyester and stainless steel.

Characteristics

models	**A** (mm)	**H** (mm)	**R** (Gas)	**Flow rate** (Nl/min)	**Weight** (g)
FVI 38	79	76	3/8	400	270
FVI 12	101	86	1/2	600	600
FVI 34	101	86	3/4	600	600
FVI 114	135	96	1”1/4	1400/1200	1050
FVI 114 G	173	156	1”1/4	1400/1200	1850
FVI 2	201	258	2”	5000	3900

Specifications

Body material	Pressed 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
Head loss	2 to 4% vacuum with a new filter
	5 to 7% vacuum with average clogging



For all orders, please specify:

Model + Fitting + Filtering material

1: Model
FVI

2: Fitting	
38	3/8 Gas
12	1/2 Gas
34	3/4 Gas
114	1”1/4
114G	1”1/4
2	2”

3: Filtering material	
C	Paper
P	Polyester
I	Stainless steel

E.g. **FVI 38 P**
(FVI series vacuum filter with 3/8 Gas fitting, polyester filtering).

Filters and Filtration Accessories

Filter models

Models	Use
FVI 38	GVP 20 - GV 20
FVI 12	GVP 25 - 30 - PVR 6 (6 m³/h)
FVI 34	Vacuum pumps: 10/16 m³/h
FVI 114	Vacuum pumps: 20/25 m³/h
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 highly humid conditions

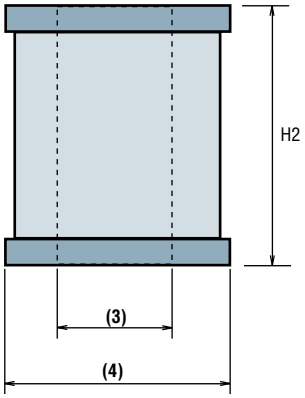
Model P: PE filtration element

- 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)

Replacement cartridge



(3) inside Ø
(4) outside Ø

Accessories

models	Replacement cartridge (*)	outside Ø (mm)	inside Ø (mm)	H2 (mm)
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).

Other models

FVG 11-2-3-5-6 series vacuum filters, for micro-ejectors

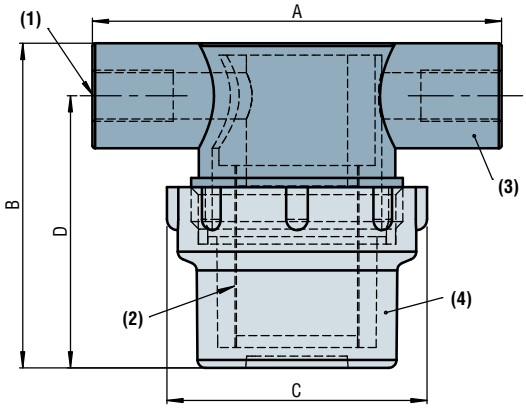
- Polyester cartridge
- See page 11/7

FVU M 14-38 series vacuum filters for GVP 12 and 15 vacuum pumps

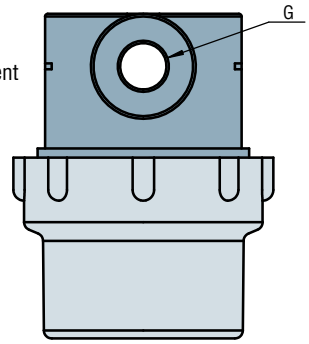
- FVU G 38-12 vacuum filters, in-line stainless steel cartridge for GVP 15 and 25 vacuum pumps and small electric PVR 6 vacuum pumps.
- See page 11/6

FVUM, FVUG series

In-line filters



(1) Vacuum generator
(2) Filtering element
(3) Body
(4) Tank



Description

The advantage of this range of filters is that they are equipped with a transparent tank so that clogging is visible.

Characteristics

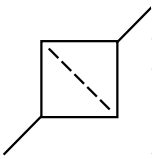
models	A (mm)	B (mm)	C (mm)	D (mm)	G (gas)	Flow rate (Nl/min)
FVUM 14	76.2	61.5	48	49.8	1/4	150
FVUM 38	76.2	61.5	48	49.8	3/8	350
FVUG 38	90.9	136.7	73.6	119.4	3/8	350
FVUG 12	90.9	136.7	63	119.4	1/2	500

Operating range

■ - 1 to 10 bar

Specifications

Body material	Height: nylon 6.6
	Tank: transparent polyamide
Filtration	Two options available: 40 micron stainless steel grille or Polyethylene 70 micron
Temperature	0 to 50°C / 14 to 140°F.



For all orders, please specify:

Model + Size + Fitting + Type of cartridge

1: Model
FVU

2: Size	
M	Mini
G	Large

3: Fitting	
14	1/4G for M series
38	3/8G for M and G series
12	1/2G for G series

4: Cartridge	
-	Stainless steel
P	Polyethylene

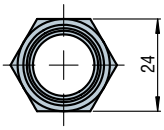
E.g. **FVU G 38**
(FVU series in-line filter, Large, with 3/8 G fitting and stainless steel cartridge).

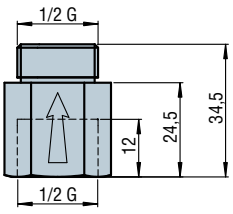
To order a replacement filtering element:

Filter model	Reference of the filtering element
FVUM14 and 38	FVUM12E (Stainless steel)
FVUG12 and 38	FVUG12E (Stainless steel)
FVUM14P and 38P	FVUM12PE (Polyethylene)
FVUG12 and 38P	FVUG12PE (Polyethylene)

FVL 12 series

In-line filter





Specifications

Material	Body: Nickel-plated brass
	Grille: 400 micron stainless steel
Weight	50 g

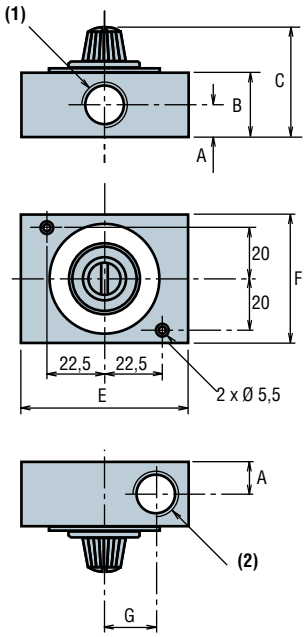
Mounting on option

The FVL 12 series in-line filter can also be mounted as a GVO P option on GVP series vacuum pumps. See page 8/12.

For all orders, please specify: FVL 12

Mini vacuum filters

FVG 3/5/6



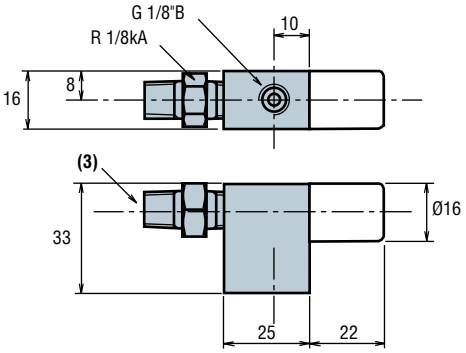
Description

FVG series vacuum filters are especially recommended for fine filtration. Their light weight allows easy on-board installation.

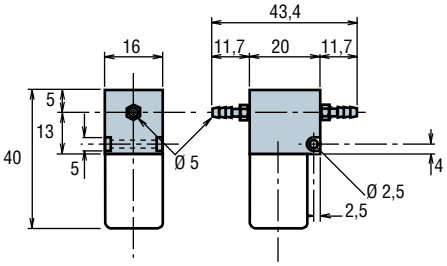
(1) D1 (Inlet)
(2) DE (Outlet)
(3) Inlet

FVG 11 and FVG 2	VR 05
FVG 3	GV 10 - VR 07 - VR 09
FVG 5	GV 15 - GV 12 and 15
FVG 6	GVP 20 - GV 20

FVG 2



FVG 11

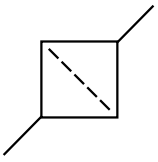


Characteristics

models	A (mm)	B (mm)	C (mm)	E (mm)	F (mm)	G (mm)	D2 (Gas)	D1 (Gas)
FVG 3	8	16	33	55.5	50.5	18	1/8	1/8
FVG 5	12.5	25	42	65	50	23	1/4	1/4
FVG 6	15	30	47	70	60	23	3/8	3/8

Specifications

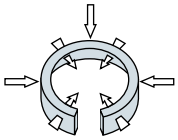
Operating pressure	-1 to 5 bar
Temperature	0 to 60°C / 32 to 140°F
Filtration (µ)	FVG 3-5-6: 40 ; FVG 11-2 : 120
Weight (g)	FVG 2/3/5/6/11: 45/90/150/235/18
Material	Anodized aluminum



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 + Filters or Cartridges

1: Model
FVG

2: Type	
11	FVG 11
2	FVG 2
3	FVG 3
5	FVG 5
6	FVG 6

3: Filters or Cartridge	
-	Filter
E	Cartridge

E.g. **FVG 11 E**
(FVG 11 model mini vacuum filter, with cartridge).

Vacuum switch range

PSA 100 C

- Electronic vacuum switch with digital display
- 2 configurable contact outputs
- NO or NC outlets
- Adjustable hysteresis
- IP 65

P 12/1

- 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.

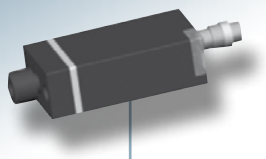
PSP 100

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

P 12/2

- The compact PSP electronic vacuum switch is used to check the exact level of vacuum in the system.
- Adjustable contact output and hysteresis

PSP100ANA



- Electronic vacuum switch
- 1 1 to 5 VDC analog output
- Response time: < 5ms
- 2 vacuum fittings available
- M8 connections

P 12/3

- The compact PSP100ANA electronic vacuum switch is used to check the exact level of vacuum in the system.
- Analog output

PSR

- Mini preset vacuum switch
- 1 contact output
- Preset value of the contact output: 30% or 50% vacuum
- 2 vacuum fittings available
- M8 connections

P 12/4

- High mechanical resistance thanks to the robust aluminum body
- Compact and ultra-light
- Visual LED indicator

Vacuum switch range

PSE 100 E

- Electric vacuum switch
- Adjustment range -300mb to -850mb
- All voltages
- Cable or M12 connector outputs

P 12/5

- 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 N.O. or N.C. function is made during wiring.

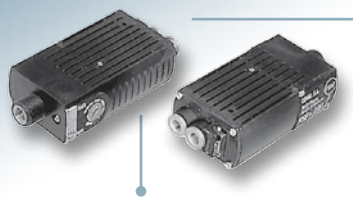
PSE 100 P

- Pneumatic vacuum switch
- 2 versions available (NO or NC)
- Adjustment range: -300mb to -850mb

P 12/6

- The PSE 100 E 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:
- N.O version, recommended for "air-saving" on the vacuum pump
- N.C. version to cover the "safety" function (object detected, etc.) and "SFC signal" function.

PSE 100 PK



- High-precision pneumatic vacuum switch.
- 2 versions available (NO or NC)
- Adjustment range:
  - NC: -250 to -830mb
  - NO: -350 to -880mb

P 12/7

- 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.
- N.O version, recommended for "air-saving" on the vacuum pump.
- N.C. version to cover the "safety" function (object detected, etc.) and "SFC signal" function.

VAF 111

- Needle vacuum gauge
- 3 diameters available: 40, 50 and 63mm
- Zone for use printed red and green

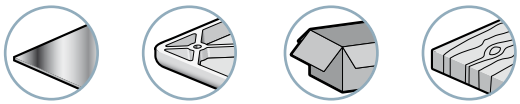
P 12/8

- 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)

PSA 100 C series

Electronic vacuum switch with display

Branch-specific applications



Description

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.

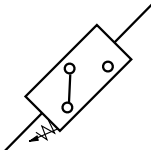
Moreover it has a digital vacuum level display with two independently-adjustable contact outputs. Every aspect has been designed to make it easy to use.

Advantages: front panel programming, simplified adjustment and threshold locking, display inversion, your choice of N.O or N.C. outlets (hysteresis can be independently adjusted for each outlet).

Characteristics

model	Measuring range (bar)	Permissible overpressure(bar)
PSA 100 C	0 / -1	4

- 2 configurable contact outputs
- Adjustable hysteresis
- M8 F connector
- IP65
- LED display
- PNP



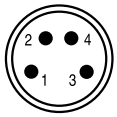
Specifications

Compatible fluids	All non-corrosive, filtered, non-lubricated gases
Supply	18 - 30 V DC polarity inversion protection
Current consumed	< 100 mA
PNP transistor outlet	125mA with 24 V DC, programmable NO or NC
Output viewing	Led
Output 1	Red LED
Output 2	Green LED
Programming	Keyboard
Display	In % vacuum (2 digits, 7 red segments, size 8.5mm)
EMC	Industrial standard Class B
Enclosure material	PA 6.6 20% FV
Protection	IP 65
Electrical connection	M8 F connector
Pneumatic connection	1/8 Gas or M5 F
Shock resistance	10 G on XYZ
Display resolution	1%
Adjustment resolution	1%
Adjustment range	0 to 99% vacuum

Additional information

Electrical connections

- M8 connector

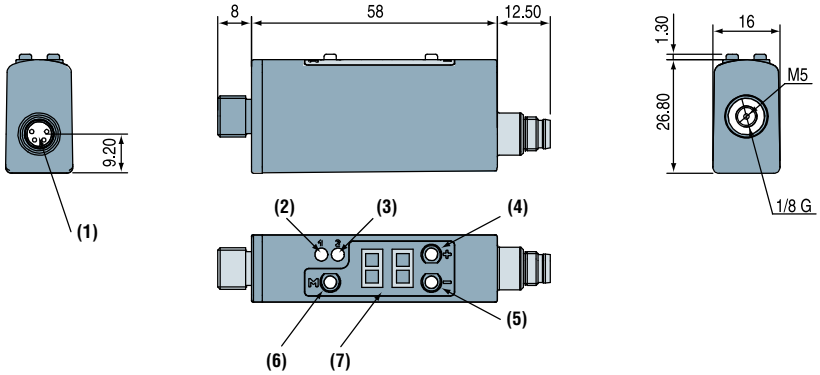


1 = + 24 V DC
2 = Output 2
3 = Common
4 = Output 1

Accessories

- Straight or elbow connector, see page 8/14.
- Mounting on vacuum pump:
  - GVP / GVPS / GVPD series: GVO PSA 100 C
  - GEM / GEMP series: VA option

Dimensions

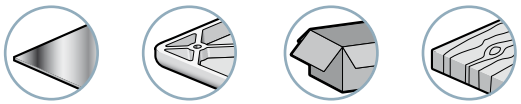


(1) M8 4 pole connector
(2) LED threshold 1
(3) LED threshold 2
(4) Up Key
(5) Down Key
(6) Menu selection MODE key
(7) Vacuum level % digital display

For all orders, please specify: PSA 100 C

Electronic vacuum switch

Branch-specific applications

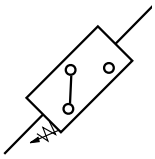


Description

PSP series electronic vacuum switches have integrated threshold and hysteresis adjustment as standard. 3 vacuum fittings (1/8 G Male, M5 female or M5 F Base) and 2 electrical connections (2 meters cable and M8 connector) make up the standard range.

Characteristics

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



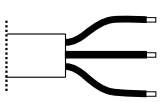
Specifications

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	< 20mA			
Transistor outlet	N.O. 125mA with 24V DC			
Thermal drift	±3% of the measuring scale between 0 and 50°C / 32 to 122°F			
Output viewing	LED			
Response time	< 5ms			
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	when operating: 0 to 50°C / 32 to 122°F in storage: -10 to 60°C / 32 to 122°F			
Protection	IP 50			
Electrical connection	PVC cable (length 2m)		M8 connector (4 poles)	
Pneumatic connection	1/8 Gas or M5 F	M5F Base	1/8 Gas or M5 F	M5F Base
Weight	62g	67g	22g	27g
Adjustment range	0 to -1 bar			

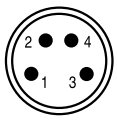
Additional information

Electrical connections

- PVC cable (length 2m)



- M8 connector

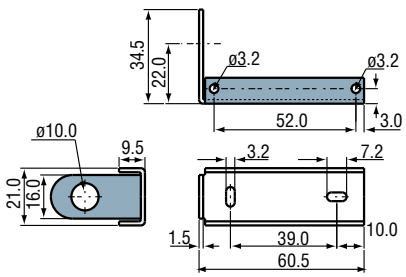


1 = + 24 V - Brown
2 =
3 = 0 V - Blue
4 = Contact - Black

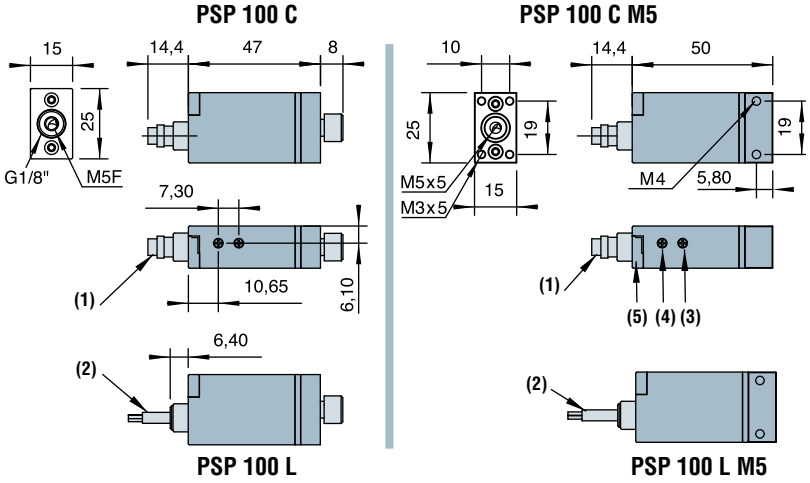
Accessories

- Straight or elbow connector, see page 8/14.
- Mounting on vacuum pump:
  - GVP / GVPS / GVPD series: GVO PSP 100 C or L
  - GEM / GEMP series: VB option

Vacuum switch attachment - Clip ref.: 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

For all orders, please specify:

Model + Electrical connection + Vacuum fitting

1: Model
PSP 100

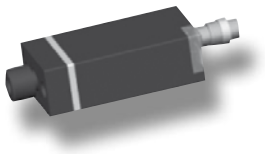
2: Electrical connection	
L	2m cable
C	M8 connector

3: Vacuum fitting	
-	1/8G M or M5 F
M5	M5 F Base

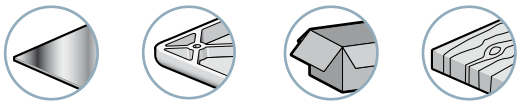
E.g. **PSP 100 L M5**
(PSP 100 series electronic vacuum switch with 2 meter cable and M5 F base)

PSP 100 ANA series

Electronic Vacuum Switch Analogue output



Applications



Description

The PSP 100 ANA contains an analogue output. It is fitted with 2 vacuum connections standard (1/8 G male or M5 Female) and one M8 electrical connector.

Characteristics

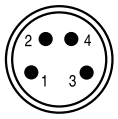
- 1 analogue output from 1 to 5 VDC
- Measuring range: 0 / -1 bar
- Overpressure: +3 bar max.
- PNP

Specifications

Models	PSP 100 ANA
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
Analogue output	1 to 5 VDC from 0 to –1 bar
Thermal drift	±3% of the measuring scale between 0 and 50°C
Response time	< 5 ms
EMC	Industrial standard Class B
Materials	PA 66 and brass
Temperature	operation: 0 to + 50 °C storage: -10 to + 60 °C
Protection	IP 50
Electrical connection	M8 connector (4 pins)
Pneumatic connection	1/8G Male and M5 Female
Mass	22g

Connections

- M8 connector

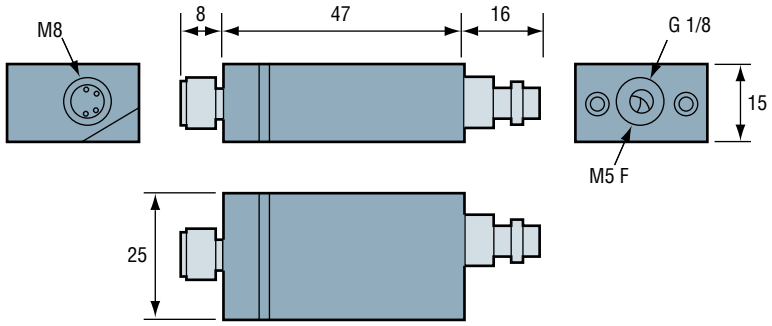


1 = + 24 V (Brown)
2 = analogue output from 1 to 5 VDC (white)
3 = 0 V common (blue)

Accessories

- Straight or elbow connector, see page 8/14.

Dimensions

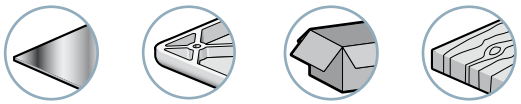


To place an order, specify:

PSP 100 ANA
(Analogue Output Electronic vacuum switch)

Pre-set Mini Vacuum Switch

Applications

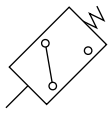


Description

Thanks to their compact and ultra-light design, the PSR series pre-set mini vacuum switches enable installation as close as possible to the suction pads to reduce response times.

PSRs are ideal for applications that only need a simple "object gripped" signal, and offer an economical and effective solution for applications with one vacuum generator per suction pad.

Characteristics



- 1 contact output
- Preloaded contact-output value: 30 or 50% vacuum
- Hysteresis 10% of max vacuum
- Overpressure: +3 bar
- PNP

Advantages

- High mechanical resistance thanks to its robust aluminum body
- Compact and ultra light
- Guaranteed precision, thanks to its pre-set vacuum level
- Available in two pre-set vacuum levels, 30 and 50% vacuum
- 4 visual LED indicators with 360° visibility
- The pre-set vacuum level helps to ensure security and prevent the risk of unplanned modifications.

Specifications

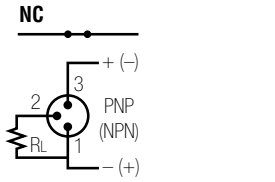
Models	PSR30D6	PSR30G18	PSR50D6	PSRG18
Compatible fluids	All filtered, non-corrosive, non-lubricated gases			
Supply	24V DC (18-30 V DC regulated, protection against polarity inversions)			
Current draw	< 30 mA			
Preloaded contact-output value	30% vacuum		50% vacuum	
Switching power	100 mA			
Function, according to output connection	PNP NO/NC or NPN NO/NC			
Thermal drift	±3% of the measuring scale between 0 and 50°C			
Output visualization	4 red LEDs at 360°			
Response time	4 ms			
Hysteresis	10% of max vacuum			
Number of cycles	1 Million min.			
EMC	Industrial standard Class B			
Materials	Aluminum/Brass/PU			
Temperature range	-25 to 85°C			
Protection	IP 40			
Electrical connection	M8 male 3 pin			
Pneumatic connection	D6	1/8 G Male	D6	1/8 G Male
Mass	15g			

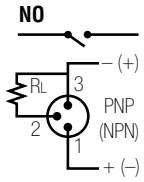
Connections

- Two vacuum connection options: for push fitting Ø6mm, or threaded 1/8 G male.
- M8 connection (3 pins)

Functions, according to output connection

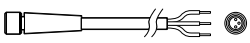
M8 electrical connectors



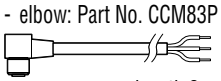


- screw-on female connectors.
- PVC cable, length 2 meters, 3 strands, overmoulded.
- IP65 protection.

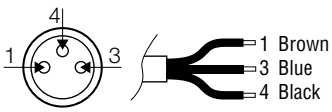
- straight: Part No. CDM 83P



- elbow: Part No. CCM83P

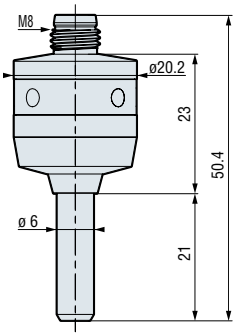


length 2 m

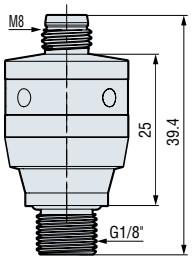


Dimensions

PSR--MD6



PSR--MG18



To place an order, specify:

Model + Detection threshold + M + Vacuum connection

1 : Model
PSR

2 : Detection threshold	
30	30% vacuum
50	50% vacuum

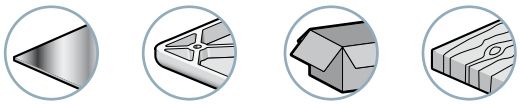
M

3 : Vacuum connection	
D6	For push fittingØ6 mm
G18	1/8 Gas Male

Example: **PSR 30 MD6** (PSR pre-set mini vacuum switch, 30% vacuum detection threshold, vacuum connection for push fittingØ6 mm)

Electric vacuum switch

Branch-specific applications



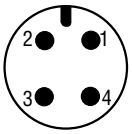
Description

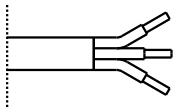
The PSE 100 E series vacuum switch with electric output allows the vacuum level in the system to be checked by means of a patented system.

- It is adapted to all electrical automated systems.
- The choice between the N.O. or N.C. function is made during wiring.

Electrical connection

M12 Connector **PVC cable (length 2m)**





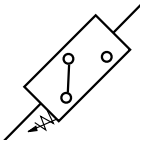
1: Common
2: N.O. Contact
3:
4: N.C. Contact

Brown: Common
White: N.O. Contact
Black: N.C. Contact

Connection for EC version (M12)

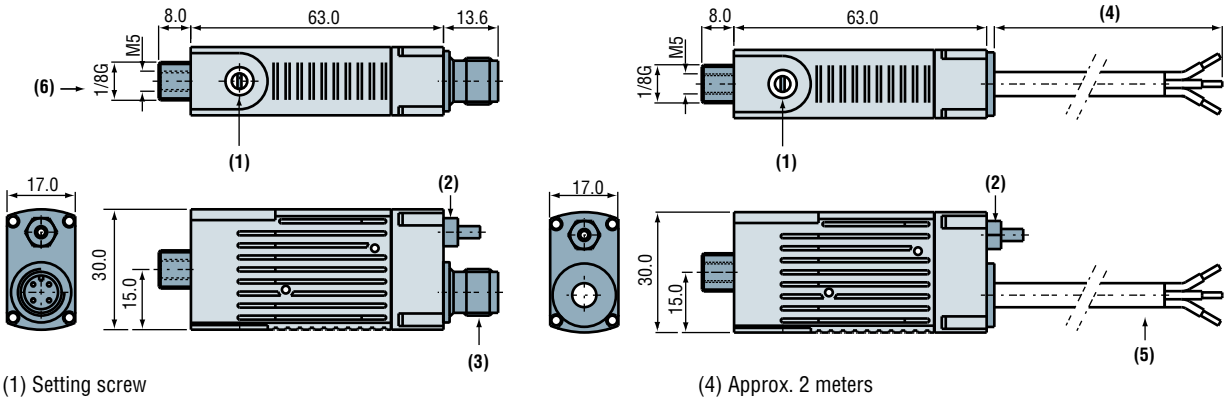
Straight PVC cable, 2 meters: ref. CD M12.
Elbow PVC cable, 2 meters: ref. CC M12.
See page 8/14.

Specifications



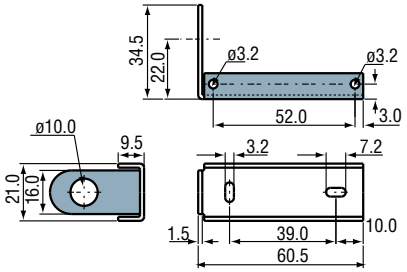
Models	Two versions: PSE 100 E and PSE 100 EC
Compatible fluids	All non-corrosive gases
Switching power	250V - 5A with cable
	125V - 3A with M12 connector
Electrical connection	M12 female connector or 3 wire PVC cable, length 2 m
Adjustment range	-300mb to -850mb
Precision	3%
Hysteresis	125mb
Repetitivity	< 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: 165g and PSE 100 EC: 37 g
Temperature	-10°C to +80°C / 14 to 176°F

Dimensions



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

Vacuum switch attachment - Clip ref.: PSE.F



For all orders, please specify: Model + Version

1: Model
PSE 100 E

2: Version	
-	PVC cable, length 2m
C	M12 connector

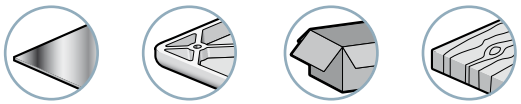
E.g. **PSE 100 E C**
(PSE 100 E series electric vacuum switch with M12 connector)

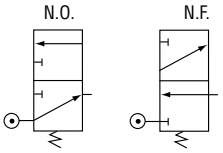
12

PSE 100 P series

Pneumatic vacuum switch

Branch-specific applications





Description

The PSE 100 E 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: N.O. version recommended for the "air saving" function on a venturi and N.C. version for the "safety" function (object detected, etc.) and "SFC signal".

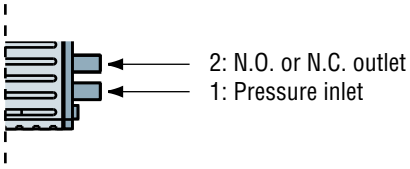
Specifications

Models	Two versions: N.O. and N.C.
Compatible fluids	All non-corrosive gases
Operating pressure	2 to 6 bar
Adjustment range	-300mb to -850mb
Precision	3%
Hysteresis	80 to 100mb
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	-10°C to +80°C / 14 to 176°F
Flow at 6 bar	70 Nl/min

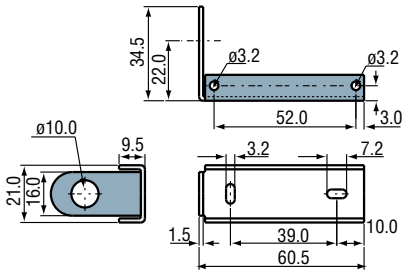
Additional information

■ Mounting in GVO option in the GVP / GVPS / GVPD vacuum pump range.

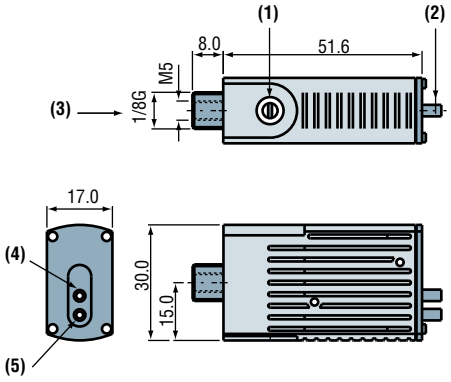
Pneumatic connection



Vacuum switch attachment - Clip ref.: PSE.F



Dimensions



(1) Vacuum threshold - Setting screw
(2) Hollow shaft for tube, inside Ø 2.7 mm
(3) Vacuum
(4) N.O. or N.C. outlet
(5) Pressure inlet

For all orders, please specify: Model + Version

1: Model
PSE 100 P

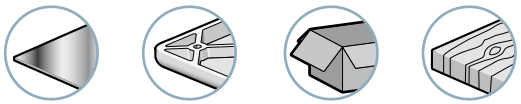
2: Version	
NO	Normally Open (N.O.)
NC	Normally Closed (N.C.)

E.g. **PSE 100 P NO**
(PSE 100 P series pneumatic vacuum switch, Normally Open version)

12

PSE 100 PK series **Pneumatic vacuum switch**

Branch-specific applications

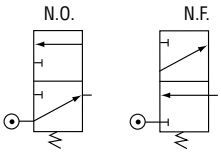


Description

The PSE 100 E 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: N.O. version recommended for the "air saving" function on a venturi and N.C. version for the "safety" function (object detected, etc.) and "SFC signal".



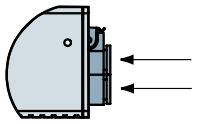
Specifications

Models	Two versions: N.O. and N.C.
Compatible fluids	All non-corrosive, non-lubricated gases
Operating pressure	2 to 6 bar
Adjustment range	NC: -250 to -830mb, NO: -350 to -880mb
Precision	± 10 %
Hysteresis	NC: 10mb - NO: 200mb
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	-10°C to +80°C / 14 to 176°F
Flow at 6 bar	66 Nl/min

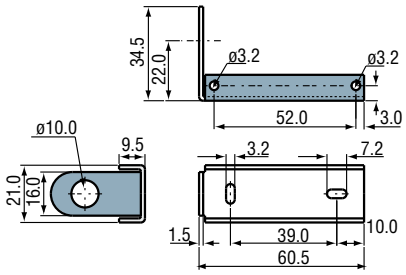
Additional information

■ Mounting in GVO option in the GVP / GVPS / GVPD vacuum pump range.

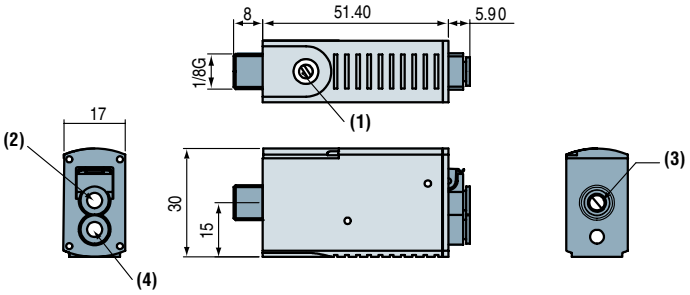
Pneumatic connection



Vacuum switch attachment - Clip ref.: PSE.F



Dimensions



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

For all orders, please specify: Model + Version

1: Model
PSE 100 PK

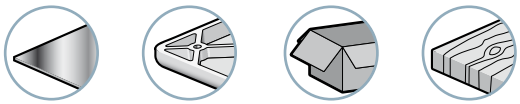
2: Version	
NO	Normally Open (N.O.)
NC	Normally Closed (N.C.)

E.g. **PSE 100 PK NO**
(PSE 100 PK series pneumatic vacuum switch, Normally Open version)

12

Vacuum gauge

Branch-specific applications



Description

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 8/11.

Characteristics

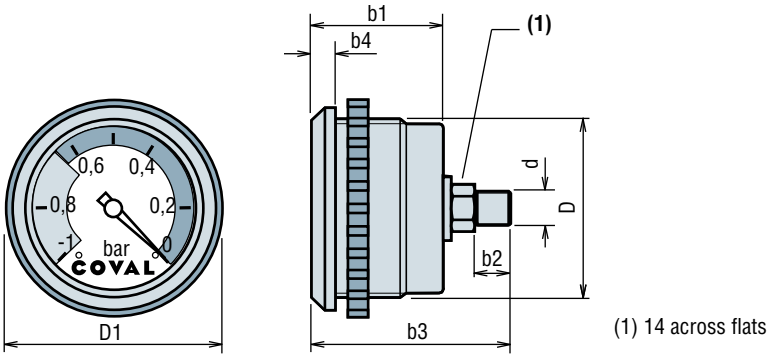
Model	D (1) (mm)	D1 (mm)	b1 (mm)	b2 (mm)	b3 (mm)	b4 (mm)	d (G male)
VAF 111 40	40	43	32.5	12	52	4	1/8
VAF 111 50	50	54	32.5	12	52	4	1/4
VAF 111 63	63	68	32.5	12	52	4	1/4

(1) : Flush-mounting diameter.

Specifications

Damping	By silicone movement - Patented
Ring	Chrome
Measuring	Bourdon tube in CuSn
Precision	cl.2.5 (±2.5% of max. scale value)
Enclosure	Black ABS
Temperature	0 to 60°C / 32 to 140°F
Flush-mounting	Ring included in the delivery
Option	as per quantity, possibility of customized dial.

Dimensions



(1) 14 across flats

For all orders, please specify:

Model + Flush-mounting diameter

1: Model
VAF 111

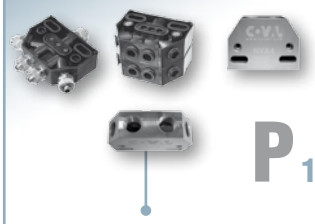
2: Flush-mounting diameter	
40	Ø 40 mm
50	Ø 50 mm
63	Ø 63mm

E.g. **VAF 111 50**

(VAF 111 series vacuum gauge with flush-mounting diameter 50mm)

Peripheral devices

NVS, NVR, NVA



- Vacuum feeders, 1 inlet, 4 to 8 outlets
- NVS: Screwed feeder fittings
- NVR: Push fitting feeder fittings
- NVA: Threaded aluminum feeder
- NVS and NVR series material: Polyamide 6.6 – 30% glass fibre, black, ULVO94
- NVS and NVR series fittings material: Nickel-plated brass

P 13/2

- Facilitates optimum vacuum management by improved distribution
- Eliminates air pressure loss
- Simplifies connection
- Less time-consuming installation
- Compact and light-weight

RDV, RCOV, Y

- RDV, RCOV and RY series: Straight, adjustable elbow or Y fitting
- Diameter options: 5, 5/8, and 6/8,7/10,8/10,10/12
- Gas fittings options: 1/2 ,1/4,1/8,3/8,
- Material: Nickel-plated brass

P 13/3

- 100% vacuum-tight
- Integrated O-ring
- Improved circuit sealing
- Can be removed and reinstalled without requiring preparation of the tubing

RVM, RVF, RVT

- Barbed fittings guarantee a rigid connection between the source and the vacuum tube

TVR

- Rigid tubes allow a vacuum network to be installed with no pressure loss

COV

- Clamps used on TVR type pipes to guarantee network sealing

P 13/4

REV 38

- Vacuum regulator
- Adjustment precision: 0.13mbar
- Materials used in the VITON body and lacquered aluminum foundry
- Adjustment by threaded pin
- 3/8 G fitting attachment bracket

P 13/5

- Direct connection to a vacuum pump
- Very fine adjustment

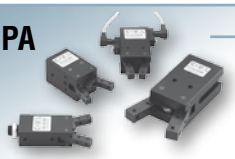
AG

- Vacuum valve
- Connection to the vacuum network
- Electric control
- Voltage: 12 VDC, 24 VDC or VAC, 110 VAC, 220 VAC
- N.O or N.C for the vacuum or compressed air supplied servo

P 13/6

- Facilitates vacuum or compressed air network management
- N.O. or N.C. option allows adaptation to suit the application

PA



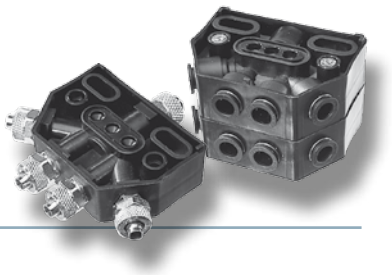
- Angular jaw clamps
- Adjustment of finger speed with compressed air regulator
- 3 models

P 13/7

- For use on all types of manipulators
- Recommended for injection press unloading robots for parts or sprue

NVS, NVR, NVA series

Vacuum feeders



Use

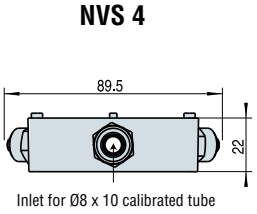
The NVS and NVR series vacuum feeders allow distribution of the vacuum in 4 to 8 channels by a simple unit. The 8/10 inlets and 4 or 8 6/8 outlets eliminate pressure loss.

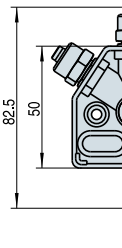
Characteristics

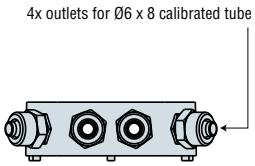
		Screwed vacuum fittings		Push fittings		Threaded
Models		**NVS 4**	**NVS 8**	**NVR 4**	**NVR 8**	**NVA 4**
Material	Body	PA 6.6 – 30 % fiber glass, black, ULVO94				Aluminum 2014 A
	fitting	Nickel-plated brass		PA		
For tube		calibrated polyamide or polyurethane (PUR)				4 x 1/4G and 1 x 3/8G
Vacuum		■ ++	■ ++	■	■	■ ++
Pressure (up to 10 bar max.)		-	-	■	■	■

■ ++ Recommended for vacuum networks with regulation

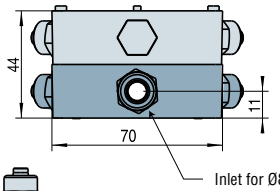
NVS 4

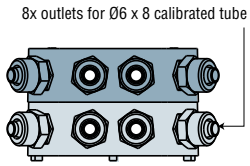




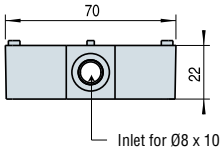


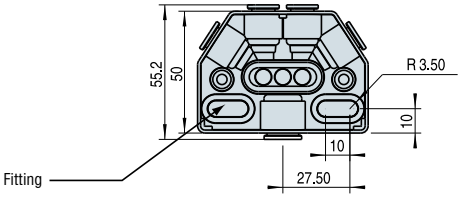
NVS 8

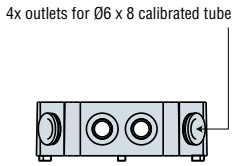




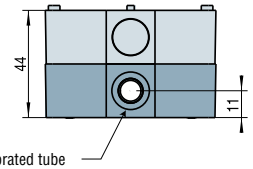
NVR 4

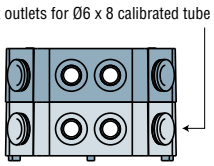




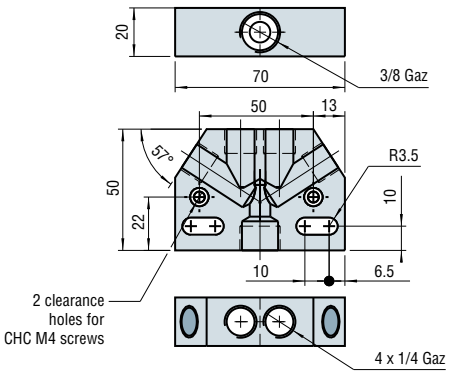


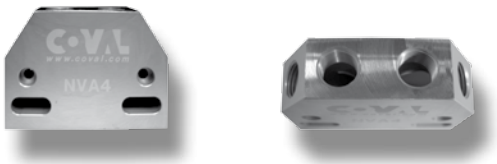
NVR 8





NVA 4





For all orders, please specify:

Model + Type + Number of outlets

1: Model
NV

2: Type	
S	screwed fittings
R	push fittings
A	threaded

3: Number of outlets	
4	4 outlets - 1 inlet
8	8 outlets - 1 inlet

E.g. **NV S 8**

(NV type vacuum feeder, screwed fittings with 8 outlets and 1 inlet)

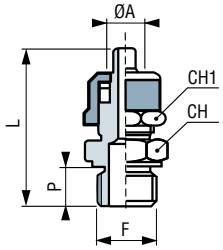
Note: for NVA series, one reference only: NVA 4 (aluminum feeder)

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.

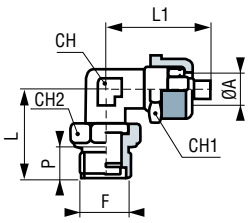
RDV series straight fitting



Ref.	ØA (mm)	F	CH (mm)	CH1 (mm)	P (mm)	L (mm)
RDV1868	6/8*	1/8G	14	14	6	26
RDV1468	6/8*	1/4G	17	14	8	29
RDV14810	8/10	1/4G	17	16	9	30.5
RDV3868	6/8*	3/8G	19	14	9	30.5
RDV38810	8/10	3/8G	19	16	9	32
RDV38812	8/12	3/8G	19	19	9	32.3
RDV12810	8/10	1/2G	24	16	10	33.5
RDV381012	10/12	3/8G	19	19	9	32.3
RDV12812	8/12	1/2G	24	19	10	34.5
RDV121012	10/12	1/2G	24	19	10	34

* 6/8 fittings are 5.5/8 compatible.

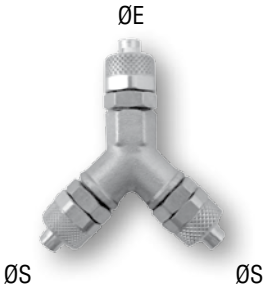
RCOV series elbowed fitting



Ref.	ØA (mm)	F	CH (mm)	CH1 (mm)	CH2 (mm)	P (mm)	L (mm)	L1 (mm)
RCOV1868	6/8*	1/8G	10	14	14	7	24	22
RCOV1468	6/8*	1/4G	13	14	17	9	28.5	27.5
RCOV14810	8/10	1/4G	13	16	17	9	28.5	28
RCOV3868	6/8	3/8G	13	14	22	9	29	27.5
RCOV38810	8/10	3/8G	13	16	22	9	29	28
RCOV12810	8/10	1/2G	17	16	26	10	35	34
RCOV121012	10/12	1/2G	17	19	26	10	35	34

* 6/8 fittings are 5.5/8 compatible.

Y fitting, Y series



Ref.	ØE (mm)	ØS (mm)
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.

RVM, RVF, RVT series

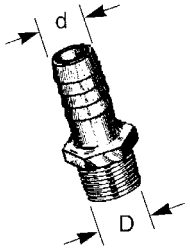
Fittings

Characteristics

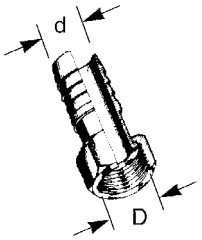
■ Material: brass.

Models	D	D1	D2	d*
RVM 1014	1/4	-	-	10
RVM 1038	3/8	-	-	10
RVM 1538	3/8	-	-	15
RVM 1512	1/2	-	-	15
RVM 2012	1/2	-	-	20
RVM 2034	3/4	-	-	20
RVF 1038	3/8	-	-	10
RVF 1512	1/2	-	-	15
RVF 2034	3/4	-	-	20
RVT 1012	-	1/2	3/8	10
RVT 1534	-	3/4	1/2	15

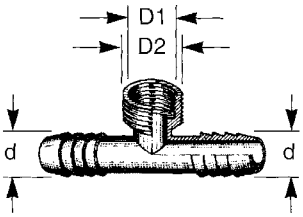
(*) Inside diameter of the suitable pipe



RVM



RVF



RVT

Description

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

TVR series

Vacuum tubes

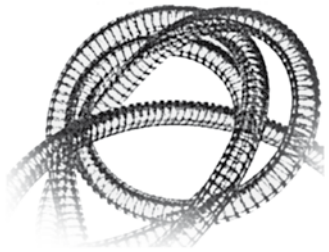
Characteristics

Models	inside Ø (mm)	outside Ø (mm)	r* (mm)
TVR 10	10	16	18
TVR 15	15.5	22.5	30
TVR 20	19.5	27.5	37

*r: minimum bend fitting

TVR vacuum tubes hold a 90% vacuum with an ambient temperature of 30°C / 86°F.

Colour: Crystal



Description

Thanks to their rigid design and steel coil, they ensure that there is no pressure loss on the vacuum network.

COV series

Collars

Characteristics

■ Material: stainless steel

Models	Tube ref.	L (mm)
COV 10	TVR 10	7
COV 15	TVR 15	7
COV 20	TVR 20	7

Other dimensions and shapes on request.

Description

Accessory to be used for attaching TVR type pipes to guarantee perfect sealing.

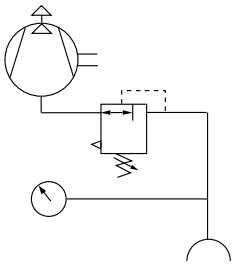
Vacuum regulator

Description

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

Characteristics

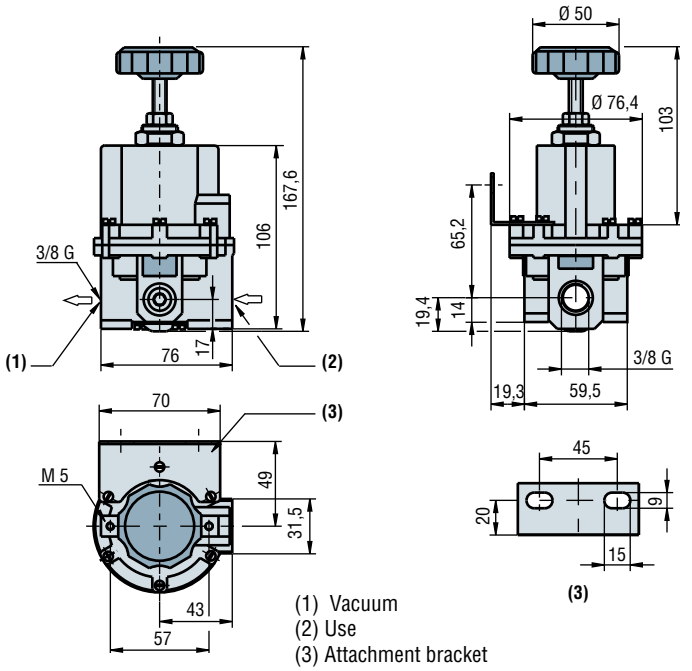
- Adjustment range: 0 to -990mbar
- Adjustment accuracy: ± 0.13mbar
- Through flow: 16.2 Nm^3/h



Specifications

Diaphragm	VITON
Material	Lacquered aluminum foundry
Adjustment	by threaded pin
Attachment bracket	Delivered as standard

Dimensions



(1) Vacuum
(2) Use
(3) Attachment bracket

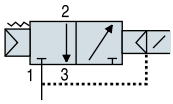
For all orders, please specify: REV 38

13

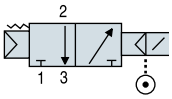
Vacuum valves, 3 channels

Description

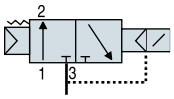
NC vacuum supplied servo
3: Exhaust
2: Use
1: Pump



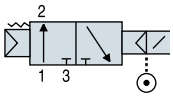
NC CA supplied servo
3: Exhaust
2: Use
1: Pump



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



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



Characteristics and dimensions

Diagram 1

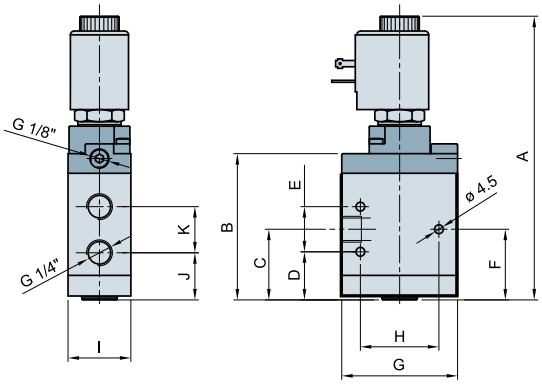
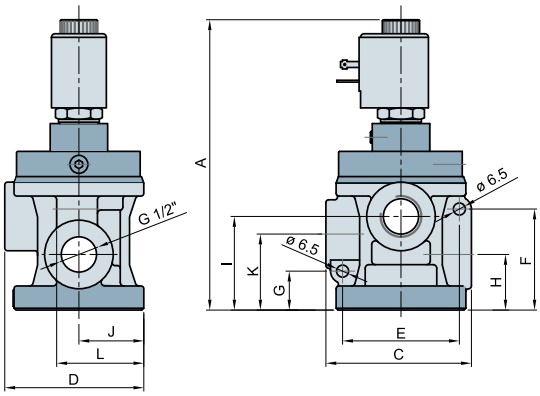


Diagram 2



Ref. NO AC servo	Ref. NC AC servo	Ref. NO Vacuum servo	Ref. NC Vacuum servo	Fitting Gas	A	B	C	D	E	F	G	H	I	J	K	L	M	Ø	diagrams
AG 3002	AG 3001			1/8"	100	52.7		9.2		19.7	35	28	25	11	17.5				1
AG 3010	AG 3009	AG 3211	AG 3210	1/4"	144.5	74.5	36	24.5	23	36	59	40	32	24	23.5		4.5	1	1
AG 3012	AG 3011	AG 3215	AG 3214	3/8"	144.5	74.5	36	24.5	23	36	59	40	32	24	23.5		4.5	1	1
AG 3021	AG 3020	AG 3223	AG 3222	1/2"	156.6	100.6	78.5	75	63	54.5	21	30	50.5	35	41	47		6.5	2
AG 3041	AG 3040	AG 3233	AG 3232	3/4"	156.6	100.6	78.5	75	63	54.5	21	30	50.5	35	41	47		6.5	2
AG 3051	AG 3050	AG 3243	AG 3242	1"	172.7	116.7	101	94	76	62.5	25.5	38	64	45	51	55		8.4	2
AG 3063	AG 3062	AG 3257	AG 3256	1"1/2	188	172	158	138	113	113	34	50	96	51	68	84	62	11	2

Specifications

Fluid	Non-lubricated 50 micron filtered air. If lubrication is used it must be uninterrupted	
Maximum vacuum	97%	
Operating temperature	-20°C +40°C / -4 to 104°F	
Fluid temperature	max +40°C / 104°F	
Dynamic seal	polyurethane	
Static seal	NBR	
Coil power	11 VA	10 VA
Voltage	12V DC / 24V DC	24V AC / 110V AC / 220V AC
Minimum vacuum for vacuum supplied servo	20 %	

Flow rate

Fitting	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1"1/2
Nominal diameter [mm]	5.5	8	10	15	19	25	39
Flow [m3/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 AC servo	1.5	2.5	2.5	3	3	3	4

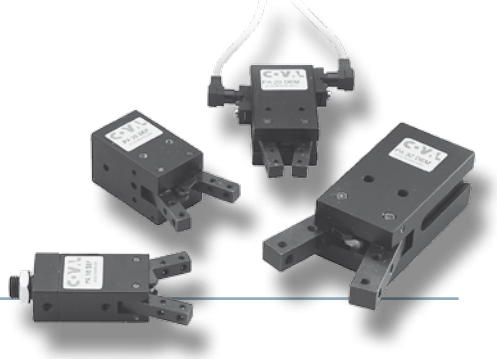
(1) with monostable electrical control

For all orders, please specify:
Model + Voltage

1: Reference of model	2: Voltage
see Characteristics	see Specifications

E.g. **AG 3215 110 VAC**
(AG series 3-channel vacuum valve, NO vacuum supplied servo, voltage 110 VAC)

Angular jaw clamps



Description

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 for parts.

Choose a clamp with a theoretical force at least equal to 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 = 6.06Kg.

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 (closure action only).
- SE0: opening by compressed air, closure by return spring (opening action only).

Specifications

Compressed air	Filtered, lubricated or non-lubricated
Maximum pressure	10 bar
Material	Anodized aluminum
Seal	Nitrile (NBR)
Heat treatment	On pins and fingers
Operating temperature	-10 to 70°C / 14 to 158°F

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 15mm from the fulcrum for models PA 16 - 20 - 32 and 30mm from the fulcrum for models PA 50.

For all orders, please specify:

Model + Action + Magnetic sensor

1: Model
PA 16 to PA 50

2: Actions	
SEF	Closure action only
SEO	Opening action only
DE	Double action

3: Magnetic sensors	
-	Without
M	For PA 20 - 32 - 50

E.g. **PA 20 SEO M**
(PA 20 model clamp jaws opening action only and magnetic sensor)

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COVAL
vacuum managers

ALL-IN-ONE SOLUTIONS

▶ COVAL GRIPPERS

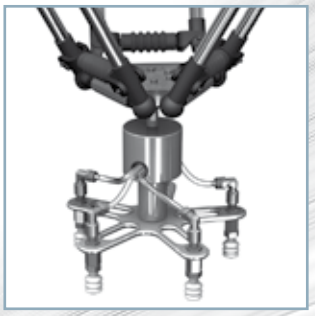
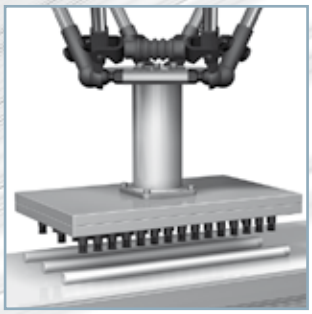
COVAL develops customized solutions on demand for automated applications in various sectors, such as packaging, food processing and plastic processing.
We intervene throughout the production chain, from the individual handling of objects to complete end-of-line layer palletization.

From components for vacuum automation to complete grippers, our know-how and experience allow us to assist you with the technical definition of a solution that will perfectly meet your needs and requirements.

We offer a full range of standard and customized vacuum chambers, fit with foam mats or suction cups for scalable applications: handling of various sizes, shapes and weights of objects.

For the individual gripping of specific products, we offer a custom-designed gripping tool that will perfectly blend into your environment.





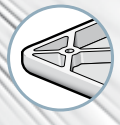
▶ COVAL SERVICES

A dedicated team helps you define an appropriate and optimized gripper for your application.

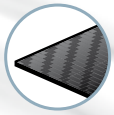
We have 3D design tools and design software that let us best determine your vacuum generator, vacuum network and suction cups to guarantee the optimal efficiency of your production system.

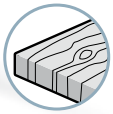
▶ SOLUTIONS BY APPLICATION

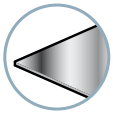

PACKAGING

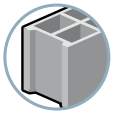

PLASTIC


GLASS


CARBON


WOOD


METAL


CONCRETE/
STONE

vacuum systems

▶ COVAL - SYSTEMS

COVAL is also a specialist in the conception and manufacturing of a wide range of vacuum lifting systems. Coval vacuum systems are suitable for all types of applications. The equipment complies with all the stringent safety regulations for vacuum lifting.

For the past 25 years COVAL SYSTEMS UNIT proposes a complete range of suction pad vacuum lifters, tube lifters and now the vacuum grippers.
In addition to our consulting support, our product range offered in the general catalogue, provides all the solutions to suit your applications.

VACUUM LIFTERS

VAC'easy : COVAL range of suction pad lifters optimized for the sheet metal industry. It enables the lifting of sheet metals up to 800kg and is a very efficient, economic and reliable solution for numerous small scale workshops and machining industries.

VACUOPAL : COVAL standard range of modular lifter available in either electric or pneumatic versions. Its high flexibility allows for the lifting of heavy loads in several positions: horizontally, vertically, pivoting at 90° or turning upside down at 180° with loads ranging from a minimum of 100kg upto several tons.

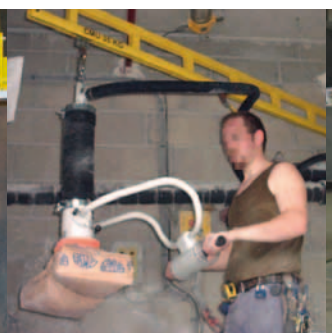
CYCLONE : They are known for high security, precision and reliability. A single operator can handle with ease, loads ranging from 20 to 300 kg such as small slabs, drums, carton boxes, sheet metal, etc.

SYSTEM COMPONENTS

COVAL offers a complete range of individual lifting components adaptable to all types of needs.
They are easy to integrate, flexible and standard materials.
Product features:
Flat suction pads, Ø 120 to 600 mm - Spring systems - Pneumatic or electric central vacuum units equipped with all the necessary security options, reinforced with respect to stringent lifting regulations - Tubes, fittings, filters - Dry vane or lubricated vacuum pumps, etc.

To find more information about our vacuum systems range, please visit our website **www.coval.com** and download the related documentation. For further information contact your local COVAL correspondent.




COVAL
vacuum managers

A TECHNOLOGICAL PARTNER WITH WORLDWIDE VISION

COVAL, ***vacuum managers***, conceives, manufactures and commercializes worldwide components and systems for vacuum automation.

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

Our mission, is to go beyond the limits of a simple component supplier and assist our clients at each step of our interaction by :

- Organizing specialized training programs for our clients and partners.
- Proposing efficient, economic and reliable solutions
- Ensuring timely delivery and proper installation of our solutions.

COVAL INC. | **COVAL S.A.S.** | **COVAL IBERICA** | **COVAL DEUTSCHLAND** | **COVAL ITALIA**

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