VACUUM PRODUCTS

PIAB

Innovators in Vacuum Technology

VACUUM PRODUCTS CATALOG

Page

"PIAB Vacuum Academy"

The PIAB Vacuum Academy (PVA) offers both theoretical and practical training around the world. PIAB will be offering training throughout the year. The courses will be divided into three learning blocks; general vacuum technology, vacuum handling and system design.

Good knowledge of vacuum technology is essential if PIAB products are to be put to effective use.

Why should I use compressed air as an energy source?

Almost every industrial plant, from a small machine shop to an immense pulp and paper mill, has some type of compressed air system that is vital to plant operation. Many companies consider compressed air as the fourth utility (after electricity, gas and water). Air powered devices are popular because they are reliable and compact.

Industrial facilities use compressed air for a multitude of operations. Almost every facility has at least two air compressors and in a medium-sized plant, there may be hundreds of different uses of compressed air. Everyday uses include powering pneumatic tools, packaging and automation equipment.

Compressed air can be stored for use when demand arises or is produced as required. To many users, the advantage of compressed air as a source of power is that it can be used at comparatively little cost and with very little trouble.

Why is it good to regulate compressed air pressure and work at a lower air pressure?

A rule of thumb is that every 2 psi increase in operating pressure requires an additional 1% in operating energy costs. For example, three 250-hp compressors operating year-round at 10 psi more than needed, costs an additional $12,250/year in energy costs, based on a rate of $0.05/kwh or $16/hp.

To realize a goal of lowering the country s energy consumption and reducing greenhouse gases, the U.S. Department of Energy has launched the Compressed Air Challenge. This initiative is designed to build awareness among users of compressed air about the benefits and approaches for improving and maintaining compressed air system efficiency.

One of the standards developed by the Compressed Air and Gas Institute (CAGI) is to lower the output pressure of an air compressor. This has two effects on the energy being consumed. First, the compressor operates more efficiently at lower pressures. Second, the lower the pressure delivered to the plant, the lower the leakage rate and the demand.

Comprehensive know-how in design saves energy!

Graphic donated by Kaeser Compressors, Inc., Fredericksburg, VA.

One of the main recommendations from a major air compressor manufacturer is to regulate all point-of-use operations at the lowest possible pressure using a quality regulator. Each and every point-of-use in the plant needs a regulator. Consider a cylinder that is supposed to operate at 85 psi, but instead is filled by air at a line pressure of 110 psi. Twenty-five percent more molecules are required to fill that cylinder at 110 psi versus 85 psi. (The percentage is determined by the ratio of the density of the gases.) This 25 percent greater artificial demand forces the compressor to operate for a longer period of time to suck in those molecules.

Another rule for compressed air systems is to use the least amount of air at the lowest air quality and pressure that satisfies the total system requirement. Reducing system pressure can also have a cascading effect in improving overall system performance, reducing leakage rates, and helping with capacity and other problems. Reduced pressure also reduces stress on components and operating equipment.

High short-term demand should be met by air stored in a storage tank. Locate the storage tank near the source of the demand.

PIAB s low-pressure vacuum pumps are designed to comply with the goals of CAGI to work at lower air pressure to be more efficient.

What does PIAB have to offer?

In the case of a PIAB Vacuum Pump, its energy source is compressed air. It is easy to control a PIAB pump on/off with an air valve. The amount of compressed air pressure, usually measured in pounds per square inch (psi), determines the amount of vacuum pressure you can achieve from the PIAB Vacuum Pump.

For a majority of applications, PIAB offers low-pressure vacuum pumps in the Mini Chip and Classic series. These pumps operate at only 50-55 psi and provide vacuum pressures down to 27.1 -inHg. There is no reason to operate at higher air pressures with PIAB.

What is vacuum?

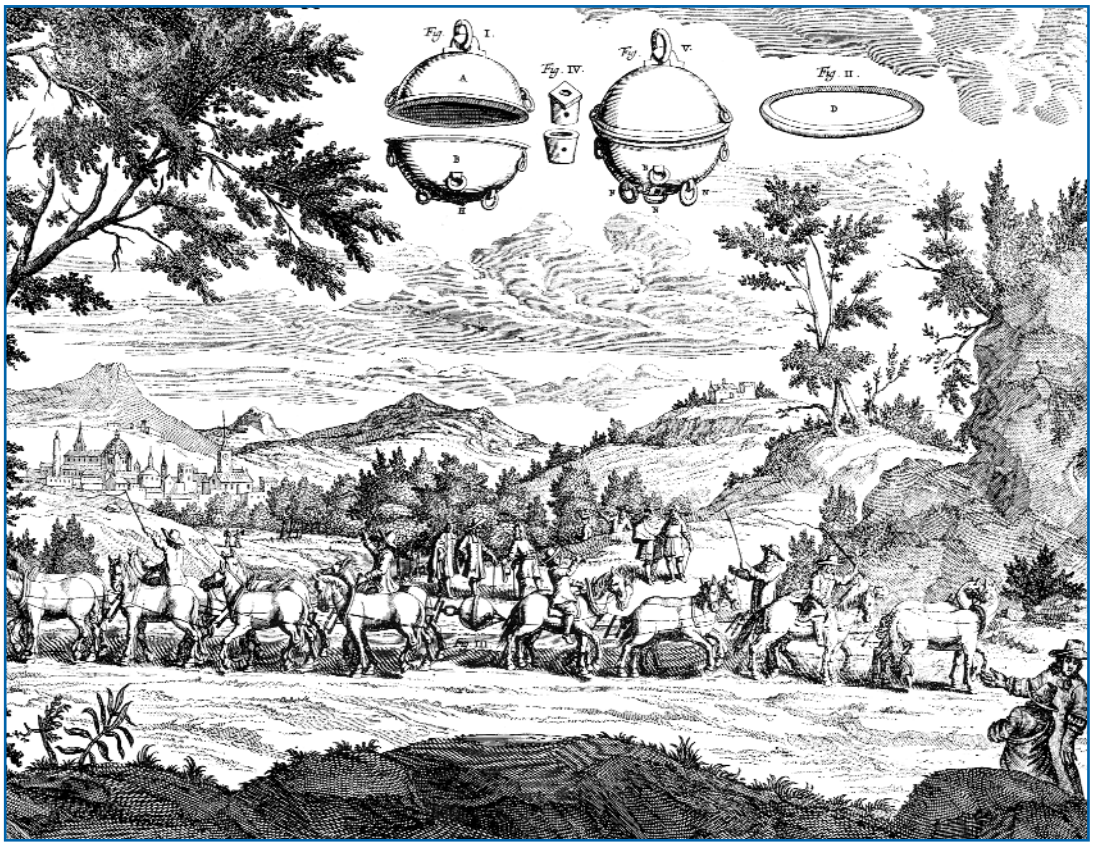
The PIAB Vacuum Academy has the answer!

At PIAB we have always stressed the importance of training. This concerns both our own people and the users of our products. A thorough knowledge of vacuum guarantees an efficient and profitable usage.

The educational activities in the vacuum field are in progress all the time and are now concentrated to the PIAB Vacuum Academy. The training activities, courses and lectures vary according to need. The PIAB "teachers" are all specialists within their field. The training can be at your own location or at PIAB distributors throughout North America.

Vacuum Technology

When using the terms "vacuum", "negative pressure", "suction", etc., we mean a pressure that is lower than the atmospheric pressure, which is the pressure of the weight of the air above us. At sea level it is usually 14.7 psi. This means that a column of air with a cross-sectional area of 1 ft^2 presses on the surface of the earth with a force around 2,200 lbf. By reducing the pressure in a closed space the atmospheric pressure will become a potential energy source.



As far back as 1654, the German Otto von Guericke showed how to produce a vacuum. He used two fitting hemispheres from which he pumped out the air. This created a pressure below atmospheric and the two hemispheres were pressed together. 16 horses were required to separate them. Finally they parted with a resounding bang.

PIAB's History: PIAB AB is a Swedish company that develops and markets vacuum products. Our first product was a drawing compass that simplified the work of design engineers. It also gave us our name: Pi (=3.14), AB is the equivalent of Inc. in Sweden.

At the end of the 1960 s, the company entered a new field of vacuum technology. The old, familiar ejector principle was refined so that PIAB could offer its customers entirely new possibilities in materials handling.

PIAB s vacuum pump was patented in the early 1970s. It is a compressed air-driven vacuum pump with an unique multi-stage ejector concept. The pump uses very little energy compared with conventional single-stage ejectors or venturis.

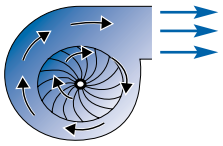
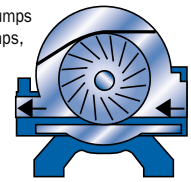
The PIAB pump comes in a variety of models which generate a vacuum easily and reliably without noise, heat or vibration.

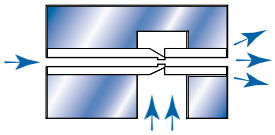
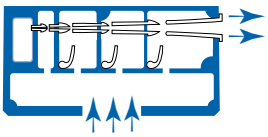
PIAB is the leader in compressed air-driven vacuum pumps in the world today. The global PIAB organization has expanded substantially and emphasizes technical innovation, customer service, quality and education.

How do you create vacuum?

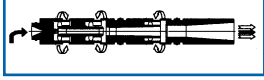
Characteristics of various pump types.

Please note that the application must be taken into account when deciding whether a certain type of pump is suitable. In other words, a pump that is “good” for one application may be “bad” for another.

Mechanical Pumps	Advantages	Disadvantages
Fan 	Few moving parts. Large Volumes.	Low maximum vacuum (approx. 20%). Slow start up and run down.
Displacement pumps (E.G. piston pumps, vane pumps) 	High vacuum and flow.	High sound level and heat emission. Sensitive to contamination. High price.

Ejector Pumps (compressed air-driven)	Advantages	Disadvantages
Single stage ejector 	Low price. No heat emission.	High noise level. Gives either high flow or high vacuum.
Multi stage ejector 	Low noise level. No heat emission. Low power consumption. Up to 99% vacuum. Fast.	Higher price than single stage ejector.

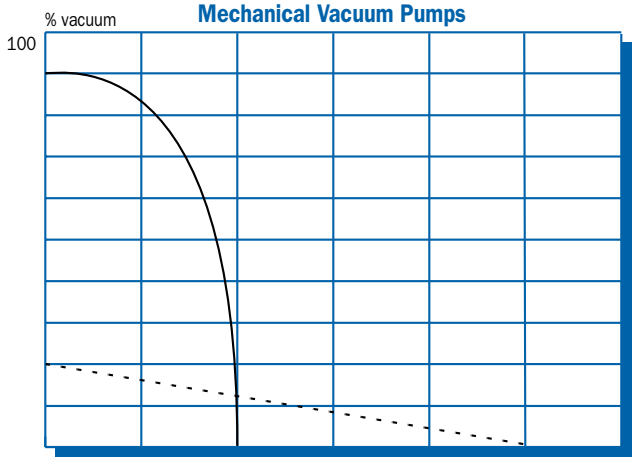
NEW

COAX™ Technology	Advantages	Disadvantages
	Compact size, Modular.	Higher price than single-state ejector.

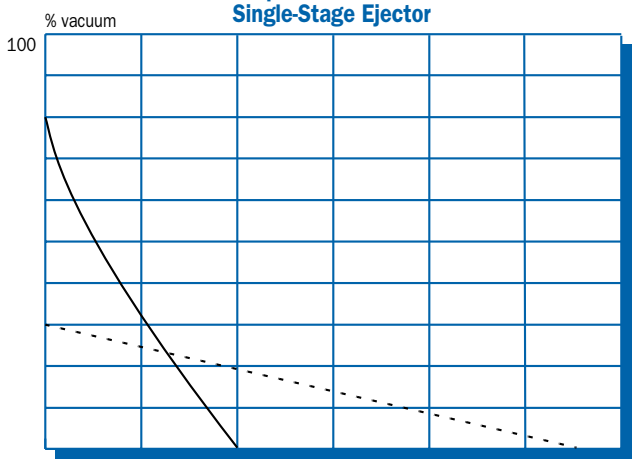
Vacuum Pumps

In order to create an under-pressure, some kind of vacuum pump is required. These can be divided into two groups: mechanical pumps and ejector pumps. Most ejector pumps run on compressed air.

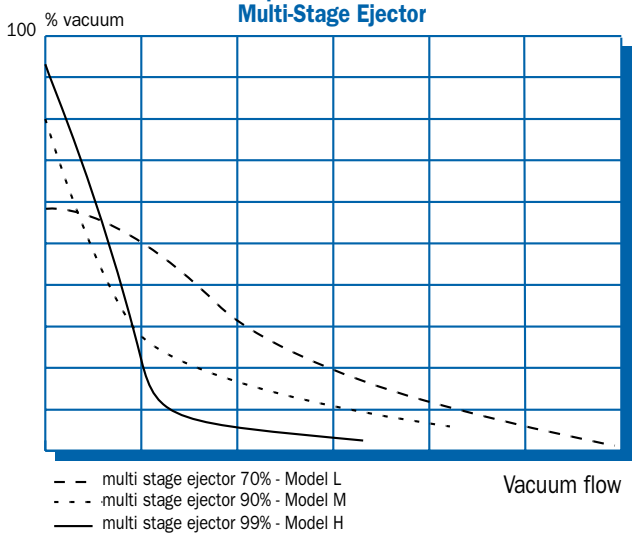
Mechanical Vacuum Pumps



Compressed-Air-Driven Single-Stage Ejector



Compressed-Air-Driven Multi-Stage Ejector



How do I design a vacuum system?

Choice of Vacuum Pump

Sealed Systems

For sealed systems, the capacity of the pump is determined by how fast the system can be evacuated to a certain vacuum level. This capacity is called the evacuation time of the pump and is normally specified in standard cubic feet per minute (scfm). This value is multiplied by the volume of the system in order to obtain the evacuation time to the desired vacuum level.

Non-Sealed Systems

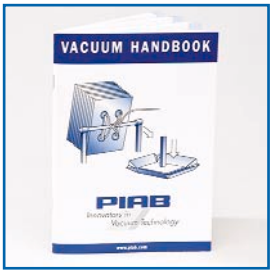
With non-sealed systems (lifting of porous material) the case is different. To maintain the desired vacuum level the pump must have the capacity to pump away the air leaking in. By establishing the leaking flow, it is possible, by reading the pump data, to find the right pump for the application in question. If the leakage occurs via a known aperture, the flow can be established according to the following table.

Vacuum Level -inHg	Leaking Flow scfm per in²
3	167
6	222
9	253
12	268*

* From approximately 12 -inHg to 29.921 -inHg the flow is constant.

When the leakage occurs through a porous material or in an unknown way, the flow can be established by a test with a vacuum pump. The pump is connected to the system and the obtained vacuum level is read. (It should be at least 6 -inHg.) The flow that is pumped away at this vacuum level can be seen on the page of the particular pump. This flow roughly corresponds to the leaking flow.

For your free copy of PIAB's Vacuum Handbook, published by the PIAB Vacuum Academy, please call PIAB Customer Service at 1-800-321-7422, send e-mail to info@piab.com, or return the enclosed postcard.



Energy Requirements

As the energy requirements increase infinitely with increased vacuum, it is advisable to choose a level of vacuum as moderate as possible. It is better to oversize the application area (e.g.-suction cup) instead of the vacuum level.

Example – a suction cup with a 2" diameter gives a holding power of 40 lb(f) at 27 -inHg. If the vacuum is lowered to 18 -inHg, the suction cup has only to be increased to 2½" diameter to sustain the holding power. The energy requirements are reduced drastically.

The pump should, as a general rule, be placed as close to the suction point as possible:

- in order to reduce the volume between the suction point and the vacuum source,
- to decrease the possibility of leakage,
- to provide a rapid process,
- to enable use of a small pump,
- to save energy.

Vacuum Glossary

Air Consumption: The volume of air per unit of time required to operate an air driven vacuum pump; usually measured in standard cubic feet per minute (scfm)

Air Supply Pressure: Pressure of compressed air at supply inlet of air-driven vacuum pump; usually measured in pounds per square inch (psi).

Free Air Capacity: The volume of air passed per unit of time through an air-driven vacuum pump when the pressure on the intake and the exhaust sides is equal to atmospheric pressure.

Time of Evacuation: The time required to remove the air in a given system from atmospheric pressure to a specified negative pressure.

Vacuum Flow: the rate at which atmospheric air is removed from a system is defined as the vacuum flow rate and is usually expressed in standard cubic feet per minute (scfm).

Vacuum Force: The level of negative pressure is defined as vacuum force and usually expressed in inches of mercury (-inHg).

Designing a Vacuum System

When designing a vacuum system, there are several different methods to increase safety and reliability. To have an efficient operation, it is important that the system be designed to the specifics of the application. In addition to the choice of suction cups, the type and size of vacuum pumps, accessories, safety level and the type of system must be decided. See our information on these next pages for general outlines and recommendations on designing a vacuum system.

Centrally or Locally Placed Vacuum Pump

Lifting devices with several suction cups can be designed in various ways. One way is to use a central vacuum pump which is connected to all suction cups. Another way is to have a vacuum pump for each suction cup. The choice is governed by desired load capacity, air consumption and safety. In most cases, however, a local vacuum pump gives best efficiency.

Centralized System

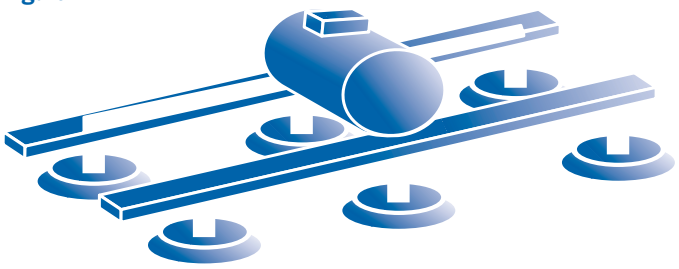
A system with a centrally placed vacuum pump and energy-saving function can look like Figure A. Assume that the total evacuation volume is 61 cubic inches, the volume of the suction cup is 6.1 cubic inches and the vacuum level of the system 27 -inHg. When the valve of the suction cup opens, the vacuum level of the system will drop to 24 -inHg. The pump must then before the next cycle reduce the vacuum from 24 to 27 -inHg. In a diagram for the evacuation time of a common compressed air-drive vacuum pump, the following results are obtained. (See Figure C.) The evacuation time to 27 (90%) -inHg is 7 sec. and to 24 (80%) and 27 -inHg is consequently 7 sec.-1.9 sec. = 5.1 sec. This means that the pump must work during the corresponding time.

Decentralized System

With a vacuum pump on each suction cup (Figure B) the pump works from 0 to max. vacuum by each cycle. The evacuation volume is only 6.1 cubic inches (one tenth of the central system), which means that the evacuation time is one tenth of the time for the central system. According to Figure C, the evacuation time for 6.1 cubic inches from 0 to 24 -inHg is only 0.19 sec. Consequently, the pump only works 0.19 sec. in the decentralized system compared to 5.1 sec. in the centralized system (26 times longer).

Centralized System

Figure A



Decentralized System

Figure B

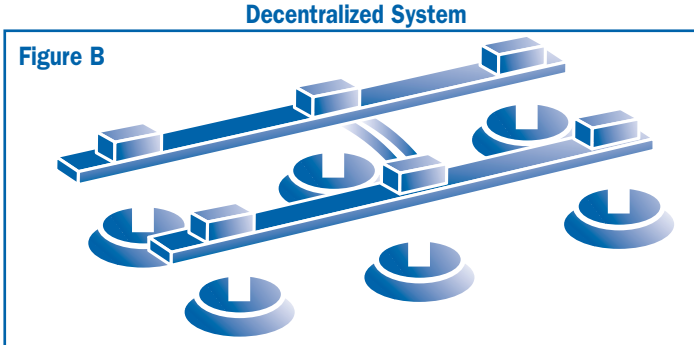
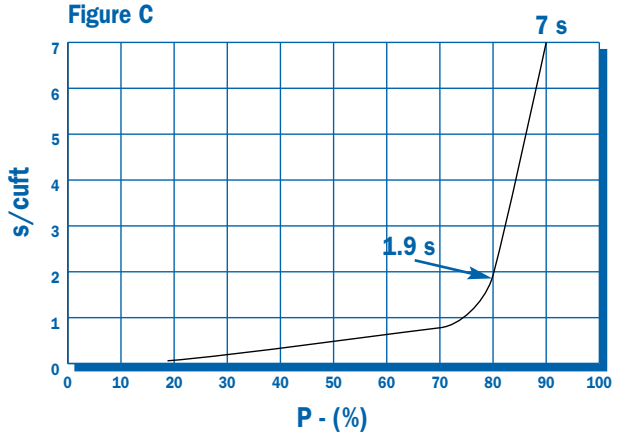


Figure C



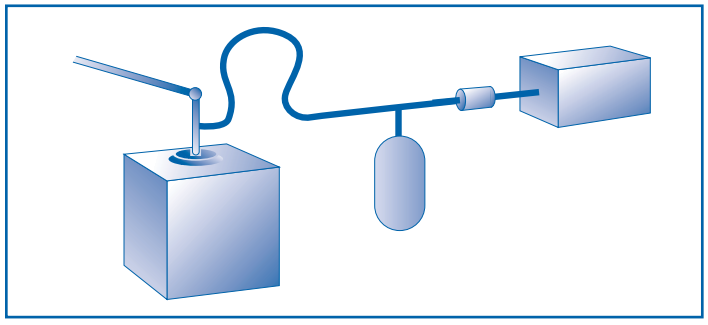
Safety

Special safety requirements govern manual vacuum lifting devices. When designing these devices allow for at least a double safety margin on the lifting force at the designated vacuum level.

In order that the load is not released by mistake, the release is blocked during lifts. Further safety is gained through sound or light signals which gives a warning if the vacuum level falls below a certain set value.

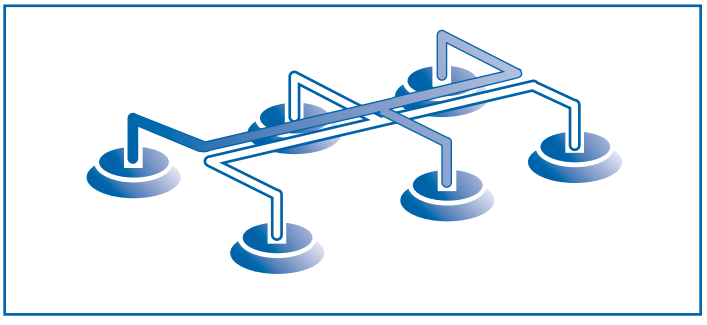
Vacuum Tank

As a protection against loss of vacuum, for example if a pipe breaks, a non-return valve is normally fitted near or in the pump. A vacuum tank between the vacuum pump and the suction cup gives extra safety if an unexpected leakage or loss of vacuum occurs.



Dual Circuit System

Lifting devices with several suction cups are often built as two separate vacuum systems with separate vacuum pumps, each one of them managing to hold the load with sufficient safety factor.



Energy Needs at Different Vacuum Levels

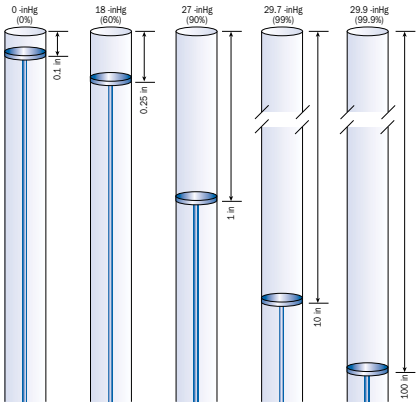
The energy required to create a vacuum increases asymptotically towards infinity with increased vacuum. To obtain optimum energy exchange it is very important to choose the least possible vacuum. To illustrate the energy needs, a cylinder with a piston (piston pump) is suitable.

According to Boyle s Law the pressure (p) in a gas is inversely proportional to its volume (V) at constant temperature:

$$p \times V = \text{constant}$$

This means that increased volume gives a lower pressure.

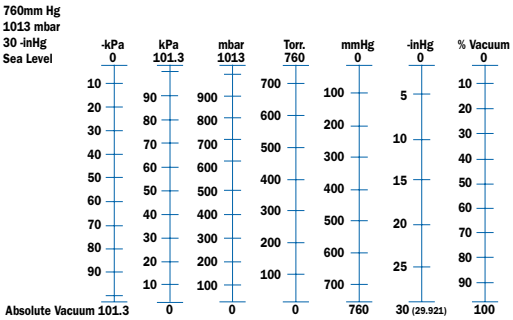
By pulling the piston slowly the distance extended will show the increased energy needs. The temperature is not constant in practice. However, at a slow operation the temperature effect is negligible.



Conversion Formulas

MULTIPLY	BY	TO OBTAIN
Volume		
cubic feet/minute	0.472	liter/second
gallons	0.134	cubic feet
liters/minute	0.2642	gallons/minute
cubic meter	35.315	cubic feet
Pressure		
inches mercury	0.4912	psi
inches water	25.4	mm water
psi	27.7	inches water
bar	14.504	psi

Pressure Below Atmospheric



Change in atmospheric pressure with altitude (height above sea level)

A vacuum gauge is normally calibrated with normal atmospheric pressure at seal level as a reference, 14.7 psi, and is influenced by the surrounding atmospheric pressure in accordance with the table below.

Barometric pressure			The reading on the vacuum gauge at 14.7 psi				
mm Hg	psi	equiv. ft. above sea level*	18 inHg	22.5 inHg	25.5 inHg	27 inHg	29.7 inHg
593	11.4	6562	11.7	16.2	19.2	20.7	23.4
671	12.9	3281	14.8	19.4	22.4	23.9	26.6
690	13.3	2553	15.6	20.1	23.1	24.6	27.3
700	13.5	2149	16.0	20.5	23.5	25.0	27.7
710	13.7	1788	16.4	20.9	23.9	25.4	28.1
720	13.9	1532	16.8	21.3	24.3	25.8	28.5
730	14.1	902	17.2	21.7	24.7	26.2	28.9
740	14.3	656	17.6	22.1	25.1	26.6	29.3
750	14.5	364	17.9	22.4	25.4	26.9	29.6
760	14.7	0	18	22.5	25.5	27	29.7

** at normal barometric pressure*

The vacuum gauge shows the differential pressure between atmospheric pressure and absolute pressure. This means that the gauge shows what vacuum level is available at different heights.

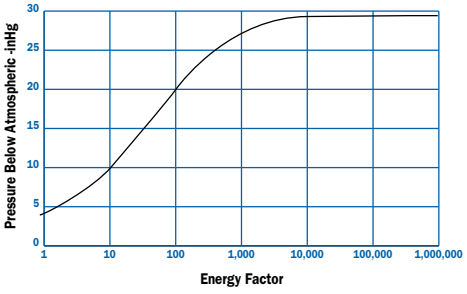
Air Flow Through an Orifice Under Vacuum Pressure

Vacuum flow in scfm at different vacuum levels (-inHg)

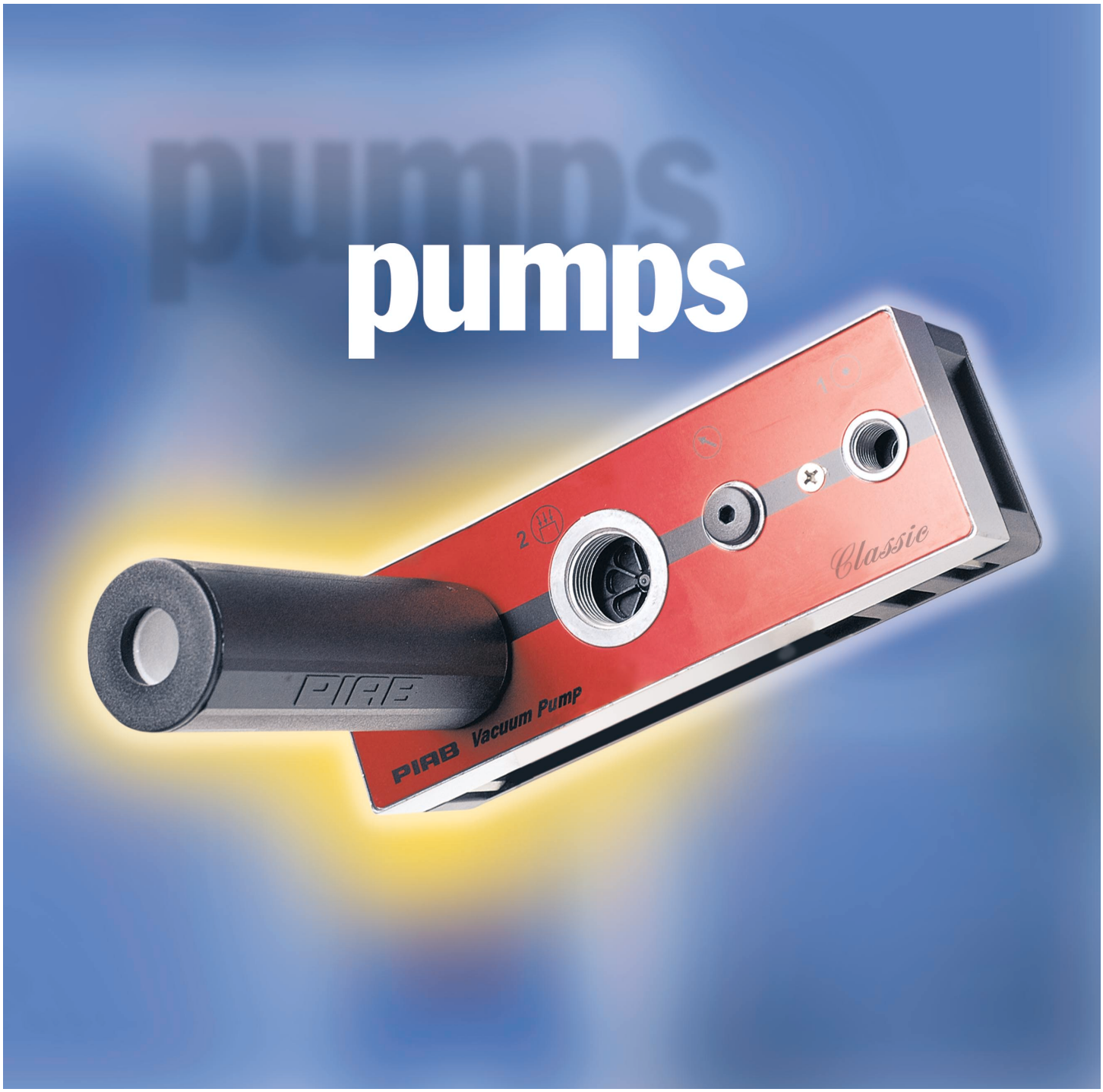
Orifice Dia. in.	3	6	9	12	15	18	21	24	27	29
0.0625 (1/16)	0.33	0.48	0.58	0.68	0.76	0.86	0.95	1.2	1.8	2
0.125 (1/8)	1.3	1.8	2.3	2.6	3	3.3	3.6	3.9	4.2	4.4
0.1875 (3/16)	2.6	3.6	4.4	5	5.7	6.2	6.8	7.2	7.9	8.1
0.25 (1/4)	5.3	7.5	9.5	10.5	11.6	12.8	13.9	15	16	16.6
0.3125 (5/16)	8.3	11.5	14	16.5	18.5	20	21.8	23.5	25	26
0.375 (3/8)	11.5	16.5	20.5	23.8	26.5	29	31.4	33.5	36	37.3
0.4375 (7/16)	16	23	28	32	36	39.5	42.5	45.5	49	51
0.5 (1/2)	21	30	36	42	47.5	52	56	60	64	67
0.625 (5/8)	33	46	55	65	74	80	87	93	100	104
0.75 (3/4)	41	68	82	95	106	116	126	134	144	150

Energy Requirement on Increased Vacuum

The following diagram illustrates the energy requirement on increased vacuum. As can be seen, the energy requirement increases drastically above 27 -inHg, which is why a vacuum level below this is always advisable.



pumps



PIAB
Innovators in Vacuum Technology

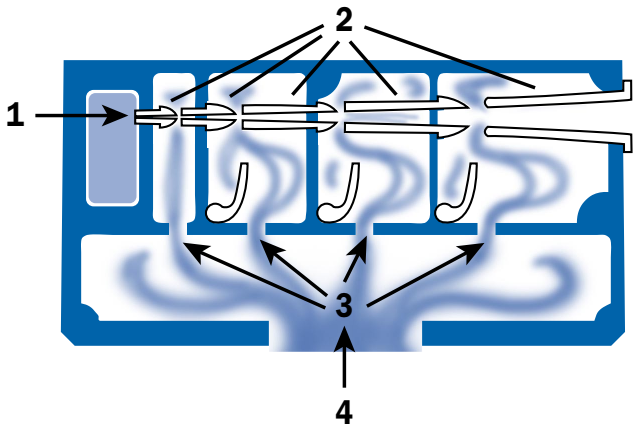
How does a PIAB vacuum pump work?

The PIAB Vacuum System

PIAB Vacuum Pumps are multi-stage ejectors. The energy supply is pressurized gas, usually dry and filtered compressed air between 45 and 87 psi. The multi-stage ejector makes better use of the energy in compressed air than a single-stage ejector and therefore consumes less energy. Large vacuum flows and high levels of vacuum are characteristic of PIAB's multi-stage ejector.

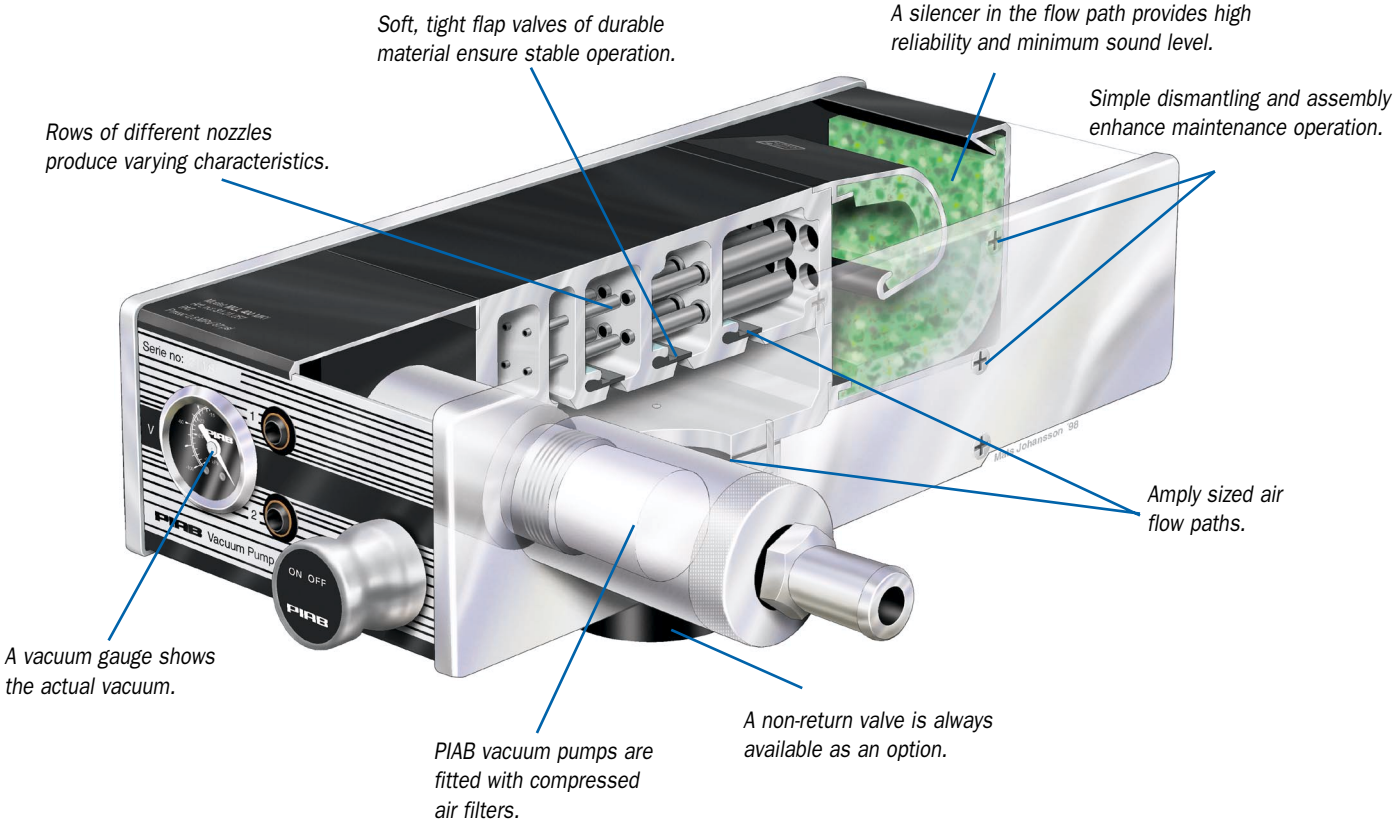
The Flap Valves are the Reason!

The PIAB rubber flap valves that separate vacuum chambers within the PIAB pump automatically adjust to fluctuating vacuum conditions by opening and closing. This adjustment to changes in porosity or the leakage rate delivers the proper combination of vacuum flow and vacuum force. The flap valves act as the thermostat of the pump — insuring that performance levels are maintained even in tough conditions!



When compressed air (1) flows through the pump nozzles (2), air from outside the pump will be entrained by the jet of air at the nozzle outlet. Suction will then be generated at the openings to the various stages (3). This generates a vacuum (4).

Simple and Compact Design

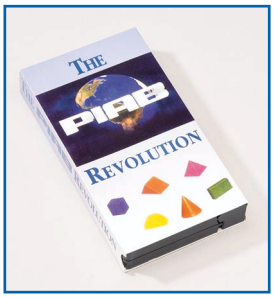


Eliminate the problems created by electric motor driven vacuum pumps.

Use a PIAB compressed air driven vacuum pump and benefit from the following features:

- **No maintenance** - The PIAB Vacuum Pump has virtually no moving parts. This practically eliminates the need for maintenance.
- **No noise** - As the PIAB Vacuum Pump has no motor, there is no disturbing motor sound. It is so silent that even those who are very sensitive to sound feel comfortable.
- **No heat** - As there are no motor parts, there is no motor heat. (In fact, the PIAB Vacuum Pump is cooled by the expanding air while it is working instead of being heated!)
- **Compact & lightweight** - By using compressed air as the driving force, it is possible to produce very powerful vacuum pumps that are compact and lightweight.
- **Highly efficient** - Due to the small size of the PIAB Vacuum Pump, it can be placed near the suction point. In this way, the losses in the vacuum pipe system are reduced to a minimum, a higher work rate is achieved and the operating efficiency is improved.
- **Low energy consumption** - The PIAB Vacuum Pump uses an economical amount of compressed air to achieve high vacuum flows and/or deep vacuum levels. The vacuum level is controlled by adjusting inlet pressure. The PIAB Vacuum Pump can be cycled on and off by controlling the inlet pressure, rather than the vacuum line, so there is no wasted energy.
- **Vacuum levels down to 5 mbar abs. (99.5% vacuum)** - The new Multi-Characteristic feature allows the PIAB Vacuum Pump to achieve deeper vacuums.
- **Volumes up to 500 scfm** - The optimized use of compressed air that distinguishes the PIAB Vacuum Pump produces unusually high capacity.
- **Reliable performance** - With no moving parts, the PIAB Vacuum Pump will dramatically reduce the downtime usually associated with electro-mechanical vacuum pumps. PIAB offers a 5-year warranty on all its vacuum pumps — the longest such warranty in this industry!
- **Easy installation** - Because of the small size and low weight, the PIAB Vacuum Pump is easy to install at any convenient position. No floor space is required and the pump can usually be mounted on the equipment for which it is necessary. Connections for compressed air and vacuum are easy to fit.

There's a revolution going on. All over the world, new solutions are being created in vacuum technology, and PIAB is leading the way. On this video, you will learn about PIAB products and have a chance to see them in action. Call PIAB Customer Service at 1-800-321-7422, e-mail us at info@piab.com, or return the enclosed postcard to receive your copy of "The PIAB Revolution" today!



Get the facts from PIAB! This booklet discusses over ten different areas of comparison between PIAB and electric motor-driven pumps. Read for yourself how a PIAB pump will increase your productivity. Facts included are meantime between failures, energy savings, unit life expectancy...and more. Call PIAB Customer Service at **1-800-321-7422**, e-mail us at **info@piab.com** or return the enclosed postcard for your own PIAB Facts Booklet.

Why are PIAB pumps more efficient than single-stage venturis?

Saving Energy

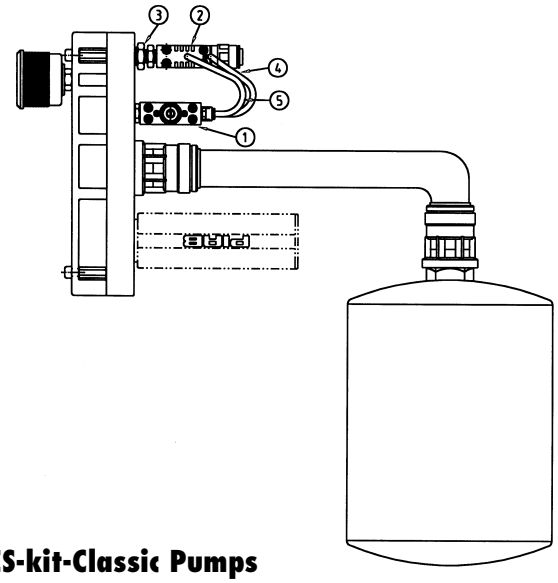
Compressed air isn't free, but saving energy as well as increasing capacity is part of PIAB's ongoing philosophy. Listed on these next pages are several ways to conserve on energy requirements.

Energy Saving with PIAB

PIAB offers the widest range of compressed air-driven vacuum pumps available on the market. This, combined with the fact that the PIAB pump is the most efficient* on the market, ensures that PIAB can always offer the best solution.

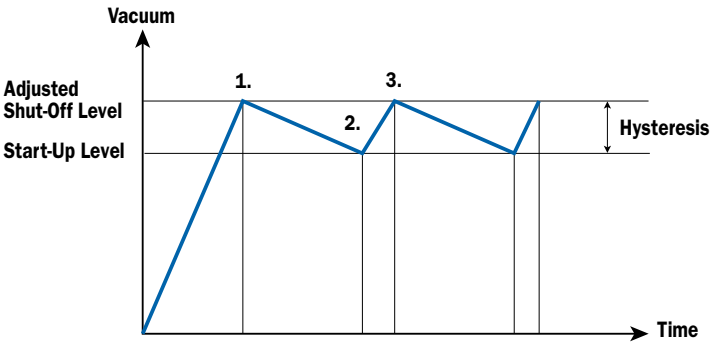
One way of saving additional energy is to use the PIAB Energy Saving (ES) system. The ES system is a pneumatic control system that shuts off the vacuum pump as soon as the required vacuum has been reached, thus minimizing the compressed air consumption of the vacuum pump. When the vacuum drops below the start-up level, the pump automatically restarts. The energy saving system is most useful in airtight systems.

** Efficiency is defined as the ratio of extracted air flow to consumed compressed air flow at different vacuum levels.*



ES-kit-Classic Pumps

1. Vacuum Switch Pneumatic NC
2. Amplifier Valve 1/8"
3. Bushing 1/4" to 1/8"
4. Hose of Nylon D=4/2
5. Hose of Nylon D=4/2

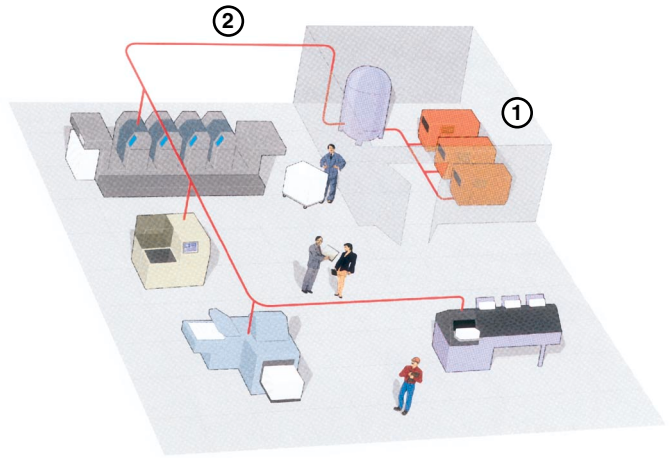


Function

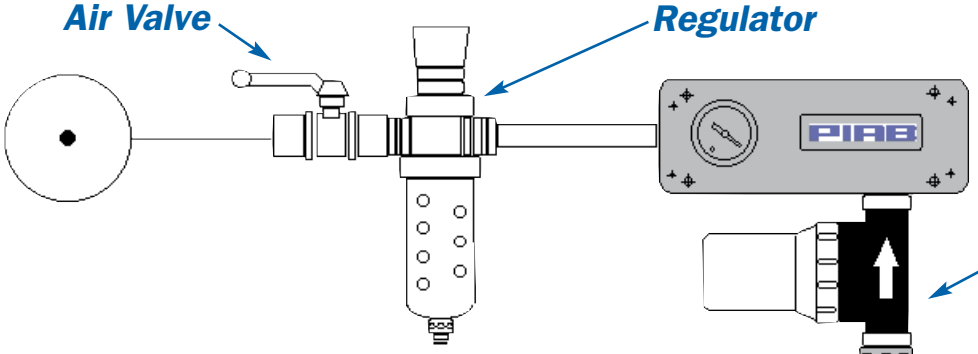
A vacuum control valve shuts off the flow of compressed air to the pump when the pre-set vacuum level is reached (1). The vacuum level is set by a knob or a screw. Because of minor leakage in a vacuum system the vacuum level drops and after a while the start up level of the valve is reached (2). Then the pump will start and work until the shut off level is reached again (3), etc.

A typical PIAB vacuum pump system set-up with more ways to save energy.

1. By using an **air valve** on the compressed air side of the PIAB pump, the valve can be cycled on/off so you only use compressed air when needed for vacuum.
2. PIAB pumps are fully adjustable with the use of a standard **pressure regulator with water separator filter**. The amount of air pressure determines the level of vacuum achieved by the PIAB pump. A number of PIAB Vacuum Pumps only need 45-58 psi of compressed air to achieve maximum vacuum levels.
3. PIAB s classic **Vacuum Pump** creates the vacuum necessary for the application.
4. PIAB s **Vacuum Filter** keeps contaminants and particles away from pump; protects investment.
5. PIAB s **Vacuum Hose and Fittings** provide leak-free connections. Reinforced hose supplies adequate vacuum to suction cups or evacuation point.
6. A **manifold** is used here to supply vacuum to different points on a machine.
7. PIAB s **Level Compensator** is a suction cup accessory added to provide more flexibility in the application.
8. PIAB s **Suction Cups** provide a secure seal and reliable handling of the product to be lifted or held.



A system of PIAB Vacuum Pumps incorporates both centralized and decentralized features. The central element is the air compressor (1). A simple piping system (2) conveys the compressed air to the individual pumps. The decentralized parts of the system mean that each pump creates the vacuum as needed by each machine.



1 Air Valve

2 Regulator

3 Vacuum Pump
Part No. M25B5-EN
Page 56

4 Vacuum Filter 3/4"
Part No. PPSF.75-x35
Page 136

5 Vacuum Hose
Part No. PVH.75
Page 140

6 Manifold

7 Level Compensator
Part No. 33.50.071
Page 114

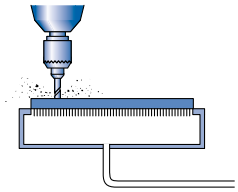
8 Suction Cups
Part No. F75.20.07UD
Page 99

All of these parts can be found in this Vacuum Products catalog.

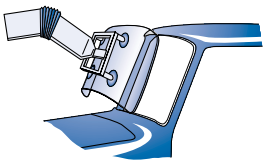
What are some typical applications for vacuum?

A Solutions Company

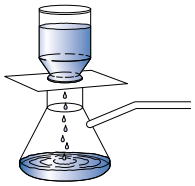
At PIAB, we sell solutions. We offer more than 40 different models of vacuum pumps as well as a wide selection of suction cups, long life vacuum filters, hoses, switches, gauges and other vacuum accessories. As a result, we are the leading provider of complete vacuum systems designed to meet the needs of any manufacturing operation worldwide.



Woodworking

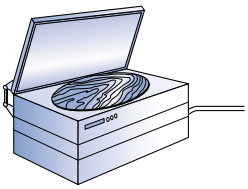


Automotive

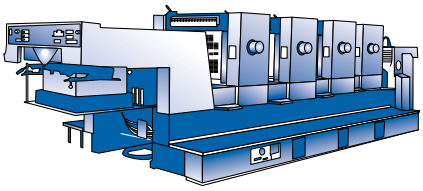


Laboratory

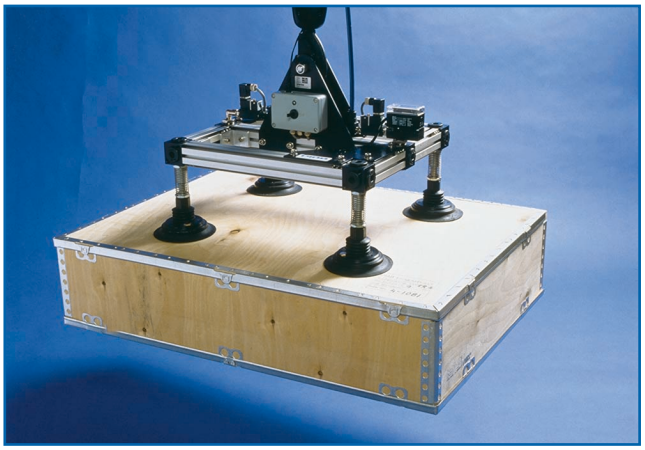
M Series Chip pumps lifting boxes and part sensing with vacuum switch.



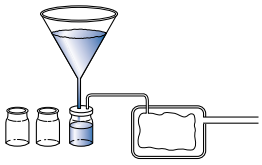
Plastics



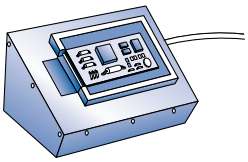
Printing



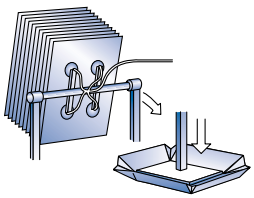
M Series Chip pumps lifting crate with safety system.



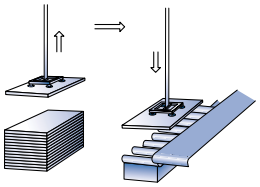
Medical/ Pharmaceutical



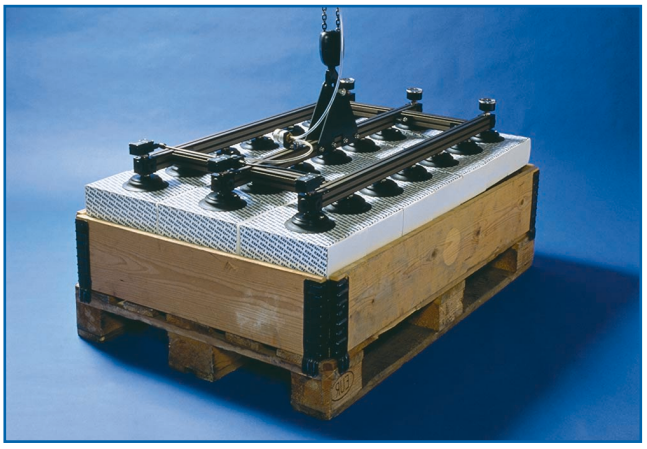
Electronics



Packaging



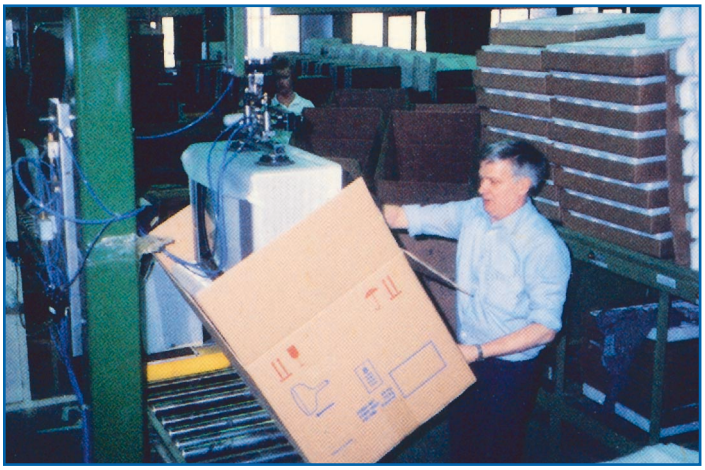
Automation/ Manufacturing



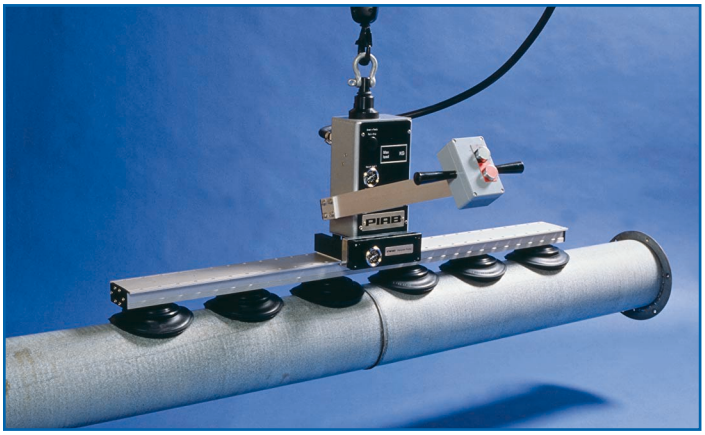
M Series Chip pumps as decentralized system.

Vacuum Applications

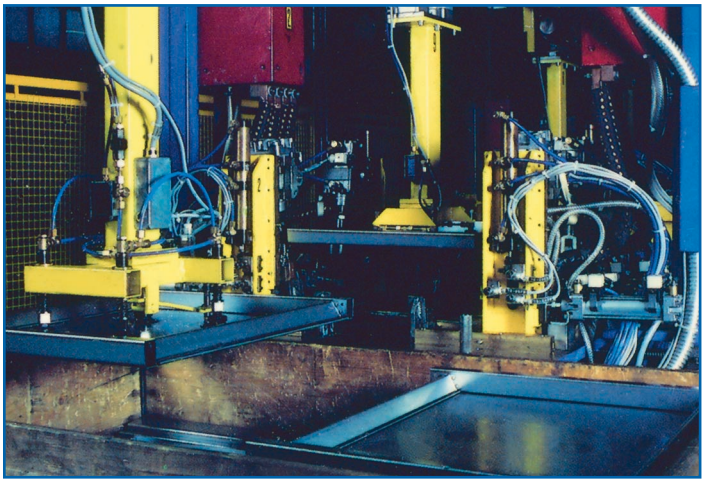
This is a range of typical vacuum applications that falls within PIAB's capabilities. We haven't discussed suction cups yet, but let's look at some typical industries PIAB serves and where the PIAB range of vacuum pumps might apply.



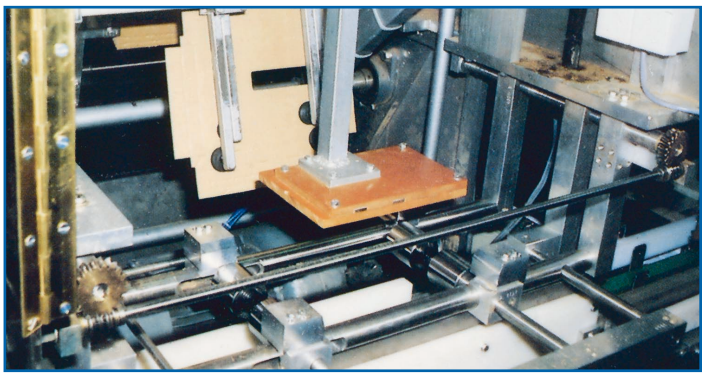
M Series Classic pump lifting and packaging TV sets.



M Series Classic pump lifting large diameter pipe.



M Series Classic pump lifting and moving refrigerator doors.



L Series Classic pump opening and erecting cartons.

MLL Series Maxi pump lifting heavy object.

MLL Series Maxi pump on two printed circuit board testers.

How do I know which pumps to test and evaluate?

NEW

P3010 Series - Available in a Compact, Modular Design

This revolutionary pump s basis is on new technology called COAX". The **in-line design** is a creation from our customer s requirements for an easy-to-use vacuum system. Mounting is simple with a unique snap-in rail. Flexible vacuum connections with push-in couplings ensure fast installation. Made of aluminum, this 3-ounce pump is strong and lightweight. The P3010 operates at any feed pressure from 25 to 87 psi, but provides a maximum vacuum level of 27 -inHg at 45 psi. A key feature of the P3010 is its **modularity**. Mounting accessories such as filters, blow-off modules, valves, vacuum switches, and even extra pump modules for improved performance or reaction time is a quick and easy job for the P3010 pump. It takes about thirty seconds to clean the P3010 pump as it can be unscrewed for service without disconnecting or breaking its connection to your machine.

L Series - Available in Mini Chip & Classic Pump Designs

The L Series signifies Large vacuum flows. This pump range works optimally between 6-21 -inHg. This series is most often used when handling porous materials or where leakage is present in the system design. Leakage is defined as air escaping from an application that needs to be replaced by the vacuum unit to achieve productivity. The vacuum flow characteristics of the L are also best where there is a need for quick evacuation of a vessel or where fast cycle times may be a factor. Their large capacity allows the use of multiple suction cups. This series operates optimally at 87 psi.

M Series - Available in Mini Chip & Classic Pump Designs

The M Series signifies Medium vacuum levels. This pump range works optimally between 0-6 & 21-27 -inHg. This range is used for the majority of applications where little or no leakage exists. The M Classic vacuum pumps have a good vacuum flow rate and high maximum vacuum level. **They work optimally at a low pressure of 50 psi**. The M Mini chip pumps provide high vacuum flow as compared to their small size. These Mini pumps are used in applications where their small size and low weight enable them to be placed very close to the point of evacuation. They are often used with small suction cups on parts handlers or even positioned directly on the cup to increase response time. **The Mini pumps work optimally at a low pressure of 55 psi**.

Full 5 Year Warranty

PIAB products are thoroughly inspected and tested before shipping. Each PIAB product is warranted to be free of defects in workmanship and materials for five full years from date of purchase.

MLL Maxi Series - Available in Large Body Pump Designs

The MLL Maxi series of pumps combine the best characteristics of the L Series with large vacuum flows and the M series with high vacuum levels. The MLL Maxi pump is the largest compressed air-driven pump on the marketplace that is comparatively compact and lightweight. They are well suited for material transport and for evacuation of large volumes to high vacuum levels. The MLL Series has vacuum flow capacity of over 500 scfm. These pumps work optimally between 0-27 -inHg at 87 psi.

X Series - Available in Mini Chip Pump Design

The X Series signifies eXtra vacuum levels. Featured in this catalog in a Mini Chip pump design, **these pumps should only be used in tightly sealed or non-porous applications**. The X Series pumps can achieve higher vacuum levels to 28 -inHg. If you need a small amount of vacuum flow at a higher vacuum level, the Mini X pumps should be considered. The ideal working range of these pumps is 21-28 -inHg. **The X series pumps work optimally at a low pressure of 58 psi**.

H Series - Available in Classic Pump Design

The H Series signifies High vacuum levels. **These pumps are used where there is practically zero leakage and with materials that are completely non-porous**. H pumps are often used in laboratories where high vacuum levels are necessary. The ideal working range of these pumps is 28.3-29.85 -inHg (15-5 mbar abs.). The H series pumps work optimally at 87 psi.

Pages 18-25 show tables of PIAB Vacuum Pumps with their vacuum flows at various vacuum levels and evacuation time amounts. Some typical application photographs are shown on pages 14 and 15 to further help you in your PIAB vacuum pump selection. If you need more help in selecting the proper vacuum pump for your application, call PIAB's Customer Service at 1-800-321-7422.

FREE TRIAL

PIAB offers on-site system evaluations along with a FREE TRIAL on any PIAB vacuum pump, suction cup or accessory. Take advantage of our free trial offer and experience PIAB's advanced vacuum technology, today.

PIAB Has a Very Large Selection of Pumps from which to Choose

The PIAB product range of vacuum pumps is divided into six series that PIAB refers to as L, M, X, H, MLL and the new P3010. Once you understand what these letters signify and for what types of applications they are designed, the easier the selection process becomes.

Overview of PIAB Vacuum Pumps

NEW

P3010-COAX™ Technology

P3010 provides vacuum levels to 27.0 -inHg

P3010 @ 45 psi
PI12-3

Large vacuum flows

"L" Series provide vacuum levels to 22.3 -inHg

Mini Chip @ 87 psi	Classic @ 87 psi	Classic MP @ 87 psi	Round @ 87 psi
L7	L25	L150	L200
L14	L50	L200	
L28	L100	L300	
L56		L400	

Medium vacuum levels

"M" Series provide vacuum levels to 27.1 -inHg

Mini Chip @ 55 psi	Classic @ 50 psi	Classic MP @ 50 psi	Round @ 87 psi	MLL Maxi @ 87 psi
M5LP	M25LP	M150LP	M200	MLL200
M10LP	M50LP	M200LP		MLL400
M20LP	M100LP	M300LP		MLL800
M30LP		M400LP		MLL1200
M40LP				
M60LP				

eXtra vacuum levels

"X" Series provide vacuum levels to 28.0 -inHg

Mini Chip @ 58 psi
X5LP
X10LP
X20LP
X30LP
X40LP
X60LP

High vacuum levels

"H" Series provide vacuum levels to 5 mbar abs (29.85 -inHg)

Classic @ 87 psi	Classic MP @ 87 psi
H40	H240
H120	H480

VACUUM FLOW at optimum feed pressure (for non-sealed systems)

Pump Series	Model Design	Max. Vacuum (-inHg)	Feed Pressure (psi)	Air cons. (scfm)	Vacuum flow in scfm at different vacuum levels (-inHg)											
					0	3	6	9	12	15	18	21	24	27	28	29.2
P3010	PI12-3	27.0	45	1.0	2.97	1.27	0.93	0.57	0.40	0.30	0.21	0.13	0.06			
L	Mini Chip L7	22.3	87	0.95	1.7	1.3	0.78	0.59	0.49	0.40	0.23	0.11				
	Mini Chip L14	22.3	87	1.91	3.3	2.5	1.5	1.1	0.93	0.76	0.44	0.19				
	Mini Chip L28	22.3	87	3.81	6.4	4.4	2.5	2.1	1.6	1.2	0.78	0.21				
	Mini Chip L56	22.3	87	7.63	12.7	8.8	5.1	4.1	3.3	2.5	1.6	0.42				
M	Mini Chip M5LP	24.1	55	0.68	1.3	0.76	0.47	0.40	0.32	0.23	0.16	0.10	0.02			
	Mini Chip M10LP	24.1	55	1.36	2.5	1.53	0.93	0.81	0.64	0.47	0.32	0.19	0.05			
	Mini Chip M20LP	24.1	55	2.71	5.1	3.1	1.9	1.6	1.3	0.93	0.64	0.38	0.09			
	Mini Chip M30LP	24.1	55	4.07	7.2	4.2	2.8	2.4	1.9	1.4	0.95	0.57	0.14			
	Mini Chip M40LP	24.1	55	5.42	10.2	6.1	3.7	3.2	2.5	1.9	1.3	0.76	0.19			
	Mini Chip M60LP	24.1	55	8.14	13.4	8.1	4.9	4.8	3.8	2.8	1.9	1.1	0.28			
X	Mini Chip X5LP	27.9	58	0.8	1.1	0.66	0.32	0.25	0.21	0.17	0.13	0.085	0.036	0.013		
	Mini Chip X10LP	27.9	58	1.7	2.1	1.3	0.61	0.49	0.42	0.34	0.25	0.17	0.074	0.025		
	Mini Chip X20LP	27.9	58	3.4	4.2	2.6	1.2	0.95	0.85	0.68	0.53	0.34	0.15	0.053		
	Mini Chip X30LP	27.9	58	5.1	6.4	4.0	1.8	1.4	1.3	1.0	0.81	0.51	0.22	0.08		
	Mini Chip X40LP	27.9	58	6.8	8.5	5.3	2.4	1.9	1.7	1.4	1.1	0.68	0.30	0.11		
	Mini Chip X60LP	27.9	58	10.2	12	7.4	3.6	2.9	2.5	2.0	1.6	1.1	0.42	0.17		
L	Classic L25	22.3	87	3.8	13	6.99	4.87	3.28	1.76	1.34	0.95	0.59				
	Classic L50	22.3	87	7.4	22	13.14	9.32	6.15	3.52	2.65	1.91	1.19				
	Classic L100	22.3	87	14.8	32	22.04	16.53	11.23	6.89	5.30	3.81	2.37				
M	Classic M25LP	27.1	50	4.0	13	5.8	4.24	2.59	1.44	1.12	0.85	0.57	0.23	0.026		
	Classic M50LP	27.1	50	8.0	22	11.4	8.26	5.19	2.88	2.25	1.7	1.14	0.47	0.053		
	Classic M100LP	27.1	50	16.0	32	19.1	14.2	9.54	5.76	4.49	3.39	2.29	0.93	0.11		
H	Classic H40	15 mbar (abs)	87	5.5	6.4	5.1	3.7	2.3	1.1	0.74	0.51	0.34	0.25	0.13	0.042	0.011
	Classic H120	5 mbar (abs)	87	16.1	18.2	14.8	10.8	7.0	3.7	2.8	1.9	1.4	0.95	0.28	0.13	0.017
L	Classic MP L150	22.3	87	23.3	55.1	34.3	26.3	17	10	8.1	5.7	3.6				
	Classic MP L200	22.3	87	31.8	74.2	46.6	35	22.2	13.1	10.4	7.6	4.4				
	Classic MP L300	22.3	87	47.7	86.9	65.7	48.7	31.8	20.1	16.3	11.7	7.2				
	Classic MP L400	22.3	87	63.6	105.9	86.9	65.7	41.3	26.5	20.6	14.8	8.9				
M	Classic MP M150LP	27.1	50	24.2	48.7	29.5	22.7	14.4	8.5	6.4	4.9	3.4	1.3	0.08		
	Classic MP M200LP	27.1	50	32.2	58.3	37.7	27.5	17.6	10.6	8.5	6.4	4.2	1.7	0.13		
	Classic MP M300LP	27.1	50	48.3	87.9	59.3	44.5	28.8	16.5	12.7	9.1	6.4	2.5	0.19		
	Classic MP M400LP	27.1	50	64.4	98.5	76.3	56.8	36	21.8	17	14.8	8.5	3.2	0.25		
H	Classic MP H240	5 mbar (abs)	87	32.2	37	28.6	19.7	10.6	6.6	4.7	3.8	2.8	1.9	0.42	0.19	0.02
	Classic MP H480	5 mbar (abs)	87	64.4	69.9	57.2	39.2	23.3	12.7	10.6	7.8	5.3	3.8	0.85	0.38	0.04
L	Round L200	22.3	87	29.7	78	51	36	23	13	10.6	7.8	4.2				
M	Round M200	27.1	87	29.7	85	59	39	20	10	7.6	5.1	2.8	1.0	0.21		
MLL	Maxi MLL200	27.1	87	29.7	85	59	39	20	10	7.6	5.1	2.8	1.0	0.21		
	Maxi MLL400	27.1	87	59.3	170	119	78	41	20	15	10	5.5	2.5	0.42		
	Maxi MLL800	27.1	87	118.7	340	240	160	81	41	31	20	11	5.1	0.85		
	Maxi MLL1200	27.1	87	178	510	360	240	120	61	46	31	17	7.6	1.3		

For values of vacuum flows at other feed pressures, please see pages 20, 22, and 24.

Virtually maintenance-free…

EVACUATION TIME at optimum feed pressure (for sealed systems)

Pump Series	Model Design	Max. Vacuum (-inHg)	Feed Pressure (psi)	Evacuation time in s/cubic foot to reach different vacuum levels (-inHg)											
				3	6	9	12	15	18	21	24	27	28	29.2	29.4	29.65
P3010	PI12-3	27.0	45	2.27	6.52	13.9	28.3	48.2	73.7	110.5	178.5					
L	Mini Chip L7	22.3	87	4.25	8.5	19.82	31.15	48.15	67.97	110.45						
	Mini Chip L14	22.3	87	2.27	4.25	9.91	15.58	24.07	33.98	55.23						
	Mini Chip L28	22.3	87	1.13	2.27	5.38	8.78	13.31	18.97	30.59						
	Mini Chip L56	22.3	87	0.57	1.13	2.83	4.24	6.8	9.35	15.29						
M	Mini Chip M5LP	24.1	55	6.23	19.82	33.98	48.99	76.47	118.95	175.59	354.01					
	Mini Chip M10LP	24.1	55	3.12	9.91	16.99	24.64	38.23	59.47	87.79	177					
	Mini Chip M20LP	24.1	55	1.7	5.1	8.5	12.18	19.26	29.74	43.9	88.64					
	Mini Chip M30LP	24.1	55	1.13	3.4	5.66	8.21	12.74	19.82	29.17	58.91					
	Mini Chip M40LP	24.1	55	0.85	2.55	4.25	6.23	9.63	15.01	22.09	44.18					
	Mini Chip M60LP	24.1	55	0.57	1.7	2.83	3.96	6.51	9.91	14.73	29.45					
X	Mini Chip X5LP	27.9	58	7.9	20.4	43	72	106	150	207	391	578				
	Mini Chip X10LP	27.9	58	4.0	10.2	22	36	53	75	104	164	289				
	Mini Chip X20LP	27.9	58	2.0	5.7	11	18	27	37	52	82	144				
	Mini Chip X30LP	27.9	58	1.5	3.8	8.1	13.6	20	28	39	61	108				
	Mini Chip X40LP	27.9	58	1.0	2.5	5.4	9.1	13	19	26	41	72				
	Mini Chip X60LP	27.9	58	0.62	1.7	3.6	6.0	8.9	12	18	27	48				
L	Classic L25	22.3	87	0.48	1.36	2.8	5.2	9.6	15	24						
	Classic L50	22.3	87	0.37	0.82	1.53	2.8	5.0	7.6	12						
	Classic L100	22.3	87	0.20	0.45	0.85	1.6	2.5	3.8	6.1						
M	Classic M25LP	27.1	50	0.57	1.59	3.4	6.8	12	19	29	46	130				
	Classic M50LP	27.1	50	0.37	0.91	1.76	3.4	6.0	9.3	14	23	65				
	Classic M100LP	27.1	50	0.23	0.51	0.91	1.8	3.1	4.7	7.2	12	33				
H	Classic H40	15 mbar (abs)	87	0.85	2.0	3.4	7.1	15.6	26	41.1	62	96	142	260	326	
	Classic H120	5 mbar (abs)	87	0.34	0.7	1.4	2.7	4.8	7.7	11.2	17	33	52	103	119	181
L	Classic MP L150	22.3	87	0.20	0.37	0.62	1.05	1.76	2.69	4.25						
	Classic MP L200	22.3	87	0.20	0.31	0.54	0.93	1.44	2.21	3.40						
	Classic MP L300	22.3	87	0.11	0.17	0.31	0.54	0.88	1.33	2.07						
	Classic MP L400	22.3	87	0.11	0.17	0.25	0.45	0.76	1.10	1.64						
M	Classic MP M150LP	27.1	50	0.20	0.34	0.62	1.22	2.12	3.40	5.10	8.50	28.3				
	Classic MP M200LP	27.1	50	0.20	0.37	0.59	1.08	1.70	2.55	3.97	6.52	19.8				
	Classic MP M300LP	27.1	50	0.11	0.23	0.37	0.65	1.13	1.70	2.55	4.25	14.2				
	Classic MP M400LP	27.1	50	0.08	0.20	0.31	0.54	0.85	1.30	1.98	3.40	11.3				
H	Classic MP H240	5 mbar (abs)	87	0.28	0.54	0.85	1.59	2.72	3.97	6.23	9.07	18.7	29.7	62.3		
	Classic MP H480	5 mbar (abs)	87	0.17	0.28	0.45	0.79	1.36	2.04	3.40	4.53	9.63	15.9	32.6		
L	Round L200	22.3	87	0.08	0.23	0.42	0.76	1.3	2.1	3.3						
M	Round M200	27.1	87	0.06	0.16	0.35	0.85	1.6	2.6	4.4	7.8	19				
MLL	Maxi MLL200	27.1	87	0.06	0.16	0.35	0.85	1.6	2.6	4.4	7.8	19				
	Maxi MLL400	27.1	87	0.03	0.08	0.18	0.42	0.79	1.3	2.2	3.9	9.5				
	Maxi MLL800	27.1	87	0.017	0.04	0.09	0.21	0.40	0.65	1.1	2.0	4.8				
	Maxi MLL1200	27.1	87	0.011	0.025	0.06	0.14	0.25	0.42	0.7	1.3	3.5				

For values of evacuation times at other feed pressures, please see pages 21, 23, and 25.

…"whisper-quiet" operation…

VACUUM FLOW at 25-58 psi feed pressure (for non-sealed systems)

Pump Series	Model Design	Max. Vacuum (-inHg)	Feed Pressure (psi)	Air cons. (scfm)	Vacuum flow in scfm at different vacuum levels (-inHg)									
					0	3	6	9	12	15	18	21	24	27
P3010	PI12-3	14.7	25	0.64	1.91	0.85	0.47	0.32	0.15					
P3010	PI12-3	27.0	45	1.0	2.97	1.27	0.93	0.57	0.40	0.30	0.21	0.13	0.06	
M	Classic M25LP	27.1	50	4.0	13	5.8	4.24	2.59	1.44	1.12	0.85	0.57	0.23	0.026
	Classic M50LP	27.1	50	8.0	22	11.4	8.26	5.19	2.88	2.25	1.7	1.14	0.47	0.053
	Classic M100LP	27.1	50	16.0	32	19.1	14.2	9.54	5.76	4.49	3.39	2.29	0.93	0.11
M	Classic MP M150LP	27.1	50	24.2	48.7	29.5	22.7	14.4	8.5	6.4	4.9	3.4	1.3	0.08
	Classic MP M200LP	27.1	50	32.2	58.3	37.7	27.5	17.6	10.6	8.5	6.4	4.2	1.7	0.13
	Classic MP M300LP	27.1	50	48.3	87.9	59.3	44.5	28.8	16.5	12.7	9.1	6.4	2.5	0.19
	Classic MP M400LP	27.1	50	64.4	98.5	76.3	56.8	36	21.8	17	14.8	8.5	3.2	0.25
M	Mini Chip M5LP	24.1	55	0.68	1.3	0.76	0.47	0.40	0.32	0.23	0.16	0.10	0.02	
	Mini Chip M10LP	24.1	55	1.36	2.5	1.53	0.93	0.81	0.64	0.47	0.32	0.19	0.05	
	Mini Chip M20LP	24.1	55	2.71	5.1	3.1	1.9	1.6	1.3	0.93	0.64	0.38	0.09	
	Mini Chip M30LP	24.1	55	4.07	7.2	4.2	2.8	2.4	1.9	1.4	0.95	0.57	0.14	
	Mini Chip M40LP	24.1	55	5.42	10.2	6.1	3.7	3.2	2.5	1.9	1.3	0.76	0.19	
	Mini Chip M60LP	24.1	55	8.14	13.4	8.1	4.9	4.8	3.8	2.8	1.9	1.1	0.28	
P3010	PI12-3	25.2	58	1.21	3.07	1.48	1.1	0.83	0.51	0.25	0.21	0.13	0.04	
L	Mini Chip L7	17.1	58	0.74	1.42	0.89	0.57	0.51	0.32	0.19	0.03			
	Mini Chip L14	17.1	58	1.48	2.69	1.57	1.10	0.90	0.64	0.33	0.02			
	Mini Chip L28	17.1	58	2.97	5.09	3.07	2.20	1.67	1.10	0.49				
	Mini Chip L56	17.1	58	5.93	9.54	5.83	4.24	3.18	2.08	0.91				
X	Mini Chip X5LP	27.9	58	0.8	1.1	0.66	0.32	0.25	0.21	0.17	0.13	0.085	0.036	0.013
	Mini Chip X10LP	27.9	58	1.7	2.1	1.3	0.61	0.49	0.42	0.34	0.25	0.17	0.074	0.025
	Mini Chip X20LP	27.9	58	3.4	4.2	2.6	1.2	0.95	0.85	0.68	0.53	0.34	0.15	0.053
	Mini Chip X30LP	27.9	58	5.1	6.4	4.0	1.8	1.4	1.3	1.0	0.81	0.51	0.22	0.08
	Mini Chip X40LP	27.9	58	6.8	8.5	5.3	2.4	1.9	1.7	1.4	1.1	0.68	0.30	0.11
	Mini Chip X60LP	27.9	58	10.2	12	7.4	3.6	2.9	2.5	2.0	1.6	1.1	0.42	0.17
L	Classic L25	18.3	58	2.7	11.4	5.5	3.4	2.1	1.6	0.91	0.23			
	Classic L50	18.3	58	5.3	17.9	10.2	6.6	4.2	3.2	1.8	0.47			
	Classic L100	18.3	58	10.6	26.5	16.8	11.7	8.05	6.1	3.6	0.93			
M	Classic M25LP	27.1	58	4.6	11.9	6.6	4.0	2.97	1.7	1.06	0.85	0.42	0.17	
	Classic M50LP	27.1	58	9.1	18.6	11.4	8.3	5.5	2.75	2.12	1.48	1.06	0.42	
	Classic M100LP	27.1	58	18.2	27.1	18.6	14.8	10.2	5.72	4.24	3.18	2.12	0.85	
L	Classic MP L150	18.3	58	16.1	51.9	29	18.9	12.1	8.9	5.3	1.3			
	Classic MP L200	18.3	58	21.5	57.8	36.2	22.7	16.1	11.7	6.6	1.3			
	Classic MP L300	18.3	58	32.3	95.4	59.1	37.1	24.4	17.8	10	2.1			
	Classic MP L400	18.3	58	43	110.2	72	45.1	31.4	21.8	12.5	2.5			
M	Classic MP M150LP	27.1	58	27.3	50.9	29.7	23.3	15.9	8.5	6.4	4.7	3	1.1	
	Classic MP M200LP	27.1	58	36.4	61.4	39.2	30.7	20.1	10.6	8.1	6.4	4.2	1.3	
	Classic MP M300LP	27.1	58	54.7	91.1	61.4	48.7	33.9	18	11.7	9.1	5.7	1.9	
	Classic MP M400LP	27.1	58	72.9	101.7	78.4	60.4	41.1	23.3	16.5	12.5	7.8	2.8	
L	Round L200	18.0	58	21.5	75.2	38.1	23.7	15.5	11	5.3				
M	Round M200	21.0	58	21.2	74.2	46.6	25.4	14.4	11.1	6.8	3.4	0.76		
MLL	Maxi MLL200	21.0	58	21.2	74.2	46.6	25.4	14.4	11.1	6.8	3.4	0.76		
	Maxi MLL400	21.0	58	42.4	148.3	93.2	50.8	28.8	22	13.6	6.8	1.53		
	Maxi MLL800	21.0	58	84.8	296.6	186.5	101.7	57.6	44.1	27.1	13.6	3.05		
	Maxi MLL1200	21.0	58	127.1	445	280	152.7	86.4	66.1	40.7	20.3	4.6		

...cool running...

EVACUATION TIME at 25-58 psi feed pressure (for sealed systems)

Pump Series	Model Design	Max. Vacuum (-inHg)	Feed Pressure (psi)	Air cons. (scfm)	Evacuation time in s/cubic foot to reach different vacuum levels (-inHg) 3	6	9	12	15	18	21	24	27
P3010	PI12-3	14.7	25	0.64	4.25	13.0	28.3	56.7					
P3010	PI12-3	27.0	45	1.0	2.27	6.52	13.9	28.3	48.2	73.7	110.5	178.5	
M	Classic M25LP	27.1	50	4.0	0.57	1.59	3.4	6.8	12	19	29	46	130
	Classic M50LP	27.1	50	8.0	0.37	0.91	1.76	3.4	6.0	9.3	14	23	65
	Classic M100LP	27.1	50	16.0	0.23	0.51	0.91	1.8	3.1	4.7	7.2	12	33
M	Classic MP M150LP	27.1	50	24.2	0.20	0.34	0.62	1.22	2.12	3.40	5.10	8.50	28.3
	Classic MP M200LP	27.1	50	32.2	0.20	0.37	0.59	1.08	1.70	2.55	3.97	6.52	19.8
	Classic MP M300LP	27.1	50	48.3	0.11	0.23	0.37	0.65	1.13	1.70	2.54	4.25	14.2
	Classic MP M400LP	27.1	50	64.4	0.08	0.20	0.31	0.54	0.85	1.30	1.98	3.40	11.3
M	Mini Chip M5LP	24.1	55	0.68	6.23	19.82	33.98	48.99	76.47	118.95	175.59	354.01	
	Mini Chip M10LP	24.1	55	1.36	3.12	9.91	16.99	24.64	38.23	59.47	87.79	177	
	Mini Chip M20LP	24.1	55	2.71	1.7	5.1	8.5	12.18	19.26	29.74	43.9	88.64	
	Mini Chip M30LP	24.1	55	4.07	1.13	3.4	5.66	8.21	12.74	19.82	29.17	58.91	
	Mini Chip M40LP	24.1	55	5.42	0.85	2.55	4.25	6.23	9.63	15.01	22.09	44.18	
	Mini Chip M60LP	24.1	55	8.14	0.57	1.7	2.83	3.96	6.51	9.91	14.73	29.45	
P3010	PI12-3	25.2	58	1.21	2.55	6.8	12.7	21.5	39.7	68	105	198	
L	Mini Chip L7	17.1	58	0.74	5.18	13.7	26.2	43.3	70.3	157.8			
	Mini Chip L14	17.1	58	1.48	2.86	7.03	12.9	21.2	36.3	107.6			
	Mini Chip L28	17.1	58	2.97	2.04	4.19	7.08	11.1	19				
	Mini Chip L56	17.1	58	5.93	0.93	1.93	3.34	5.61	9.69				
X	Mini Chip X5LP	27.9	58	0.8	7.9	20.4	43	72	106	150	207	391	578
	Mini Chip X10LP	27.9	58	1.7	4.0	10.2	22	36	53	75	104	164	289
	Mini Chip X20LP	27.9	58	3.4	2.0	5.7	11	18	27	37	52	82	144
	Mini Chip X30LP	27.9	58	5.1	1.5	3.8	8.1	13.6	20	28	39	61	108
	Mini Chip X40LP	27.9	58	6.8	1.0	2.5	5.4	9.1	13	19	26	41	72
	Mini Chip X60LP	27.9	58	10.2	0.62	1.7	3.6	6.0	8.9	12	18	27	48
L	Classic L25	18.3	58	2.75	0.62	1.8	4.2	7.5	13.6	32.3			
	Classic L50	18.3	58	5.3	0.40	1.0	2.1	3.8	6.8	16.14			
	Classic L100	18.3	58	10.6	0.28	0.65	1.25	2.12	3.54	8.07			
M	Classic M25LP	27.1	58	4.6	0.57	1.59	3.12	5.95	11.33	18.98	29.46	50.99	
	Classic M50LP	27.1	58	9.1	0.34	0.85	1.53	2.83	5.67	9.35	14.73	26.06	
	Classic M100LP	27.1	58	18.2	0.23	0.42	0.76	1.27	2.32	3.68	5.67	9.92	
M	Classic MP L150	18.3	58	16.1	0.14	0.35	0.71	1.25	2.15	4.36			
	Classic MP L200	18.3	58	21.5	0.12	0.28	0.57	1.02	1.70	3.60			
	Classic MP L300	18.3	58	32.3	0.11	0.23	0.40	0.68	1.10	2.18			
	Classic MP L400	18.3	58	43	0.09	0.17	0.34	0.54	0.91	1.98			
M	Classic MP M150LP	27.1	58	27.3	0.20	0.40	0.65	1.1	1.9	3.1	5.1	9.3	
	Classic MP M200LP	27.1	58	36.4	0.14	0.31	0.51	0.91	1.56	2.52	3.97	7.08	
	Classic MP M300LP	27.1	58	54.5	0.14	0.25	0.37	0.59	1.02	1.7	2.6	4.82	
	Classic MP M400LP	27.1	58	72.9	0.11	0.20	0.31	0.48	0.82	1.25	1.98	3.11	
L	Round L200	18.0	58	21.5	0.13	0.31	0.59	1.05	1.87	5.5			
M	Round M200	21.0	58	21.2	0.07	0.23	0.57	1.08	1.8	3.0			
MLL	Maxi MLL200	21.0	58	21.2	0.07	0.23	0.57	1.08	1.8	3.0			
	Maxi MLL400	21.0	58	42.4	0.037	0.11	0.28	0.54	0.90	1.5			
	Maxi MLL800	21.0	58	84.8	0.02	0.06	0.14	0.28	0.45	0.75			
	Maxi MLL1200	21.0	58	27.1	0.014	0.04	0.099	0.18	0.30	0.51			

...clean...

VACUUM FLOW at 72.5 psi feed pressure (for non-sealed systems)

Pump Series	Model Design	Max. Vacuum (-inHg)	Feed Pressure (psi)	Air cons. (scfm)	Vacuum flow in scfm at different vacuum levels (-inHg) 0	3	6	9	12	15	18	21	24	27	28
P3010	PI12-3	25.2	72.5	1.44	3.18	1.70	1.10	0.91	0.70	0.44	0.21	0.11	0.04		
L	Mini Chip L7	21.3	72.5	0.91	1.57	1.04	0.64	0.53	0.49	0.30	0.20	0.07			
	Mini Chip L14	21.3	72.5	1.82	2.97	1.93	1.17	0.97	0.78	0.59	0.36	0.10			
	Mini Chip L28	21.3	72.5	3.64	5.83	3.81	2.31	1.91	1.53	1.06	0.54	0.11			
	Mini Chip L56	21.3	72.5	7.29	10.6	6.99	4.56	3.71	2.82	1.97	1.08	0.15			
L	Classic L25	22.3	72.5	3.3	12.3	6.6	4.3	2.8	1.7	1.3	0.85	0.42			
	Classic L50	22.3	72.5	6.4	20.6	11.9	8.3	5.1	3.4	2.5	1.7	0.85			
	Classic L100	22.3	72.5	12.7	29.7	19.9	14.8	8.9	6.9	5.1	3.4	1.7			
M	Classic M25LP	27.1	72.5	5.3	13.1	7.4	4.2	3.5	2.6	1.7	0.83	0.40	0.11		
	Classic M50LP	27.1	72.5	10.6	19.5	11.4	8.7	6.8	4.9	3.2	1.48	0.85	0.21		
	Classic M100LP	27.1	72.5	21.2	28.4	18.6	15.7	12.7	9.75	6.36	2.97	1.48	0.42		
H	Classic H40	29.5	72.5	4.7	5.7	4.3	2.9	1.4	1.0	0.76	0.6	0.4	0.25	0.15	0.042
L	Classic MP L150	22.3	72.5	19.4	57.2	33.3	23.7	14.2	10.2	7.4	4.9	2.5			
	Classic MP L200	22.3	72.5	25.8	65.7	41.5	29.5	16.7	13.1	9.7	6.1	2.6			
	Classic MP L300	22.3	72.5	39	108.1	66.1	47.5	26.7	20.1	14.6	9.7	4.0			
	Classic MP L400	22.3	72.5	51.6	127.1	84.1	57.8	33.9	25.4	18	11.7	4.7			
M	Classic MP M150LP	27.1	72.5	31.8	53	33.9	24.4	19.9	14.8	8.5	4.2	2.3	0.85		
	Classic MP M200LP	27.1	72.5	42.4	63.6	41.3	31.8	24.4	17.6	10.6	6.4	3.2	1.3		
	Classic MP M300LP	27.1	72.5	63.6	97.5	65.7	50.9	40.3	30.7	18.2	8.9	5.1	2.1		
	Classic MP M400LP	27.1	72.5	84.8	108.1	82.6	65.7	50.9	36	21.8	11.4	6.6	2.3		
L	Round L200	21.0	72.5	25.8	82.6	44.9	31.4	17	12.9	9.1	5.3	0.74			
M	Round M200	25.7	72.5	25.4	80.5	53	33.9	15.3	11.02	8.48	5.93	3.22	1.5		
MLL	Maxi MLL200	25.7	72.5	25.4	80.5	53	33.9	15.3	11.02	8.48	5.93	3.22	1.5		
	Maxi MLL400	25.7	72.5	50.85	161	106	67.8	30.5	22	16.95	11.9	6.44	3.0		
	Maxi MLL800	25.7	72.5	101.7	322	212	135.6	61	44.1	33.9	23.7	13	5.93		
	Maxi MLL1200	25.7	72.5	152.6	483	318	203.4	91.5	66.1	50.85	35.6	19.3	8.9		

...compact size...

EVACUATION TIME at 72.5 psi feed pressure (for sealed systems)

Pump Series	Model Design	Max. Vacuum (-inHg)	Feed Pressure (psi)	Air cons. (scfm)	Evacuation time in s/cubic foot to reach different vacuum levels (-inHg) 3	6	9	12	15	18	21	24	27	28	29.2
P3010	PI12-3	25.2	72.5	1.44	1.98	5.67	11.3	18.7	28.3	48.2	90.7	229			
L	Mini Chip L7	21.3	72.5	0.91	4.48	11.6	22.9	36.8	55	80.7	137.4				
	Mini Chip L14	21.3	72.5	1.82	2.69	6.37	11.8	18.7	28.4	42.8	77.9				
	Mini Chip L28	21.3	72.5	3.64	1.61	3.40	6.01	9.35	14	22.1	45.3				
	Mini Chip L56	21.3	72.5	7.29	1.25	2.21	3.60	5.24	7.59	11.8	27.6				
L	Classic L25	22.3	72.5	3.3	0.57	1.5	3.1	6.4	10.8	18.1	31.1				
	Classic L50	22.3	72.5	6.4	0.40	0.93	1.7	3.3	5.7	9.1	15.6				
	Classic L100	22.3	72.5	12.7	0.23	0.54	0.88	1.8	2.8	4.5	7.8				
M	Classic M25LP	27.1	72.5	5.3	0.57	1.59	3.12	4.82	7.93	13.88	26.91	55.81			
	Classic M50LP	27.1	72.5	10.6	0.37	0.85	1.53	2.41	3.97	6.80	13.31	28.05			
	Classic M100LP	27.1	72.5	21.2	0.23	0.42	0.76	1.08	1.61	2.83	5.38	10.48			
H	Classic H40	29.5	72.5	4.7	0.99	2.26	4.8	10.5	18	28	40.78	60.9	93.5	133	275
L	Classic MP L150	22.3	72.5	19.4	0.13	0.31	0.59	1.13	1.81	2.92	4.67				
	Classic MP L200	22.3	72.5	25.8	0.12	0.24	0.48	0.88	1.42	2.22	3.63				
	Classic MP L300	22.3	72.5	39	0.12	0.2	0.34	0.60	0.93	1.52	2.49				
	Classic MP L400	22.3	72.5	51.6	0.11	0.16	0.25	0.45	0.74	1.19	2.06				
M	Classic MP M150LP	27.1	72.5	31.8	0.23	0.40	0.62	0.96	1.42	2.54	4.82	10.2			
	Classic MP M200LP	27.1	72.5	42.4	0.17	0.31	0.48	0.74	1.19	2.10	3.82	7.64			
	Classic MP M300LP	27.1	72.5	63.6	0.17	0.28	0.40	0.57	0.79	1.27	2.49	5.1			
	Classic MP M400LP	27.1	72.5	84.8	0.17	0.23	0.31	0.45	0.68	1.08	1.98	3.97			
L	Round L200	21.0	72.5	25.8	0.13	0.26	0.48	0.91	1.5	2.42	4.44				
M	Round M200	25.7	72.5	25.4	0.065	0.18	0.45	0.96	1.64	2.5	3.96	6.7			
MLL	Maxi MLL200	25.7	72.5	25.4	0.065	0.18	0.45	0.96	1.64	2.5	3.96	6.7			
	Maxi MLL400	25.7	72.5	50.85	0.034	0.091	0.23	0.50	0.82	1.3	1.98	3.4			
	Maxi MLL800	25.7	72.5	101.7	0.017	0.045	0.11	0.25	0.40	0.65	0.99	1.7			
	Maxi MLL1200	25.7	72.5	152.6	0.011	0.031	0.076	0.17	0.30	0.40	0.65	1.1			

...easy to install...

VACUUM FLOW at 87 psi feed pressure (for non-sealed systems)

Pump Series	Model Design	Max. Vacuum (-inHg)	Feed Pressure (psi)	Air cons. (scfm)	Vacuum flow in scfm at different vacuum levels (-inHg)											
					0	3	6	9	12	15	18	21	24	27	28	29.2
P3010	PI12-3	24.9	87	1.67	3.39	2.12	1.06	0.87	0.76	0.59	0.36	0.11	0.02			
L	Mini Chip L7	22.3	87	0.95	1.7	1.3	0.78	0.59	0.49	0.40	0.23	0.11				
	Mini Chip L14	22.3	87	1.91	3.3	2.5	1.5	1.1	0.93	0.76	0.44	0.19				
	Mini Chip L28	22.3	87	3.81	6.4	4.4	2.5	2.1	1.6	1.2	0.78	0.21				
	Mini Chip L56	22.3	87	7.63	12.7	8.8	5.1	4.1	3.3	2.5	1.6	0.42				
L	Classic L25	22.3	87	3.8	13	6.99	4.87	3.28	1.76	1.34	0.95	0.59				
	Classic L50	22.3	87	7.4	22	13.14	9.32	6.15	3.52	2.65	1.91	1.19				
	Classic L100	22.3	87	14.8	32	22.04	16.53	11.23	6.89	5.30	3.81	2.37				
M	Classic M25LP	27.1	87	6.3	13.6	8.05	4.45	3.60	2.97	2.33	1.42	0.47	0.11			
	Classic M50LP	27.1	87	12.5	19.9	11.7	8.90	7.42	5.51	4.24	2.54	0.85	0.21			
	Classic M100LP	27.1	87	25.0	28.8	19.1	15.9	13.8	11	8.26	4.87	1.27	0.42			
H	Classic H40	15 mbar (abs)	87	5.5	6.4	5.1	3.7	2.3	1.1	0.74	0.51	0.34	0.25	0.13	0.042	0.011
	Classic H120	5 mbar (abs)	87	16.1	18.2	14.8	10.8	7.0	3.7	2.8	1.9	1.4	0.95	0.28	0.13	0.017
L	Classic MP L150	22.3	87	23.3	55.1	34.3	26.3	17	10	8.1	5.7	3.6				
	Classic MP L200	22.3	87	31.8	74.2	46.6	35	22.2	13.1	10.4	7.6	4.4				
	Classic MP L300	22.3	87	47.7	86.9	65.7	48.7	31.8	20.1	16.3	11.7	7.2				
	Classic MP L400	22.3	87	63.6	105.9	86.9	65.7	41.3	26.5	20.6	14.8	8.9				
M	Classic MP M150LP	27.1	87	37.5	55.1	37.1	24.2	21.2	17	12.7	7.4	2.33	0.74			
	Classic MP M200LP	27.1	87	50	65.7	44.5	31.8	27.5	22.2	15.9	9.1	2.97	1.06			
	Classic MP M300LP	27.1	87	75	101.7	76.3	48.7	42.4	35.4	25.4	14.8	5.3	1.7			
	Classic MP M400LP	27.1	87	100	112.3	86.9	64.6	55.1	44.5	33.9	19.1	5.5	1.9			
H	Classic MP H240	5 mbar (abs)	87	32.2	37	28.6	19.7	10.6	6.6	4.7	3.8	2.8	1.9	0.42	0.19	0.02
	Classic MP H480	5 mbar (abs)	87	64.4	69.9	57.2	39.2	23.3	12.7	10.6	7.8	5.3	3.8	0.85	0.38	0.04
L	Round L200	22.3	87	29.7	78	51	36	23	13	10.6	7.8	4.2				
M	Round M200	27.1	87	29.7	85	59	39	20	10	7.6	5.1	2.8	1.0	0.21		
MLL	Maxi MLL200	27.1	87	29.7	85	59	39	20	10	7.6	5.1	2.8	1.0	0.21		
	Maxi MLL400	27.1	87	59.3	170	119	78	41	20	15	10	5.5	2.5	0.42		
	Maxi MLL800	27.1	87	118.7	340	240	160	81	41	31	20	11	5.1	0.85		
	Maxi MLL1200	27.1	87	178	510	360	240	120	61	46	31	17	7.6	1.3		

...environmentally friendly...

EVACUATION TIME at 87 psi feed pressure (for sealed systems)

Pump Series	Model Design	Max. Vacuum (-inHg)	Feed Pressure (psi)	Air cons. (scfm)	Evacuation time in s/cubic foot to reach different vacuum levels (-inHg)												
					3	6	9	12	15	18	21	24	27	28	29.2	29.4	29.4
P3010	PI12-3	24.9	87	1.67	1.7	4.82	10.5	18.4	28.3	39.7	68	255					
L	Mini Chip L7	22.3	87	0.95	4.25	8.5	19.82	31.15	48.15	67.97	110.45						
	Mini Chip L14	22.3	87	1.91	2.27	4.25	9.91	15.58	24.07	33.98	55.23						
	Mini Chip L28	22.3	87	3.81	1.13	2.27	5.38	8.78	13.31	18.97	30.59						
	Mini Chip L56	22.3	87	7.63	0.57	1.13	2.83	4.24	6.8	9.35	15.29						
L	Classic L25	22.3	87	3.8	0.48	1.36	2.8	5.2	9.6	15	24						
	Classic L50	22.3	87	7.4	0.37	0.82	1.53	2.8	5.0	7.6	12						
	Classic L100	22.3	87	14.8	0.20	0.45	0.85	1.6	2.5	3.8	6.1						
M	Classic M25LP	27.1	87	6.3	0.57	1.47	3.12	4.82	7.08	11.05	20.11	53.26					
	Classic M50LP	27.1	87	12.5	0.40	0.85	1.50	2.41	3.68	5.52	10.11	26.63					
	Classic M100LP	27.1	87	25.0	0.23	0.42	0.76	1.02	1.42	2.27	3.97	10.20					
H	Classic H40	15 mbar (abs)	87	5.5	0.85	2.0	3.4	7.1	15.6	26	41.1	62	96	142	260	326	
	Classic H120	5 mbar (abs)	87	16.1	0.34	0.7	1.4	2.7	4.8	7.7	11.2	17	33	52	103	119	181
L	Classic MP L150	22.3	87	23.3	0.20	0.37	0.62	1.05	1.76	2.69	4.25						
	Classic MP L200	22.3	87	31.8	0.20	0.31	0.54	0.93	1.44	2.21	3.40						
	Classic MP L300	22.3	87	44.7	0.11	0.17	0.31	0.54	0.88	1.33	2.07						
	Classic MP L400	22.3	87	63.6	0.11	0.17	0.25	0.45	0.76	1.10	1.64						
M	Classic MP M150LP	27.1	87	37.5	0.23	0.40	0.65	0.93	1.36	1.98	3.97	10.2					
	Classic MP M200LP	27.1	87	50	0.20	0.34	0.51	0.71	1.02	1.56	3.12	7.65					
	Classic MP M300LP	27.1	87	75	0.14	0.23	0.34	0.51	0.68	1.02	1.9	5.1					
	Classic MP M400LP	27.1	87	100	0.17	0.28	0.37	0.45	0.62	0.91	1.56	3.97					
H	Classic MP H240	5 mbar (abs)	87	32.2	0.28	0.54	0.85	1.59	2.72	3.97	6.23	9.07	18.7	29.7	62.3		
	Classic MP H480	5 mbar (abs)	87	64.4	0.17	0.28	0.45	0.79	1.36	2.04	3.40	4.53	9.63	15.9	32.6		
L	Round L200	22.3	87	29.7	0.08	0.23	0.42	0.76	1.3	2.1	3.3						
M	Round M200	27.1	87	29.7	0.06	0.16	0.35	0.85	1.6	2.6	4.4	7.8	19				
MLL	Maxi MLL200	27.1	87	29.7	0.06	0.16	0.35	0.85	1.6	2.6	4.4	7.8	19				
	Maxi MLL400	27.1	87	59.3	0.03	0.08	0.18	0.42	0.79	1.3	2.2	3.9	9.5				
	Maxi MLL800	27.1	87	118.7	0.017	0.04	0.09	0.21	0.40	0.65	1.1	2.0	4.8				
	Maxi MLL1200	27.1	87	178	0.011	0.025	0.06	0.14	0.25	0.42	0.7	1.3	3.5				

...PIAB Vacuum Pumps

From the PIAB Vacuum Academy –

How do I provide a blow-off function with a PIAB Classic Vacuum Pump?

Recommended hose dimensions or connections *(internal diameter)*

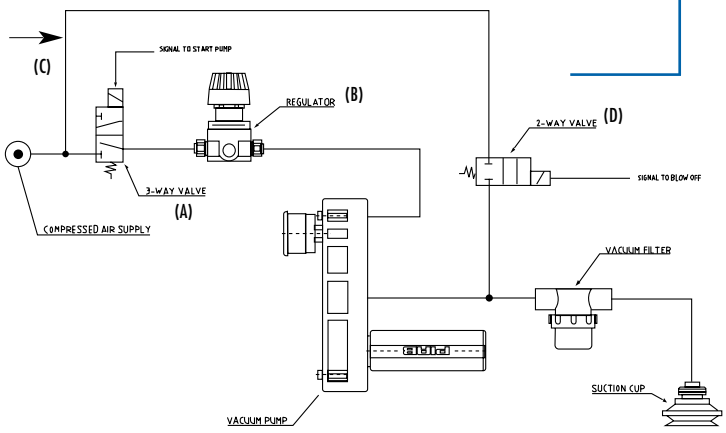
Model	Pump design	Compressed air	Vacuum	Exhaust
P3010	PI12-3 (1 module)	0.24"	0.32"	0.32"
P3010	PI12-3 (2 modules)	0.24"	0.32"	0.39"
Mini Chip	L7	0.08″	0.32″	0.39″
	L14	0.16″	0.39″	0.47″
	L28	0.16″	0.47″	0.47″
	L56	0.24″	0.59″	0.59″
	M5LP	0.08″	0.20″	0.32″
	M10LP	0.08″	0.32″	0.39″
	M20LP	0.16″	0.39″	0.47″
	M30LP	0.16″	0.47″	0.47″
	M40LP	0.24″	0.47″	0.59″
	M60LP	0.24″	0.59″	0.71″
	X5LP	0.08″	0.20″	0.32″
	X10LP	0.16″	0.20″	0.32″
	X20LP	0.24″	0.39″	0.47″
	X30LP	0.24″	0.47″	0.47″
	X40LP	0.24″	0.32″	0.39″
	X60LP	0.24″	0.47″	0.59″
Classic	L25	0.16″	0.47″	0.47″
	L50	0.24″	0.59″	0.59″
	L100	0.32″	0.75″	0.87″
	M25LP	0.16″	0.47″	0.47″
	M50LP	0.24″	0.59″	0.59″
	M100LP	0.32″	0.75″	0.87″
	H40	0.32″	0.32″	0.39″
	H120	0.35″	0.59″	0.75″
Classic MP	MP M150LP/L150	0.31″	0.98″	1.26″
	MP M200LP/L200	0.39″	1.26″	1.57″
	MP M300LP/L300	0.47″	1.57″	1.57″
	MP M400LP/L400	0.47″	1.57″	1.57″
	MP H240	0.39″	1.26″	1.57″
	MP H480	0.47″	1.26″	1.57″
Round	L200	0.39″	1.26″	1.26″
	M200	0.39″	1.26″	1.26″
Maxi	MLL200	0.39″	1.26″	1.57″
	MLL400	0.47″	1.57″	2.36″
	MLL800	0.59″	1.97″	2.96″
	MLL1200	0.59″	2.96″	3.94″

Sometimes you need to quickly release a handled part in a vacuum application. This is also known as blowing-off a part.

Supply compressed air to the pump through a 3-way air valve (A) and air regulator (B). By activating the valve, air flows to the pump and the pump pulls a vacuum.

Supply the blow-off supply line (C) to the main air line before the regulator to ensure a stronger blow-off with more air pressure. The blow-off line passes through a 2-way air valve (D). Actuating this valve activates the blow-off function. Connecting the blow-off in this way allows air to blow through the vacuum filter and suction cup for cleaning.

Note: Turn the vacuum pump off when you need the blow-off function.



Pump and Seal Material

Choosing the correct vacuum pump must also take into account the right material for the application.

Resistance	PA Polyamide (Nylon)	PPS Polyphenylene Sulphide (Ryton®)	POM Acetal (Delrin®)	ABS Acrylonitrile Butadien Styrene	Al Aluminum	Nitrile Rubber NBR	EPDM Rubber	Viton Rubber
Weather, Ozone	–	+++	+	++	++	+	+++	+++
Heat, Aging	++	+++	++	+	+++	++	++	+++
Oil, Petrol	++	+++	++	+	+	+++	–	+++
Hydrolysis	–	+++	++	+	+++	++	++	++
Acid & Alkali	+	+++	+	–	–	++	+++	++
Acetone	+++	+++	+++	–	+++	–	+++	–
Ammonia	+	++	–	–	++	+	+++	–
Amyl Alcohol	+++	+++	+++	–	++	++	+++	++
Benzene	+++	+++	+++	–	++	–	–	+++
Butanol	–	+++	+++	+++	++	++	++	+++
Cyclohexane	+++	+++	+++	–	+++	++	–	+++
Ethanol	+++	+++	+++	++	++	+	+++	+++
Ethyl Acetate	+++	+++	+++	–	++	–	++	–
Hexane	++	+++	+++	–	+++	+++	–	+++
Carbone Tetrachloride	–	+++	++	–	–	–	–	+++
Chloro Benzene	–	+++	–	–	+++	–	–	+++
Chloroform	+++	+++	+++	–	+	–	–	+++
Methanol	++	+++	+++	–	++	+++	+++	+
Methylene Chloride	+	+++	++	–	+	–	++	+++
Methyl Ethyl Ketone, MEK	+++	+++	+	–	++	–	+++	–
NaOH	+++	+++	+	+	–	++	+++	++
Propanol	–	+++	+++	++	++	+++	+++	+++
Sulphuric Acid	–	+++	–	++	–	+	++	+++
Tetrahydrofuran	+++	+++	+++	–	–	–	++	–
Tetrachlorethylene	+++	+++	+++	–	–	–	–	+++
Toulene	+++	+++	+	–	+++	–	–	+++
Trichlorethane	+	+++	+++	–	–	–	–	+++
Trichlorethylene	+	+++	–	–	–	–	–	+++
Xylene	+++	+++	+++	–	++	–	–	+++
Acetic Acid	–	+++	–	–	+	+	+++	++

+++ Excellent, insignificant effect, recommended. ++ Good, minor chemical attack. + Limited, moderate chemical attack, limited service. – Unsuitable, severe attack, not recommended.

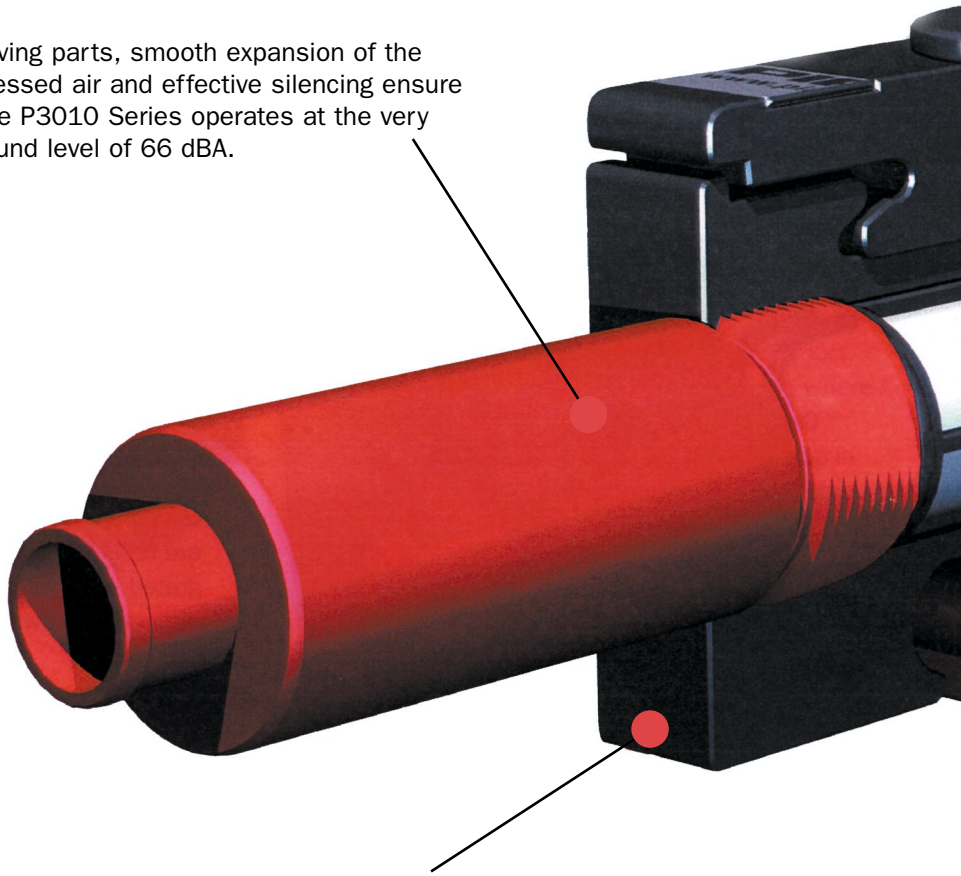
Not Just Another Plastic!

While the connection ports are made of a durable, die-cast aluminum, the material of the PIAB Classic vacuum pump body is a plastic composite material called Ryton® PPS (polyphenylene sulfide). This polymer offers the broadest resistance to chemicals of any advanced engineering plastic. It also has remarkable endurance at very high temperatures. A certain application for PPS is in the mining industry. Bronze rings in a centrifugal mining pump are now made of PPS. Other industries using stainless steel pumps are having the stainless steel housings replaced with PPS housings. Finally, in the automotive industry, PPS is in everything from powertrain transmission parts to ABS brake systems. The choice of PPS was for its mechanical strength, dimensional stability, high resistance to chemicals and low weight.

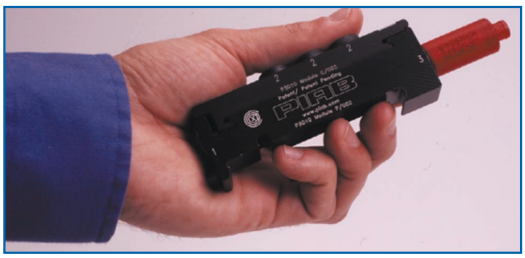
This material gives the PIAB Classic pump the same qualities of strength, low weight and durability. It allows PIAB Classic pumps to be used in a wide variety of environments and applications.

UNCOMPROMISING PERFORMANCE – P3010 SERIES

No moving parts, smooth expansion of the compressed air and effective silencing ensure that the P3010 Series operates at the very low sound level of 66 dBA.

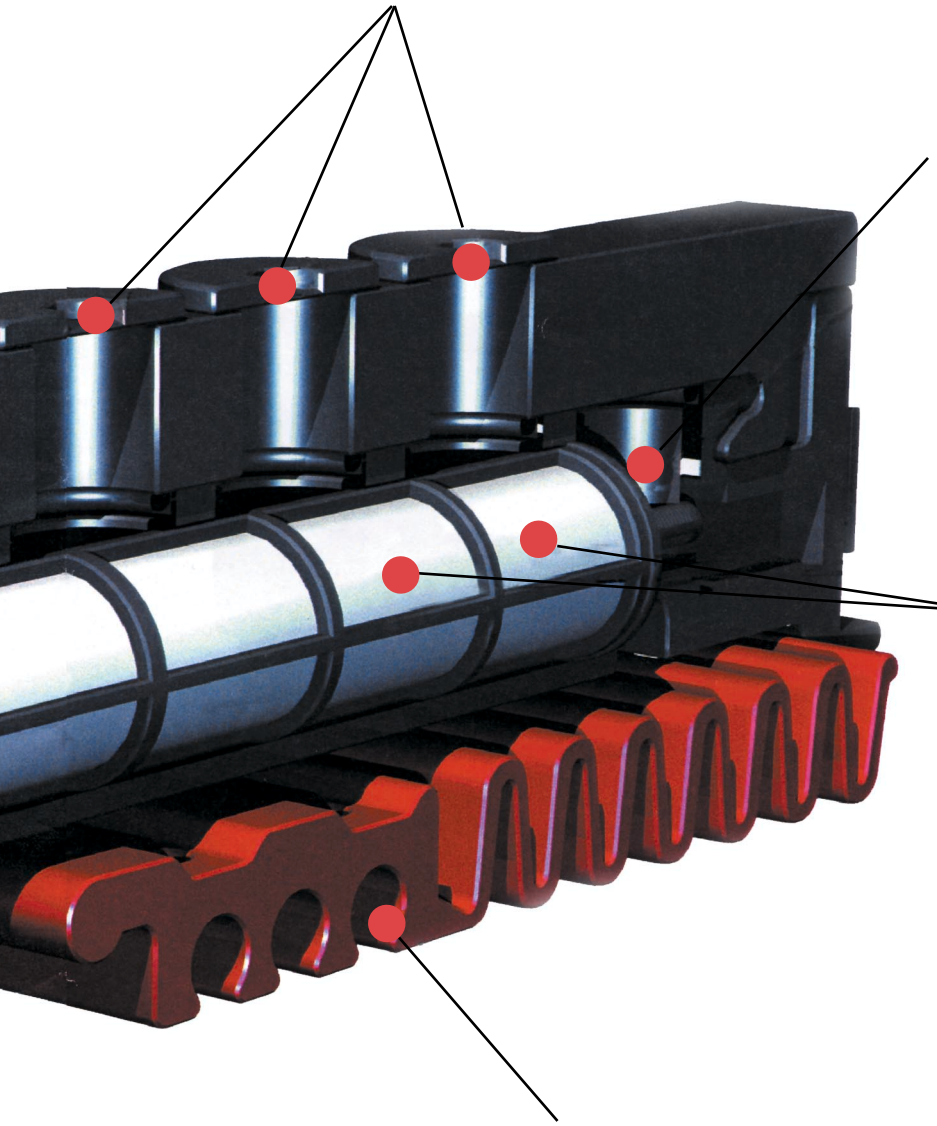


Only 0.65 in. wide.



The PIAB P3010 SERIES creates no sparking, no vibrations and no heat emission. This guarantees higher productivity, a safer workplace and an excellent working environment.

Several vacuum connections offer flexible installation.



The heart of the pump consists of a cassette with integrated nozzles, flap valves, silencers and filters for compressed air and vacuum.

The compressed air expands through several nozzles. The energy is put to maximum use, and the pump therefore consumes much less air than conventional ejectors - 1.0 scfm at 45 psi for a maximum flow of 3.0 scfm.

"Click-in" rail for fast installation.

Reliable: The pump can operate at pressures from 25 psi up to 87 psi.

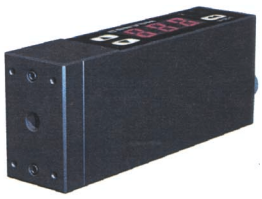
PUSH N' PLAY*

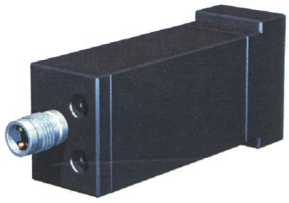
CREATE YOUR OWN P3010!

The P3010 Series enables you to decide for yourself the functions you need, and you can eliminate all costly, needless refinements. The performance can therefore be upgraded in pace with your changing needs.

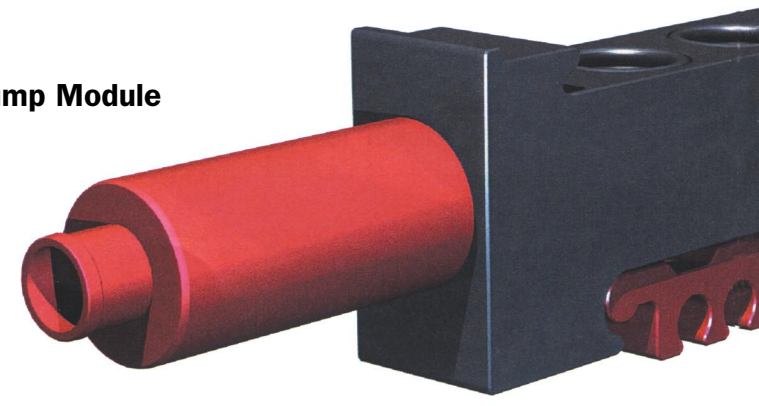
Connection modules are available in several versions, with 3 or 6 connections.

Various vacuum switches are available for more reliable operation and accurate control of the process - miniaturized design, analog and static outputs and an LED display are some of the standard alternatives.



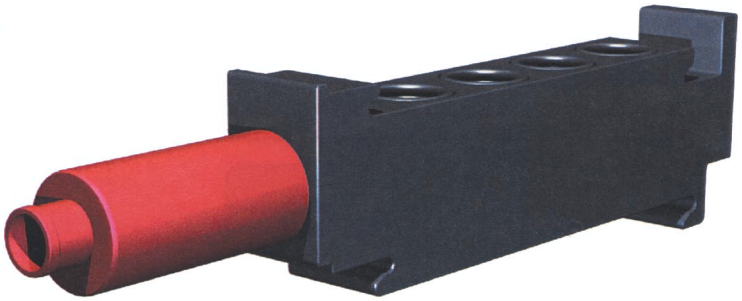


Pump Module

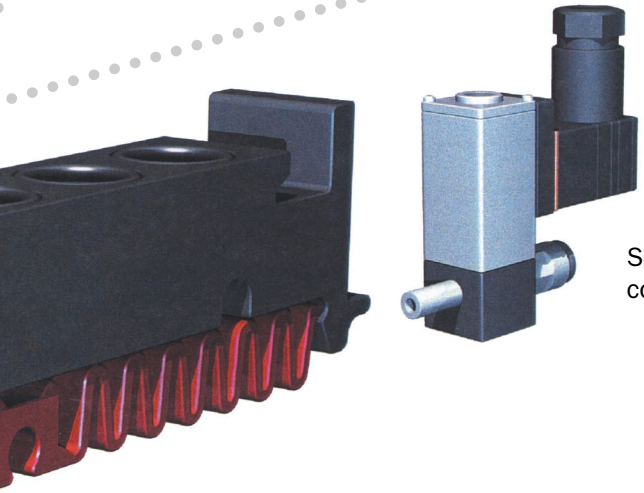


*Most accessories have "push-in" connections making for easy assembly.

The Quick release module speeds up the release of a part or restoring the system to atmospheric pressure. For higher capacity, an extra tank that offers additional volume can be fitted to the quick release module.



The pump performance can be doubled by adding an extra pump module.



Solenoid valve for controlling the pump.

The “click-in” rail is available in several versions. Up to four pumps can be docked to a single rail.

P3010 SERIES

- New patented technology
- Easy installation
- Increase your productivity
- Safe and economical operation
- Shorter working cycles

This revolutionary pump's basis is on new technology called COAX™.
The "in-line" design is a creation from our customer's requirements for an easy-to-use vacuum system.

VACUUM FLOW FOR ONE PUMP MODULE

Pump Series	Model Design	Max. Vacuum (-inHg)	Feed Pressure (psi)	Air cons. (scfm)	Vacuum flow in scfm at different vacuum levels (-inHg)								
					0	3	6	9	12	15	18	21	24
P3010	**PI12-3**	27.0	45	1.00	2.97	1.27	0.93	0.57	0.40	0.30	0.21	0.13	0.06

EVACUATION TIME FOR ONE PUMP MODULE

Pump Series	Model Design	Max. Vacuum (-inHg)	Feed Pressure (psi)	Air cons. (scfm)	Evacuation time in s/cubic foot to reach different vacuum levels (-inHg)							
					3	6	9	12	15	18	21	24
P3010	**PI12-3**	27.0	45	1.00	2.27	6.52	13.9	28.3	48.2	73.7	110.5	178.5

CHARACTERISTICS

	Optimum Pressure psi	Maximum Vacuum at 45 psi	Temperature	Weight oz.	Sound Level dB(A)	Material
PI12-3	45	27.0 -inHg	+14° to +112°F	3.0*	66-68	PA, Nitrile, Al, SS

*For one pump module

Explanation of P3010 Series Vacuum Pump Part Number

P3010.AA.07.AA.05

1. Pump Module	Part Number for Individual Module	Code for Complete P3010 Series Pump
PI12-3 with push-in 6mm air inlet	01.04.656	AA
PI12-3 with NPSF 1/8" air inlet	01.04.657	AB
2x PI12-3 with push-in 6mm air inlet	01.04.667	AC
2x PI12-3 with NPSF 1/8" air inlet	01.04.668	AD

2. Function Module	Part Number for Individual Module	Code for Complete P3010 Series Pump
Connection module, vacuum 6xNPSF 1/8"	01.04.270	01
Connection module, vacuum 3xNPSF 1/8"	01.04.269	02
Quick release module vacuum inlet push-in 10mm+6mm	01.04.351	04
Quick release module vacuum inlet push-in 10mm fitting + 6mm & quick-release tank 30 cm^3	01.04.671	07

3. Valve Module	Part Number for Individual Module	Code for Complete P3010 Series Pump
None	–	XX
Solenoid DS23, 3-way with 6mm stem includes DIN connector and push-in 6mm fitting	01.04.274	AA
Vacustat 6mm stem and push-in 6mm fitting	01.04.701	AC

4. Vacuum Switch Module	Part Number for Individual Module	Code for Complete P3010 Series Pump
None	–	00
PNP NO/NC adjustable with 6mm push-in fitting	01.04.176	05

For operation, every P3010 Series vacuum pump must consist of a pump module and a function module.

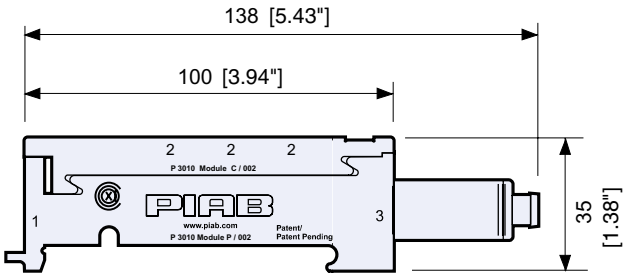
More P3010 Parts	Part Number
Pump module PI12-3, extra	01.04.658
Quick release tank 30 cm^3	01.04.272
Click-in mounting rail x1 pump	01.04.276
Click-in mounting rail x2 pumps	01.04.277
Click-in mounting rail x4 pumps	01.04.278

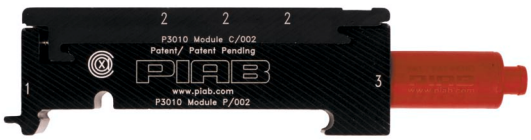
Examples of P3010 Series Vacuum Pumps	Part Number
PI12-3 w/3x NPSF 1/8" vacuum connection	P3010.AB.02.XX.00
2x PI12-3 w/6x NPSF 1/8" vacuum connection	P3010.AD.01.XX.00
PI12-3 w/quick-release module & DS23 solenoid valve	P3010.AA.04.AA.00
PI12-3 w/quick-release module & DS23 solenoid valve & quick-release tank 30 cm^3	P3010.AA.07.AA.00
PI12-3 w/quick-release module & DS23 solenoid valve & quick-release tank 30 cm3 & PNP vacuum switch	P3010.AA.07.AA.05

See pages 34-35.

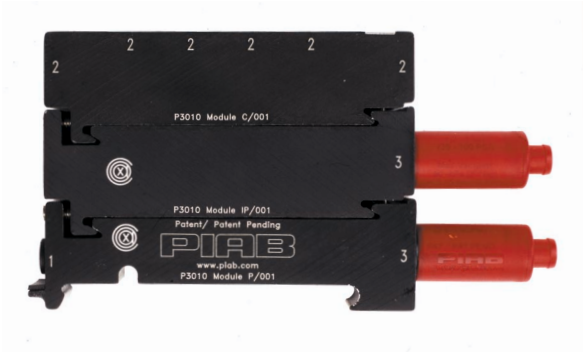
You are not limited to these combinations of P3010 Series Vacuum Pumps.
Use the above tables (1. to 4.) to build a P3010 Series Vacuum Pump to your specification.

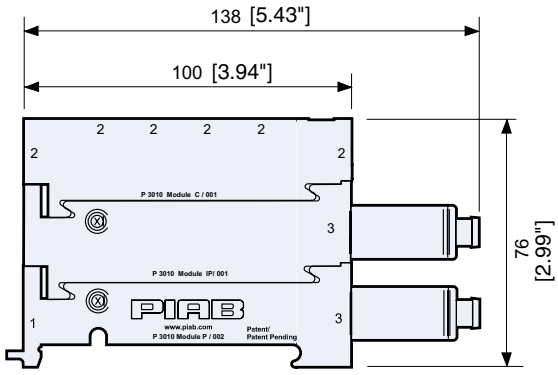
EXAMPLES OF P3010 SERIES VACUUM PUMPS



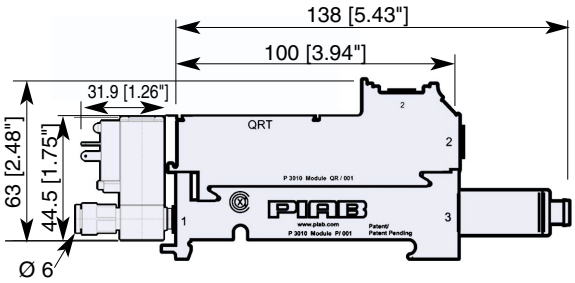


Pump PI12-3 with connections 3 x NPSF 1/8"
Part no. P3010.AB.02.XX.00
1. Compressed air NPSF 1/8"
2. Vacuum 3 x NPSF 1/8"
3. Exhaust Free-flow silencer

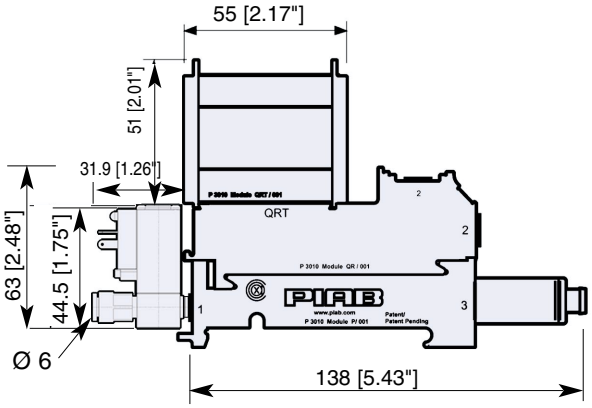


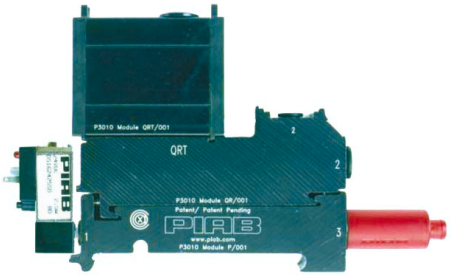


Pump 2 x PI12-3 with connections 6 x NPSF 1/8"
Part no. P3010.AD.01.XX.00
1. Compressed air NPSF 1/8"
2. Vacuum 6 x NPSF 1/8"
3. Exhaust Free-flow silencer



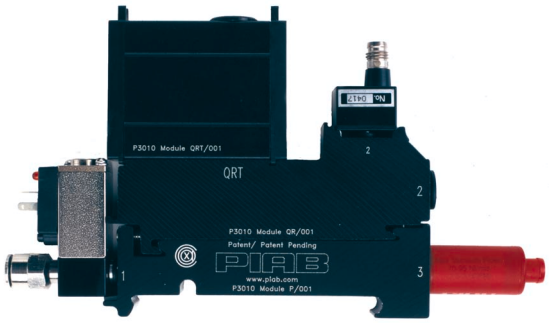
Pump PI12-3 with Quick-release and Solenoid Valve
Part no. P3010.AA.04.AA.00
1. Compressed air Push-in Ø 6mm
2. Vacuum Push-in Ø 8 and 6mm
3. Free-flow silencer

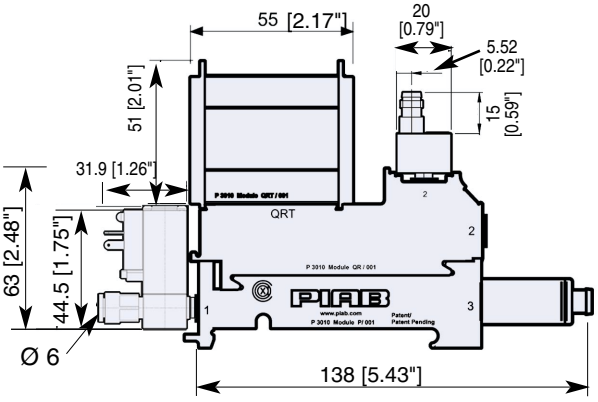




Pump PI12-3 with Quick-release and Tank 30 cm³ and Solenoid Valve
Part no. P3010.AA.07.AA.00

1. Compressed air Push-in Ø 6mm
2. Vacuum Push-in Ø 8 and 6mm
3. Free-flow silencer



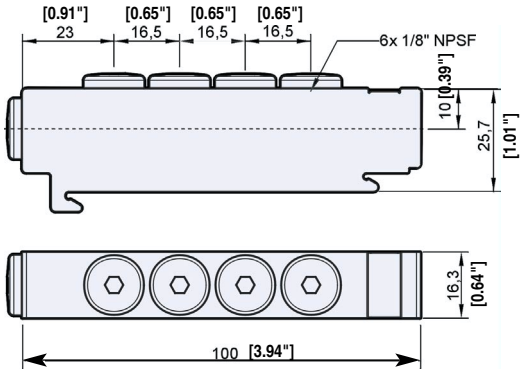


Pump PI12-3 with Quick-release and Tank 30 cm³ and Solenoid Valve and Vacuum Switch
Part no. P3010.AA.07.AA.05

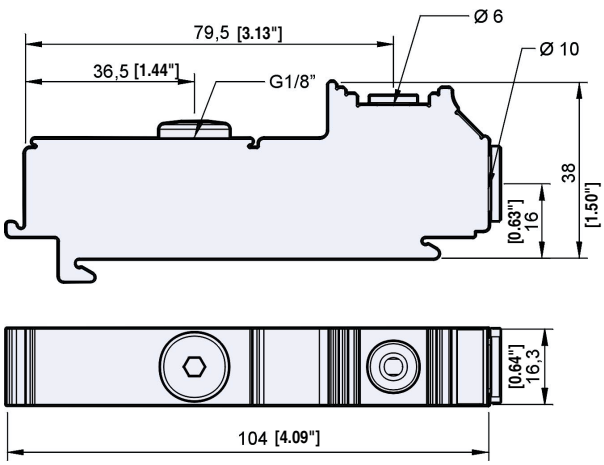
1. Compressed air Push-in Ø 6mm
2. Vacuum Push-in Ø 8 and 6mm
3. Free-flow silencer

You are not limited to these combinations. There are more P3010 Series pump possibilities on page 33.

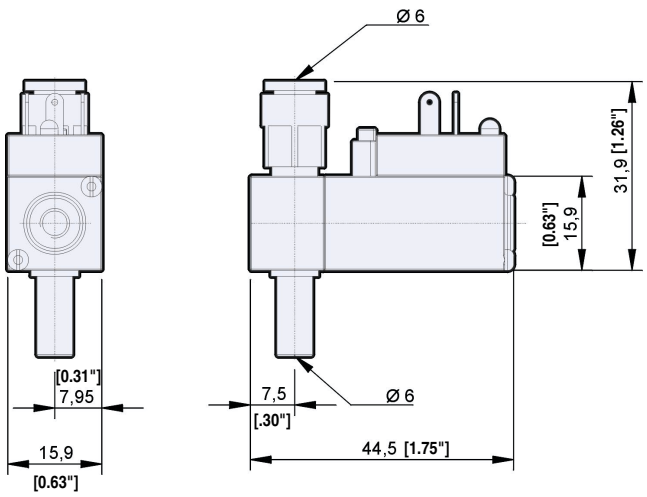
P3010 SERIES ACCESSORIES



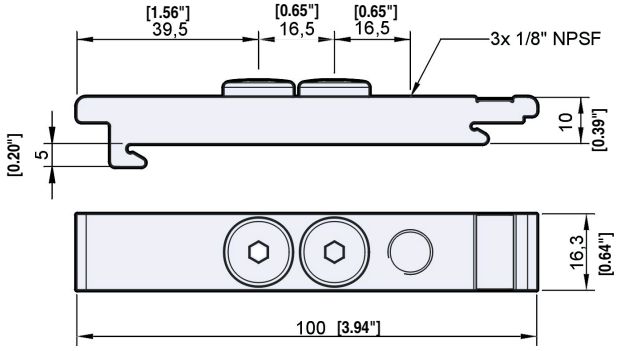
Connection module, vacuum 6 x NPSF 1/8"
Part no. 01.04.270 (Code 01)



Quick-release module
Vacuum connections 10 and 6mm
Part no. 01.04.351 (Code 04)

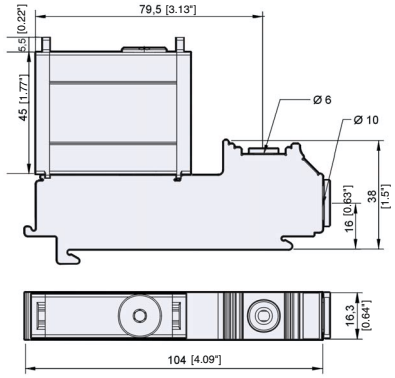


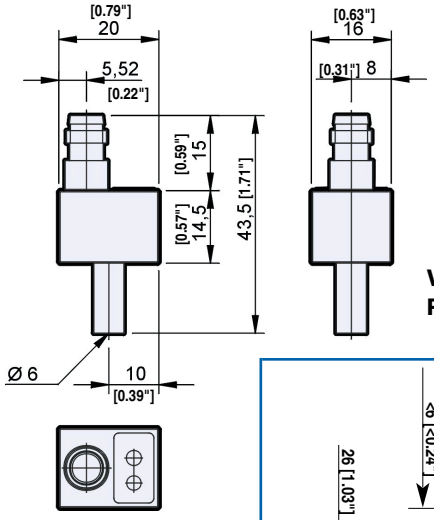
Solenoid valve, DS23
Part no. 01.04.274 (Code AA)



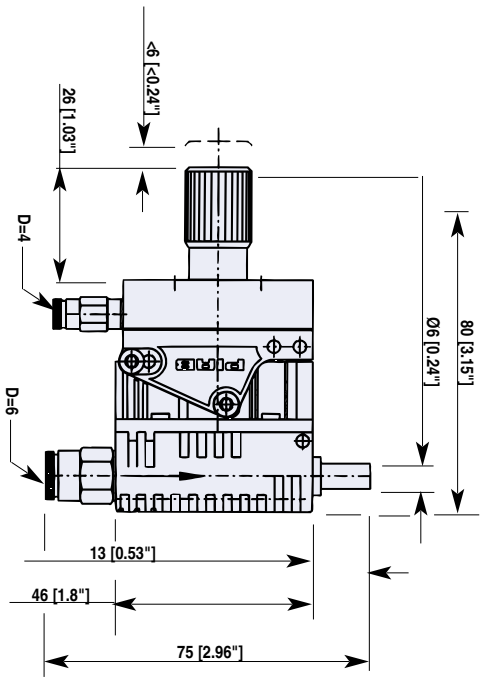
Connection module, vacuum 3 x NPSF 1/8"
Part no. 01.04.269 (Code 02)

Quick-release module
Vacuum connections
10 and 6mm and
Quick-release Tank 30cm³
Part no. 01.04.671
(Code 07)

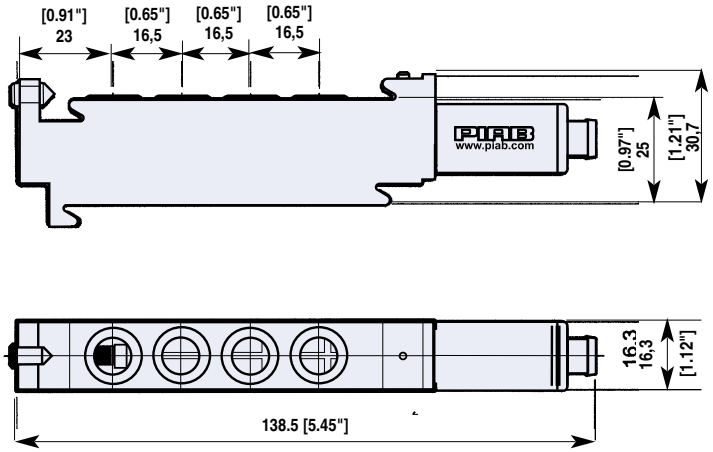




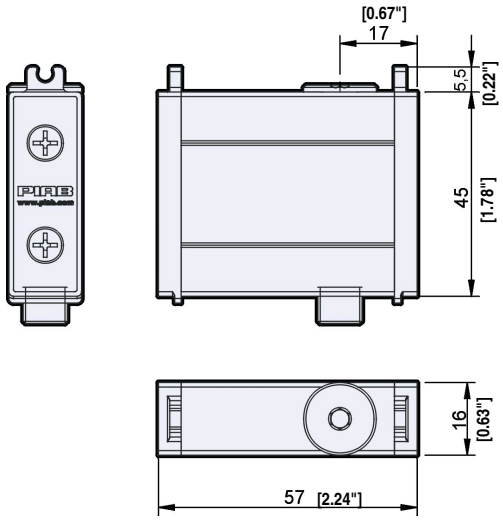
Vacuum switch, PNP NO/NC
Part no. 01.04.176 (Code 05)



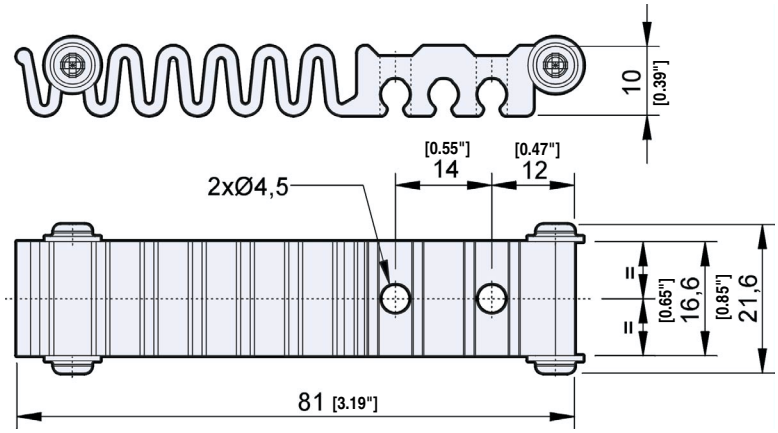
Vacustat 6mm
push-in fitting
Part no. 01.04.701
(Code AC)



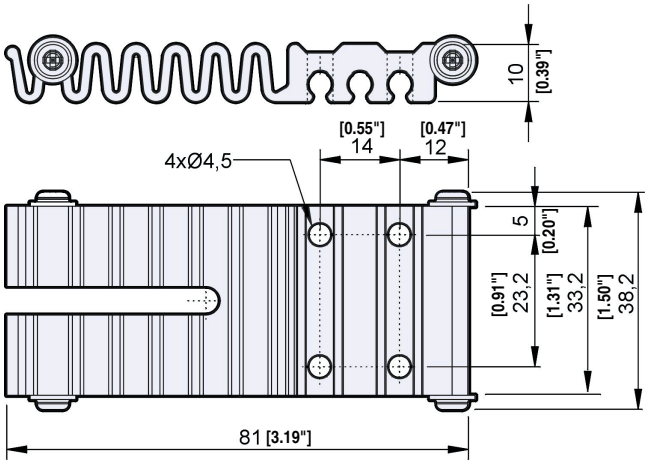
Pump module PI12-3, extra
Part no. 01.04.658



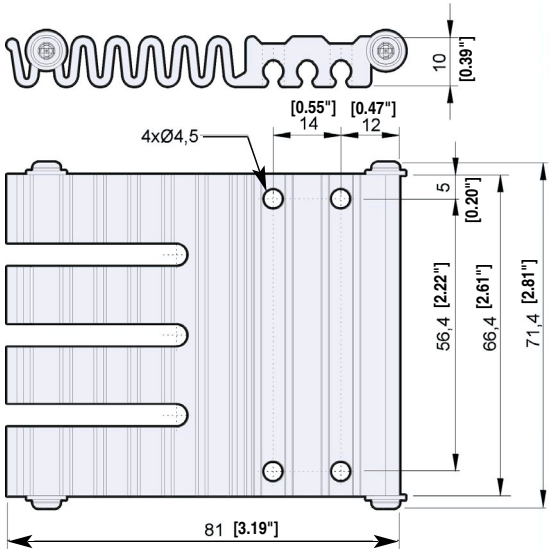
Quick-release Tank 30cm³
Part no. 01.04.272



Click-in mounting rail for 1 vacuum pump module
Part no. 01.04.276



Click-in mounting rail for 2 vacuum pump modules
Part no. 01.04.277



Click-in mounting rail for 4 vacuum pump modules
Part no. 01.04.278

EXPLANATION OF MINI CHIP VACUUM PUMP PART NUMBER:

L7A6-ANA

Pump Series	Max. Vacuum (inHg)
L	22.3
M	24.1
X	27.9

Size	Pump Series
7-56	L
5-60	M, X

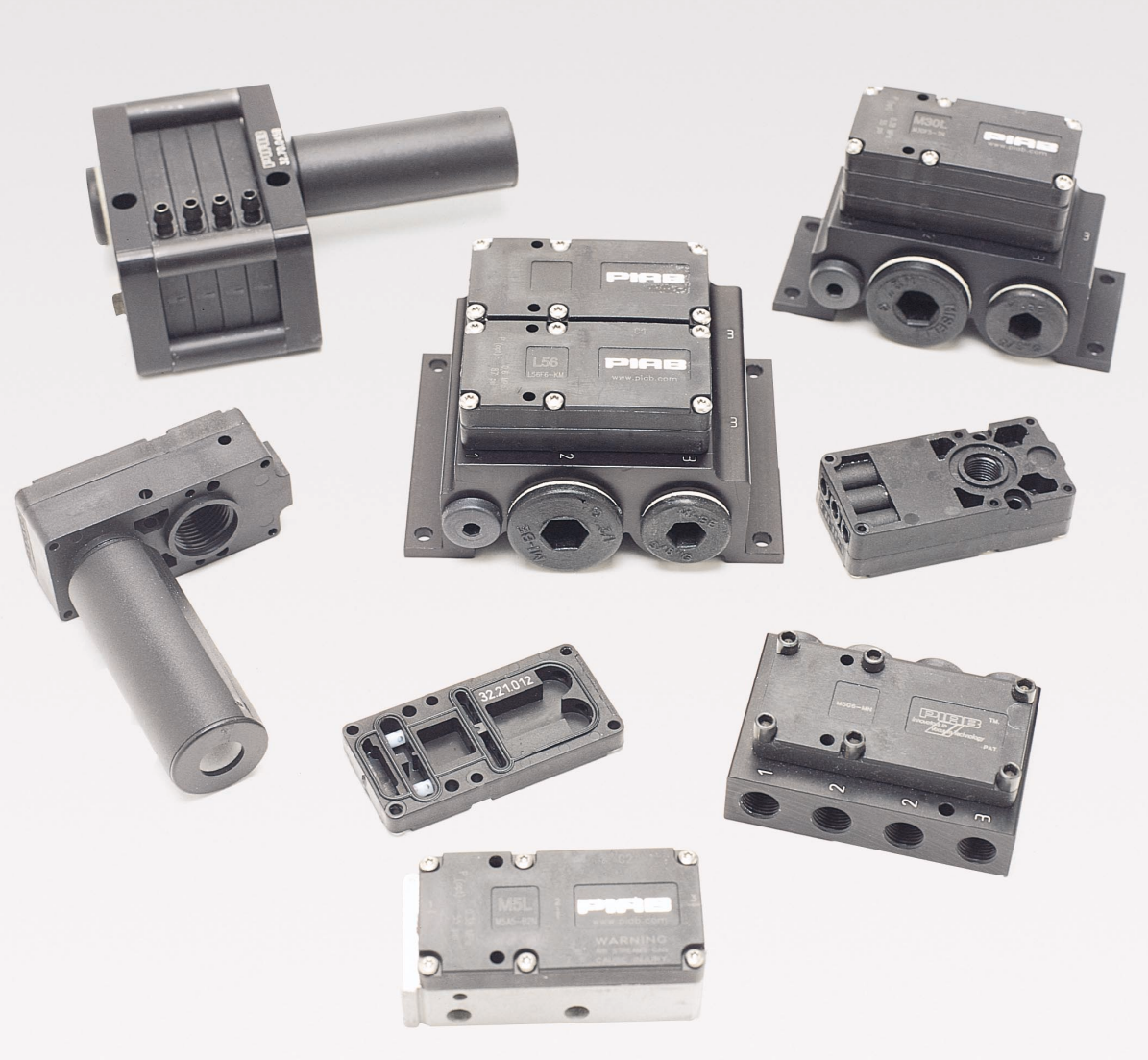
Model	Pump Housing
A	Chip

Optimum Feed Pressure	psi
5	55 or 58
6	87

Connectors	Compressed Air Connection	Vacuum Connection	Exhaust Connection
-A	M5	NPSF 1/8"	vent
-B2 (aluminum)	NPSF 1/8"	NPSF 3/8"	vent
-C	NPSF 1/8"	NPSF 3/8"	NPSF 3/8"
-K	2 x NPSF 1/8"	2 x G 1/2"	4 x NPSF 3/8"
-M	2 x NPSF 1/8"	4 x NPSF 1/8"	2 x NPSF 1/8"
-T	2 x NPSF 1/8"	2 x G 1/2"	3 x NPSF 3/8"
-Z	Direct Mounting		

Seal Material	
N	Nitrile
E	EPDM
V	Viton

Non-Return Valve	
A	Yes
–	No

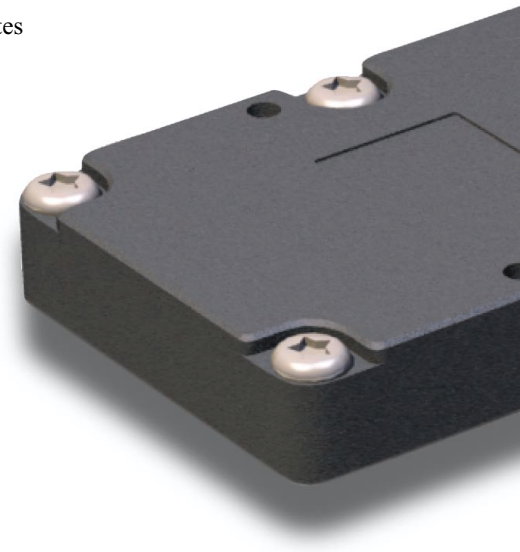

PIAB
L56
M30L
M5L
32.21012
WARNING

The Mini Chip Pump

The Mini Chip Pump is the heart of all PIAB Mini Vacuum Pumps. Your working environment dictates your mounting choice.

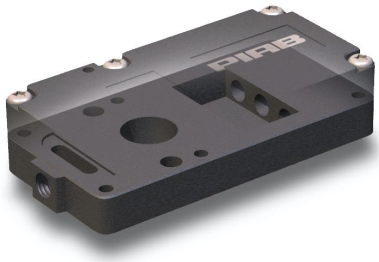
To choose the proper size, consult the tables on pages 42-43 to select the Mini Chip Pump for your application. Then, look at these two pages to see which mounting suits you best.
Complete dimensional drawings follow these pages.

The Mini Chip Pump is also available without a connection plate for direct mounting (Z style). (Available in 5/7/10/14 size chips).



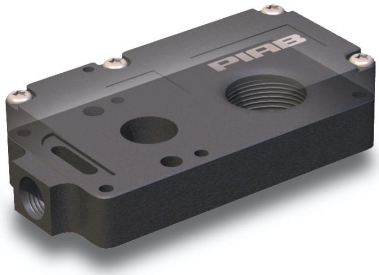
Connection plates of high-tech composite material

When the connection needs to be lightweight and resistant to chemicals



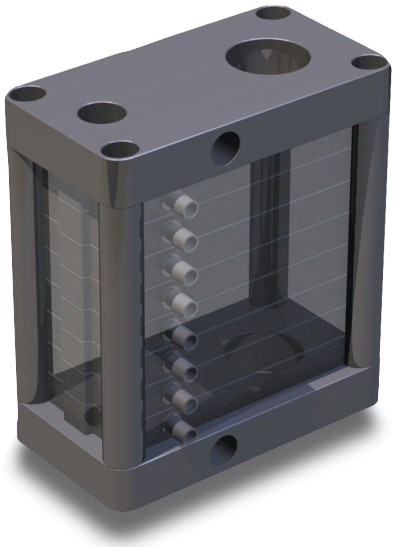
Connection plate A

An extra-thin, compact and lightweight connection plate.
(Available in 5/7/10 size chips)



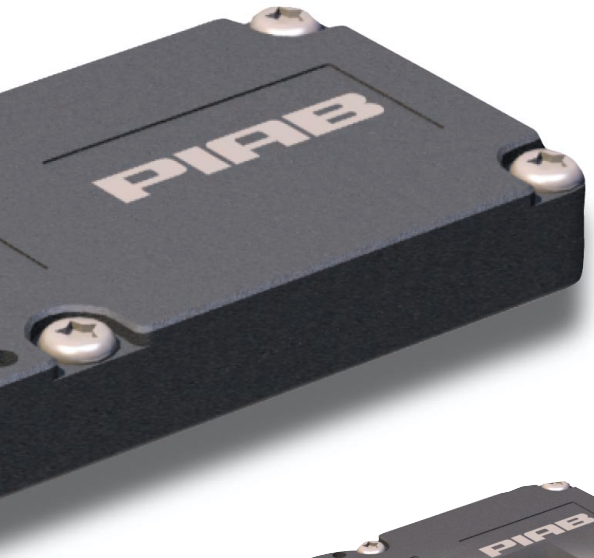
Connection plate C

A compact connection plate with facilities for connecting an external silencer or for discharging the blow-off air.
(Available in 5/7/10/14/20/28 size chips)



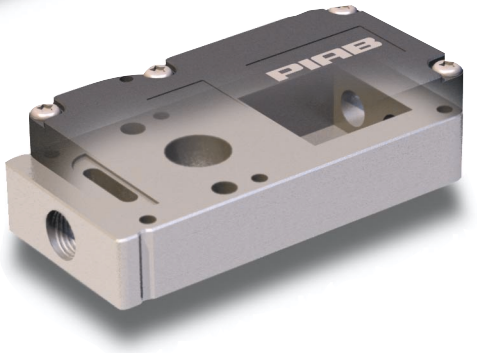
Chip Stack with aluminum connections

With independent vacuum connections to every pump housing.
(Available in 5/10 size chips)



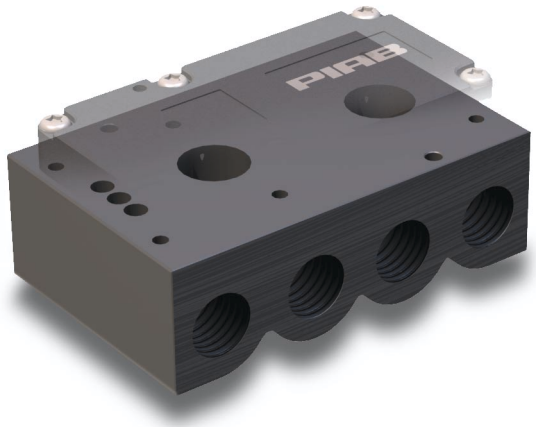
Aluminum connection profiles

When the connection needs to be stronger and durable



Connection plate B of aluminum

Durable connection plate with built-in silencer.
(Available in 5/7/10/14/20/28 size chips)

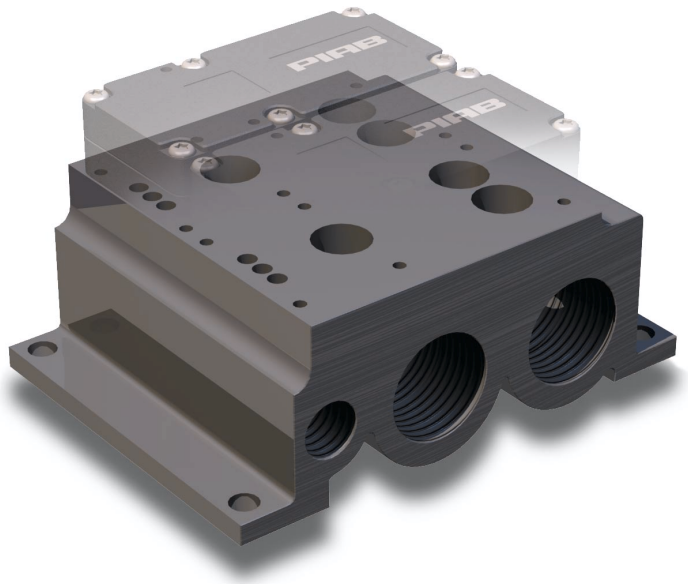


4 x 1/8" aluminum connection profile

Durable connection profile with four vacuum connections.
(Available in 5/7/10/14/20 size chips)

2 x 1/2" aluminum connection profile

Durable connection profile with amply sized holes for mounting bolts.
(Available in 14/20/28/30 size chips)



Double 2 x 1/2" aluminum connection profile

Durable connection profile with amply sized holes for mounting bolts.
Scope of mounting two packs of pump housings.
(Available in 40/56/60 size chips)

VACUUM FLOW at optimum feed pressure (for non-sealed systems)

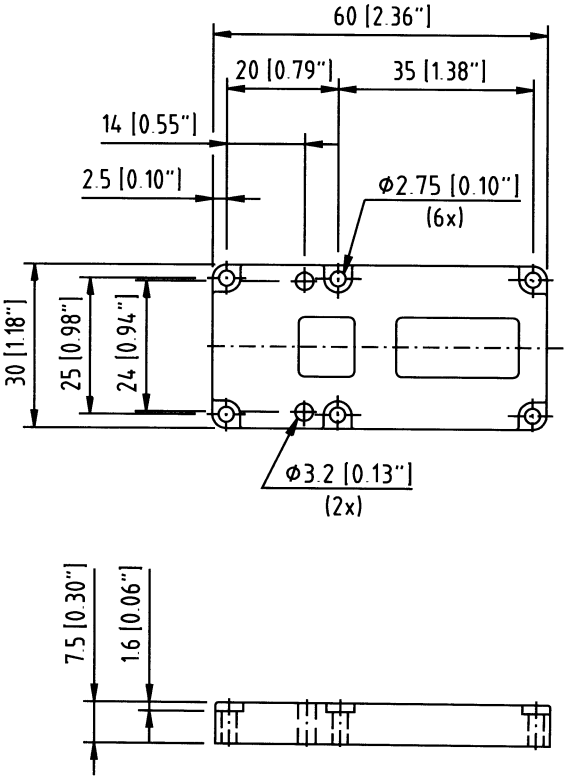
Pump Series	Model	Max. Vacuum (-inHg)	Feed Pressure (psi)	Air cons. (scfm)	Vacuum flow in scfm at different vacuum levels (-inHg)									
					0	3	6	9	12	15	18	21	24	27
L	L7	22.3	87	0.95	1.7	1.3	0.78	0.59	0.49	0.40	0.23	0.11		
	L14	22.3	87	1.91	3.3	2.5	1.5	1.1	0.93	0.76	0.44	0.19		
	L28	22.3	87	3.81	6.4	4.4	2.5	2.1	1.6	1.2	0.78	0.21		
	L56	22.3	87	7.63	12.7	8.8	5.1	4.1	3.3	2.5	1.6	0.42		
M	M5LP	24.1	55	0.68	1.3	0.76	0.47	0.40	0.32	0.23	0.16	0.10	0.02	
	M10LP	24.1	55	1.36	2.5	1.53	0.93	0.81	0.64	0.47	0.32	0.19	0.05	
	M20LP	24.1	55	2.71	5.1	3.1	1.9	1.6	1.3	0.93	0.64	0.38	0.09	
	M30LP	24.1	55	4.07	7.2	4.2	2.8	2.4	1.9	1.4	0.95	0.57	0.14	
	M40LP	24.1	55	5.42	10.2	6.1	3.7	3.2	2.5	1.9	1.3	0.76	0.19	
	M60LP	24.1	55	8.14	13.4	8.1	4.9	4.8	3.8	2.8	1.9	1.1	0.28	
X	X5LP	27.9	58	0.8	1.1	0.66	0.32	0.25	0.21	0.17	0.13	0.085	0.036	0.013
	X10LP	27.9	58	1.7	2.1	1.3	0.61	0.49	0.42	0.34	0.25	0.17	0.074	0.025
	X20LP	27.9	58	3.4	4.2	2.6	1.2	0.95	0.85	0.68	0.53	0.34	0.15	0.053
	X30LP	27.9	58	5.1	6.4	4.0	1.8	1.4	1.3	1.0	0.81	0.51	0.22	0.08
	X40LP	27.9	58	6.8	8.5	5.3	2.4	1.9	1.7	1.4	1.1	0.68	0.30	0.11
	X60LP	27.9	58	10.2	12	7.4	3.6	2.9	2.5	2.0	1.6	1.1	0.42	0.17

EVACUATION TIME at optimum feed pressure (for sealed systems)

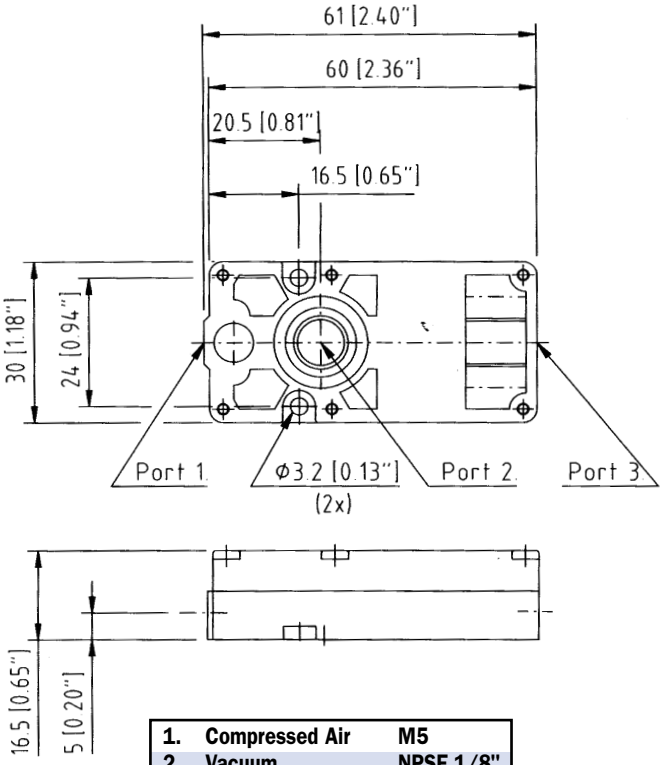
Pump Series	Model	Max. Vacuum (-inHg)	Feed Pressure (psi)	Evacuation time in s/cubic foot to reach different vacuum levels (-inHg)								
				3	6	9	12	15	18	21	24	27
L	L7	22.3	87	4.25	8.5	19.82	31.15	48.15	67.97	110.45		
	L14	22.3	87	2.27	4.25	9.91	15.58	24.07	33.98	55.23		
	L28	22.3	87	1.13	2.27	5.38	8.78	13.31	18.97	30.59		
	L56	22.3	87	0.57	1.13	2.83	4.24	6.8	9.35	15.29		
M	M5LP	24.1	55	6.23	19.82	33.98	48.99	76.47	118.95	175.59	354.01	
	M10LP	24.1	55	3.12	9.91	16.99	24.64	38.23	59.47	87.79	177	
	M20LP	24.1	55	1.7	5.1	8.5	12.18	19.26	29.74	43.9	88.64	
	M30LP	24.1	55	1.13	3.4	5.66	8.21	12.74	19.82	29.17	58.91	
	M40LP	24.1	55	0.85	2.55	4.25	6.23	9.63	15.01	22.09	44.18	
	M60LP	24.1	55	0.57	1.7	2.83	3.96	6.51	9.91	14.73	29.45	
X	X5LP	27.9	58	7.9	20.4	43	72	106	150	207	391	578
	X10LP	27.9	58	4.0	10.2	22	36	53	75	104	164	289
	X20LP	27.9	58	2.0	5.7	11	18	27	37	52	82	144
	X30LP	27.9	58	1.5	3.8	8.1	13.6	20	28	39	61	108
	X40LP	27.9	58	1.0	2.5	5.4	9.1	13	19	26	41	72
	X60LP	27.9	58	0.62	1.7	3.6	6.0	8.9	12	18	27	48

Dimensional Drawings

Mini Chip Pump without Connection Plate Z
For Direct Mounting



Mini Chip Pump with Connection Plate A



1.	Compressed Air	M5
2.	Vacuum	NPSF 1/8"
3.	Exhaust	3 x Ø5 mm

Mini Chip Pump without Connection Plate (Z)

Size	Part No.	Weight Oz.
L7	L7A6-ZN	0.46
L14	L14A6-ZN	0.46
M5LP	M5A5-ZN	0.46
M10LP	M10A5-ZN	0.46
X5LP	X5A5-ZN	0.46
X10LP	X10A5-ZN	0.46

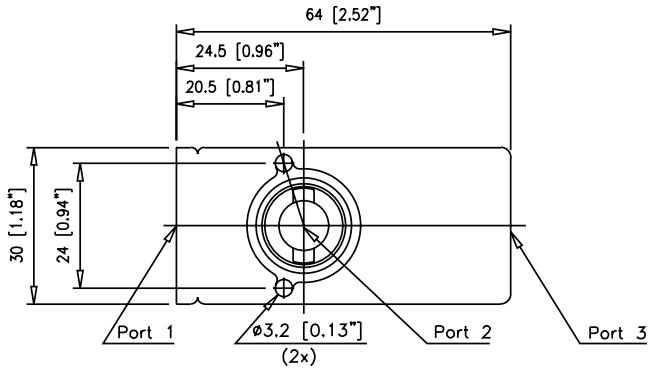
* Viton or EPDM seals optional (i.e. Part No. L7A6-ZV or L7A6-ZE)
** Non-return valves installed upon request. Add a letter "A" to end of Part No. (i.e. L7A6-ZNA).
Materials: PA, POM, Nitrile

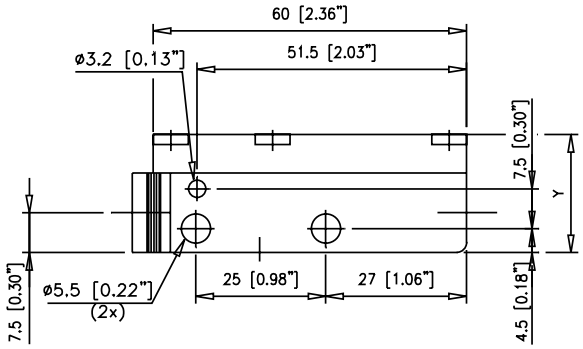
Mini Chip Pump with Connection Plate (A)

Size	Part No.	Weight Oz.
L7	L7A6-AN	1.16
M5LP	M5A5-AN	1.16
M10LP	M10A5-AN	1.16
X5LP	X5A5-AN	1.16
X10LP	X10A5-AN	1.16

* Viton or EPDM seals optional (i.e. Part No. L7A6-AV or L7A6-AE)
** Non-return valves installed upon request. Add a letter "A" to end of Part No. (i.e. L7A6-ANA).
Materials: PA, POM, Nitrile

Mini Chip Pump with Connection Plate B in Aluminum





1.	Compressed Air	NPSF 1/8"
2.	Vacuum	NPSF 3/8"
3.	Exhaust	2 x Ø7 mm Internal silencer

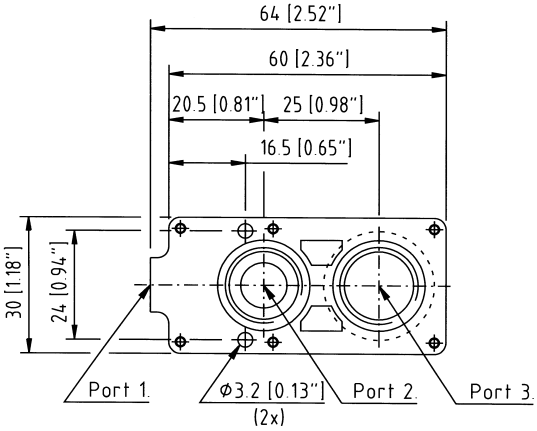
Size	Y
5/7/10/14	22.5 (0.89")
20/28	30 (1.18")

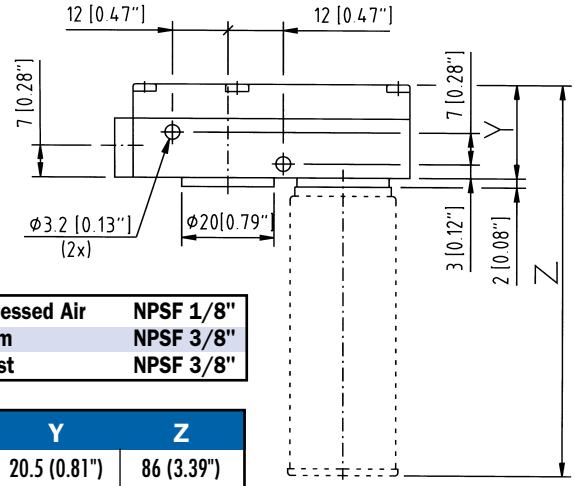
Mini Chip Pump with Connection Plate (B) in Aluminum

Size	Part No.	Weight Oz.
L7	L7A6-B2N	2.19
L14	L14A6-B2N	2.19
L28	L28A6-B2N	2.68
M5LP	M5A5-B2N	2.19
M10LP	M10A5-B2N	2.19
M20LP	M20A5-B2N	2.68
X5LP	X5A5-B2N	2.19
X10LP	X10A5-B2N	2.19
X20LP	X20A5-B2N	2.68

* Viton or EPDM seals optional (i.e. Part No. L7A6-B2V or L7A6-B2E)
** Non-return valves installed upon request. Add a letter "A" to end of Part No. (i.e. L7A6-B2NA).
Materials: PA, Al, POM, Nitrile

Mini Chip Pump with Connection Plate C





1.	Compressed Air	NPSF 1/8"
2.	Vacuum	NPSF 3/8"
3.	Exhaust	NPSF 3/8"

Size	Y	Z
5/7/10/14	20.5 (0.81")	86 (3.39")
20/28	28 (1.10")	94 (3.70")

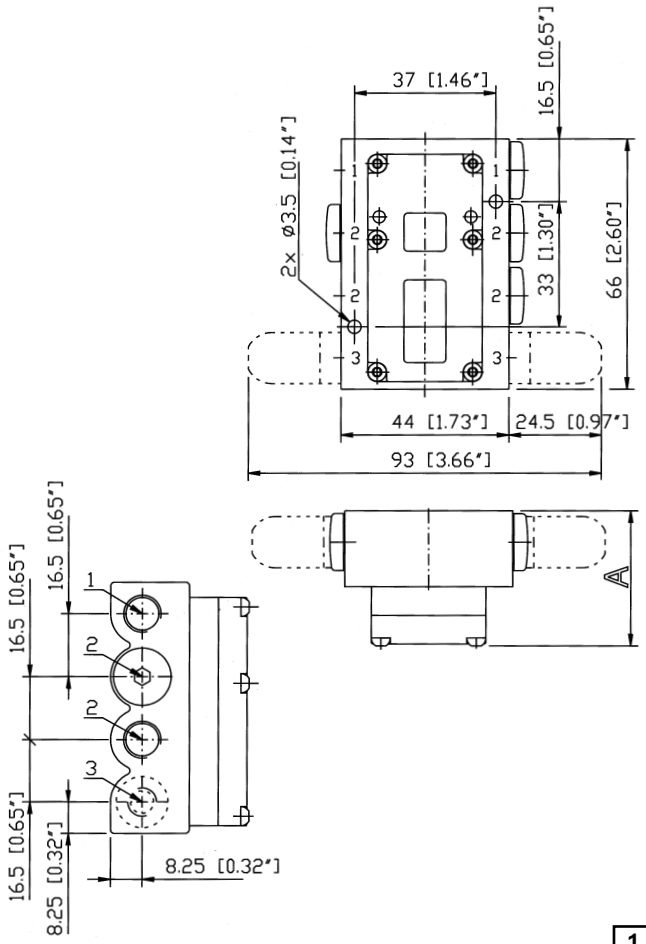
Mini Chip Pump with Connection Plate (C)

Size	Part No.	Weight Oz.
L7	L7A6-CN	1.69
L14	L14A6-CN	1.69
L28	L28A6-CN	2.12
M5LP	M5A5-CN	1.69
M10LP	M10A5-CN	1.69
M20LP	M20A5-CN	2.12
X5LP	X5A5-CN	1.69
X10LP	X10A5-CN	1.69
X20LP	X20A5-CN	2.12

* Viton or EPDM seals optional (i.e. Part No. L7A6-CV or L7A6-CE)
** Non-return valves installed upon request. Add a letter "A" to end of Part No. (i.e. L7A6-CNA).
Materials: PA, ABS, POM, Nitrile

Dimensional Drawings

Mini Chip Pump with 4 x 1/8" Aluminum Profile
(Mini System Model)



Size	A
5/7/10/14	27.5 (1.08")
20	35 (1.38")

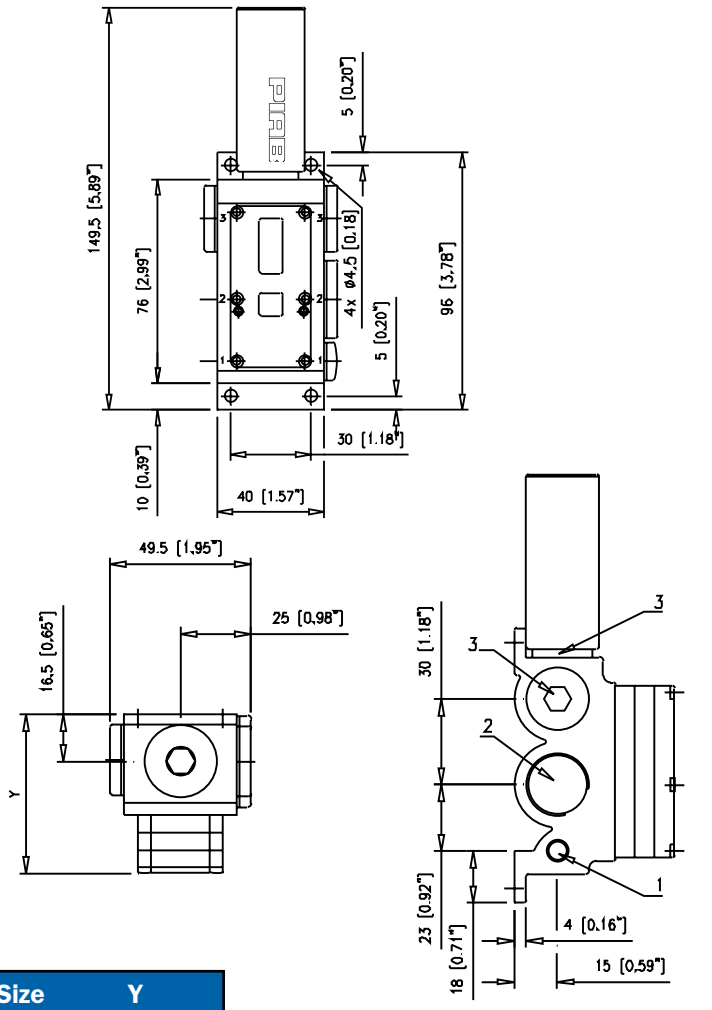
1. Compressed Air	2 x NPSF 1/8"
2. Vacuum	4 x NPSF 1/8"
3. Exhaust	2 x NPSF 1/8"

Mini Chip Pump with 4 x 1/8" Aluminum Profile

Size	Part No.	Weight Oz.
L7	L7G6-MN	4.58
L14	L14G6-MN	4.58
M5LP	M5G5-MN	4.58
M10LP	M10G5-MN	4.58
M20LP	M20G5-MN	4.94
X5LP	X5G5-MN	4.58
X10LP	X10G5-MN	4.58
X20LP	X20G5-MN	4.94

* Viton or EPDM seals optional (i.e. Part No. L7G6-MV or L7G6-ME)
** Non-return valves installed upon request. Add a letter "A" to end of Part No. (i.e. L7G6-MNA).
Materials: PA, Al, POM, Nitrile

Mini Chip Pump with 2 x 1/2" Aluminum Profile



Size	Y
14	41 (1.65")
20/28	48.5 (1.91")
30	56 (2.2")

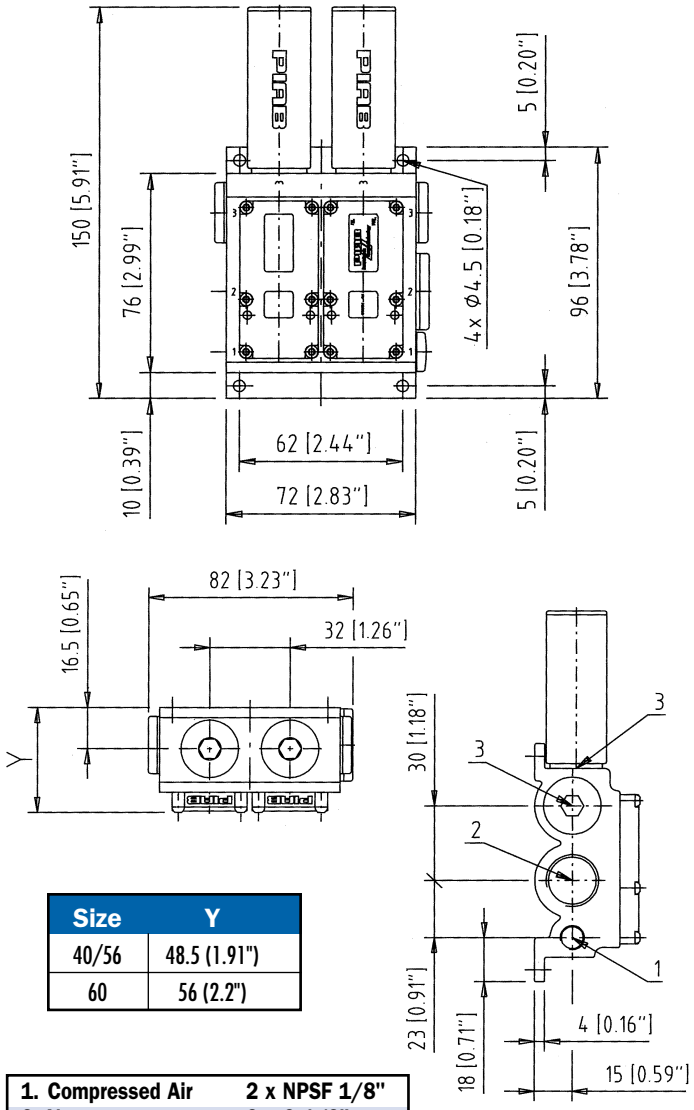
1. Compressed Air	2 x NPSF 1/8"
2. Vacuum	2 x G 1/2"
3. Exhaust	3 x NPSF 3/8"

Mini Chip Pump with 2 x 1/2" Aluminum Profile

Size	Part No.	Weight Oz.
L14	L14F6-TN	8.1
L28	L28F6-TN	8.4
M20LP	M20F5-TN	8.4
M30LP	M30F5-TN	8.8
X20LP	X20F5-TN	8.4
X30LP	X30F5-TN	8.8

* Viton or EPDM seals optional (i.e.Part No. L14F6-TV or L14F6-TE)
** Non-return valves installed upon request. Add a letter "A" to end of Part No. (i.e. L14F6-TNA).
Materials: PA, Al, POM, Nitrile

Mini Chip Pump with 2 x 1/2" Double Aluminum Profile
(Mini Flex Model)



Size	Y
40/56	48.5 (1.91")
60	56 (2.2")

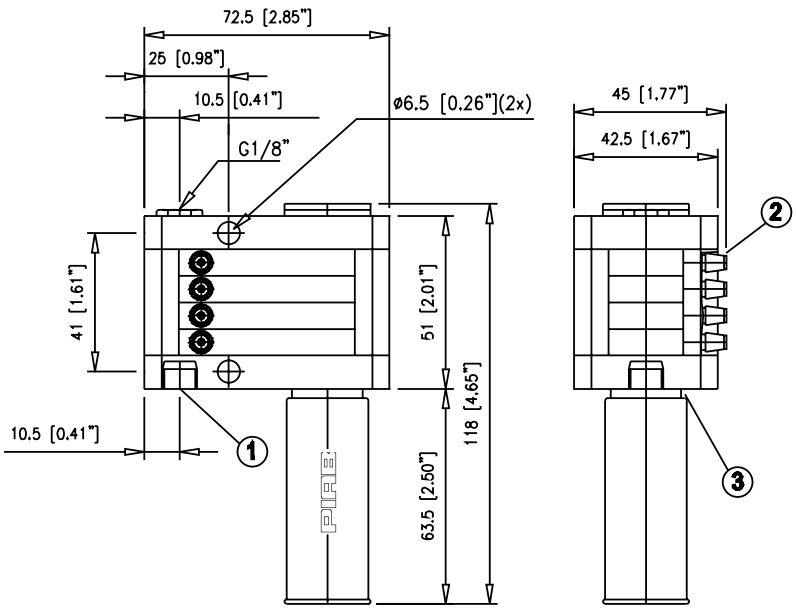
1. Compressed Air	2 x NPSF 1/8"
2. Vacuum	2 x G 1/2"
3. Exhaust	4 x NPSF 3/8"

Mini Chip Pump with Double 2 x 1/2" Aluminum Profile

Size	Part No.	Weight Oz.
L56	L56F6-KN	14.9
M40LP	M40F5-KN	14.9
M60LP	M60F5-KN	15.8
X40LP	X40F5-KN	14.9
X60LP	X60F5-KN	15.8

* Viton or EPDM seals optional (i.e.Part No. L56F6-KV or L56F6-KE)
** Non-return valves installed upon request. Add a letter "A" to end of Part No. (i.e. L56F6-KNA).
Materials: PA, Al, POM, Nitrile

Chip Stacks with 4 separate vacuum channels

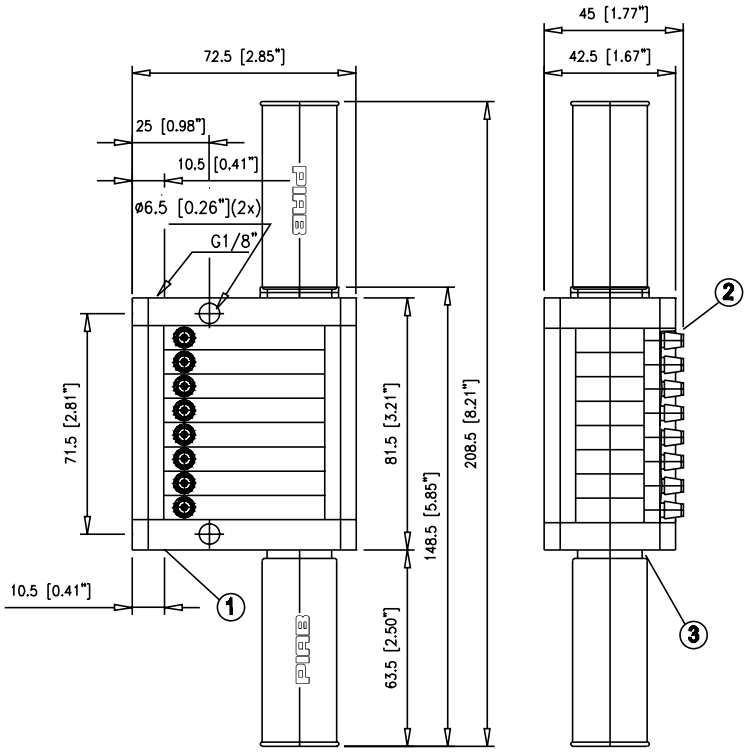


Chip Stacks with 4 separate vacuum channels

Size	Part No.	Weight Oz.
M5x4 CF	32.70.045B	8.40
M10x4 CF	32.70.046B	8.40
X5x4 CF	32.70.043B	8.40
X10x4 CF	32.70.044B	8.40

Materials: PA, Al, POM, Nitrile

Chip Stacks with 8 separate vacuum channels



1. Compressed Air	G 1/8"
2. Vacuum	4x alt. 8xD/d=6/4
3. Exhaust	G 3/8"

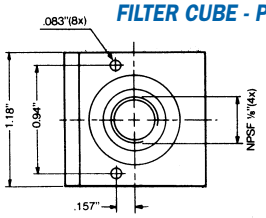
Chip Stacks with 8 separate vacuum channels

Size	Part No.	Weight Oz.
M5x8 CF	32.70.045C	11.30
X5x8 CF	32.70.043C	11.30

Materials: PA, Al, POM, Nitrile

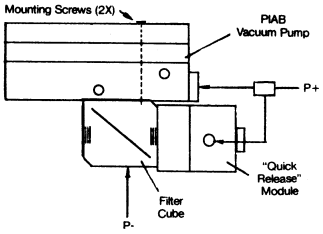
Accessories

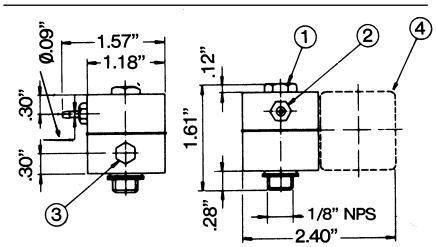
FILTER CUBE - Part. No. 32.16.006



Use for filtration of induced air and for multiple connection of mini-pump accessories.
Materials:
Housing - Makrolon
Filter - Nylon

EXAMPLE OF COMBINATIONS



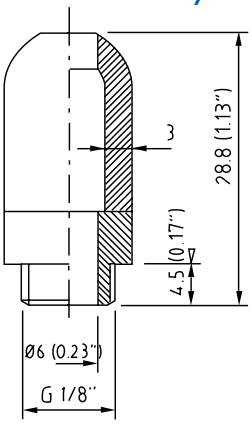


"QUICK RELEASE" MODULE

Used for fast unloading of parts and for filter cleaning. "Quick release" module 5cm³ volume: Part. no.31.16.023. "Quick release" module 23cm³ volume: Part. No. 31.16.031. Additional chamber 18cm³: Part. No. 31.16.030.

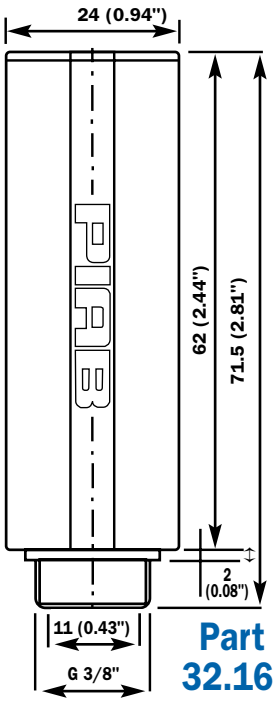
1. Plug (NPSF 1/8"), connection of vacuum switch.
2. Tube connection 4/2mm, to be connected to the inlet tube at the Multi-Ejector.
3. Plug (M5), connection of additional chamber.
4. Additional chamber 18cm3 with connection M5, to increase the feedback effect.

SILENCER 1/8"



Part No. 01.01.059

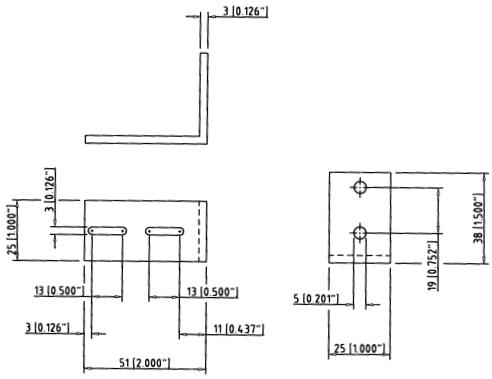
SILENCER 3/8"



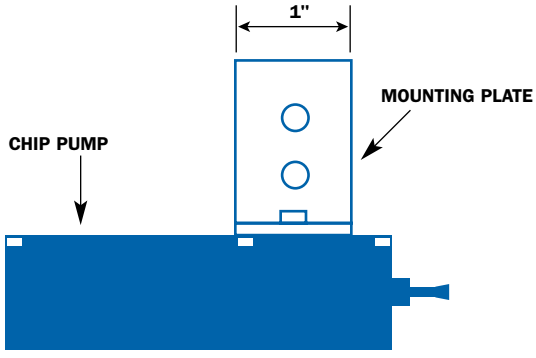
Part No. 32.16.009

CHIP PUMP MOUNTING PLATE

Material: Aluminum



Part No. 31.16.081



Recommended Plastic Filter			
Filter Assembly Part Number	Connection Port (NPT)	Replacement Element Number	Replacement Element Packed
PPSF.125-X10	1/8"	PPX10RE3	3
PPSF.375-x10	3/8"	PPX10RE3	3

Chip Seal Kits			
Chip Pump Size	Nitrile	Viton	EPDM
5-28	32.01.097	32.01.097V	32.01.097E
30-60	01.00.491	01.00.491V	01.00.491E

Kits include flap valves, gaskets, and compressed air filters.

EXPLANATION OF CLASSIC PUMP PART NUMBER:

M25B5-ENAF

Pump Series	Max. Vacuum (inHg)
L	22.3
M	27.1
H	29.5/29.85

Size	Pump Series
25-100	L, M
40, 120	H
150-400	MP L, M
240, 580	MP H

Model	Pump Housing
B	Classic

Optimum Feed Pressure	psi
5	50
6	87

Connectors	Compressed Air Connection	Vacuum Connection	Exhaust Connection
-E	NPT 1/4"	NPT 3/4"	NPT 3/4"
-V	2 x G 1/2"	2 x G 1 1/2"	2 x G 1 1/2"

Seal Material	
N	Nitrile
E	EPDM
V	Viton

Non-Return Valve	
A	Yes
–	No

Energy-Savings Kit	
F	Yes
–	No

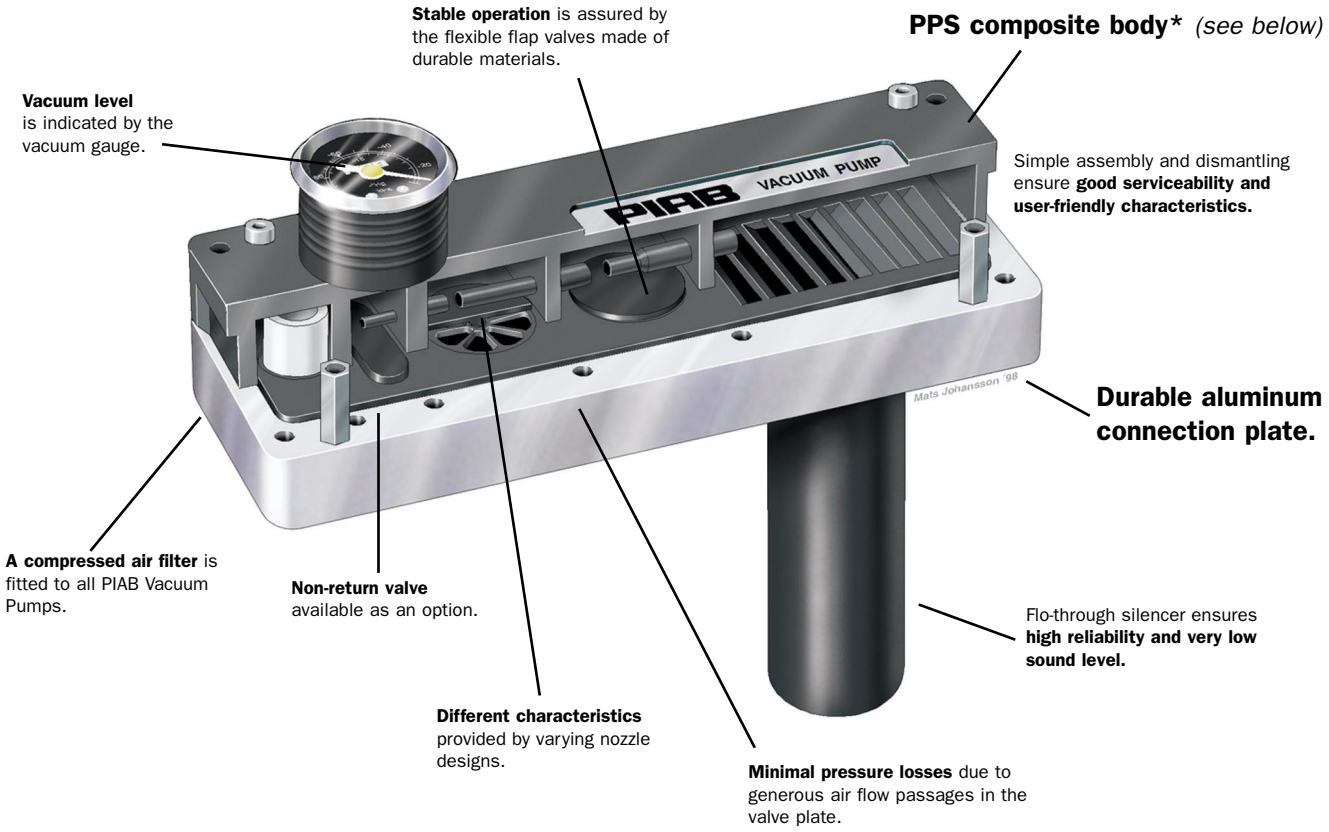

3
2
1
PIAB Vacuum Pump
Classic

PIAB CLASSIC PUMPS

The Classic Series Vacuum Pump Provides You with These Benefits

- ✔ M Classic-series runs at a low 50-psi inlet pressure.
- ✔ Higher vacuum flows with L-series.
- ✔ Four bolts to remove for simple assembly and disassembly. The pump can be connected to the machine for maintenance.
- ✔ Lightweight with PPS (corrosion resistance) body and Aluminum connection plate (1.43-1.80 lb.) or 100% PPS for maximum corrosion resistance.
- ✔ NPT threads for compressed air, vacuum and exhaust connections.

THE PIAB CLASSIC PUMP



*Not Just Another Plastic!

While the connection ports are made of a durable, die-cast aluminum, the material of the PIAB Classic vacuum pump body is a plastic composite material called Ryton® PPS (polyphenylene sulfide). This polymer offers the broadest resistance to chemicals of any advanced engineering plastic. It also has remarkable endurance at very high temperatures. A certain application for PPS is in the mining industry. Bronze rings in a centrifugal mining pump are now made of PPS. Other industries using stainless steel pumps are having the stainless steel housings replaced with PPS housings. Finally, in the automotive industry, PPS is in everything from powertrain transmission parts to ABS brake systems. The choice of PPS was for its mechanical strength, dimensional stability, high resistance to chemicals and low weight.

This material gives the PIAB Classic pump the same qualities of strength, low weight and durability. It allows PIAB Classic pumps to be used in a wide variety of environments and applications.

L SERIES

22.3 -inHg at 87 psi

- PPS body and aluminum connection plate
- Noise level 60-65 dB(A)
- Faster evacuation speeds at low vacuum levels

The L Series vacuum pumps have been designed to provide 30%-70% more vacuum flow than other models. Energy Saving (ES) system available.

Max. Vacuum (-inHg)	Pump Model PIAB-	Vacuum Flow in scfm at different vacuum level (-inHg) at 87 psi							
		0	3	6	9	12	15	18	21
22.3	L 25/ES	13	6.99	4.87	3.28	1.76	1.34	0.95	0.59
	L 50/ES	22	13.14	9.32	6.15	3.52	2.65	1.91	1.19
	L 100/ES	32	22.04	16.53	11.23	6.89	5.30	3.81	2.37
Max. Vacuum (-inHg)	**Pump model PIAB-**	**Air Cons. (scfm)**	**Evacuation time in s/cubic foot to reach different vacuum levels (-inHg)**						
			3	6	9	12	15	18	21
22.3	L 25/ES	3.8	0.48	1.36	2.8	5.2	9.6	15	24
	L 50/ES	7.4	0.37	0.82	1.53	2.8	5.0	7.6	12
	L 100/ES	14.8	0.20	0.45	0.85	1.6	2.5	3.8	6.1

* For values of vacuum flow and evacuation time at other feed pressures, please see pages 20-23.

CHARACTERISTICS

	Part Number for Ordering	Optimum Pressure psi	Maximum Vacuum at 87 psi	Temperature	Weight lb.	Sound Level dB(A)	Material
L 25	L25B6-EN	87	22.3 -inHg	-4° to +176°F	1.43	60-65	PPS, aluminum, nitrile rubber*
L 25 ES	L25B6-ENAF	87	22.3 -inHg	-4° to +176°F	1.59	60-65	PPS, aluminum, nitrile rubber*
L 50	L50B6-EN	87	22.3 -inHg	-4° to +176°F	1.43	60-65	PPS, aluminum, nitrile rubber*
L 50 ES	L50B6-ENAF	87	22.3 -inHg	-4° to +176°F	1.59	60-65	PPS, aluminum, nitrile rubber*
L 100	L100B6-EN	87	22.3 -inHg	-4° to +176°F	1.80	60-65	PPS, aluminum, nitrile rubber*
L 100 ES	L100B6-ENAF	87	22.3 -inHg	-4° to +176°F	1.96	60-65	PPS, aluminum, nitrile rubber*

* Viton or EPDM optional (i.e. Part No. L25B6-EV or L25B6-EE) - See page 71 for mounting bracket.

ACCESSORIES

Recommended Plastic Filter

Filter Assembly Part Number	Connection Port (NPT)	Replacement Element Number	Replacement Element Packed
PPSF.75-X35	3/4"	PPX35RE3	3

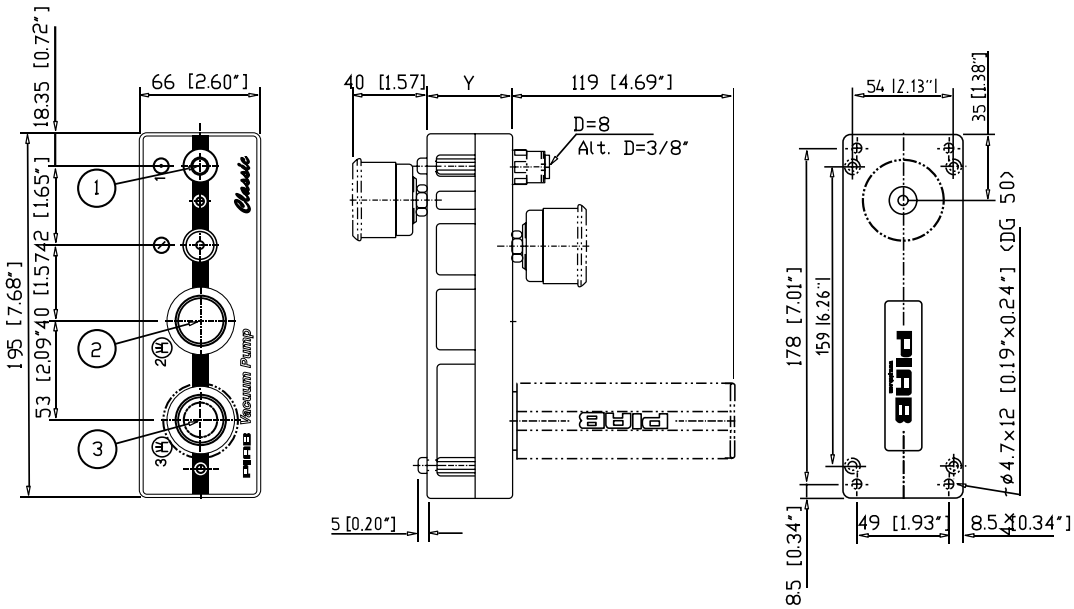
L Pump Seal Kits

Nitrile	Viton	EPDM
32.01.069	32.01.069V	32.01.069E

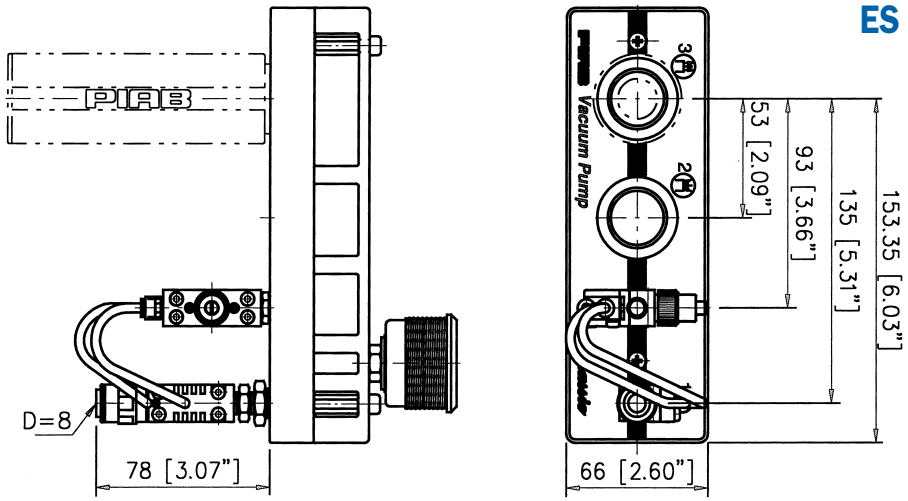
Kits include flap valves, gaskets, and compressed air filters.

PIAB Pump/Filter Special

Buy a PIAB Classic vacuum pump and a 3/4" NPT vacuum filter and receive a FREE 3-pack of filter elements. Add "PPFC" to the start of the Classic pump model number to order. (i.e. Part No. PPFCL25B6-EN)



ES SYSTEM



1. Compressed Air	NPT 1/4"
2. Vacuum	NPT 3/4"
3. Exhaust	NPT 3/4"

Size	Y
25, 50	45 (1.77")
100	65 (2.56")

CONNECTION SIZES

Pump	Compressed Air (1)	Vacuum (2)	Exhaust (3)
L25	0.16" ID 1/4" NPT	0.47" ID 3/4" NPT	0.47" ID 3/4" NPT
L50	0.24" ID 1/4" NPT	0.59" ID 3/4" NPT	0.59" ID 3/4" NPT
L100	0.32" ID 1/4" NPT	0.75" ID 3/4" NPT	0.87" ID 3/4" NPT

ID size is minimum recommended hose size. NPT is shown in actual thread sizes.

*PIAB free-flow silencer, vacuum gauge and mounting brackets come standard with all L pumps.

ENERGY SAVING SYSTEM

The PIAB energy saving (ES) system operates on a roughly similar system to that of a thermostat in a heating system. The energy saving achieved by the ES system will be at maximum if the vacuum system is sealed. The ES system is available as a separate module (Part No. 01.03.110) or it can be integrated with the pump for a compact unit.

M SERIES

27.1 -inHg at 50 psi

- PPS body and aluminum connection plate
- Noise level 60-65 dB(A)

The M Series vacuum pumps have been designed to handle low or fluctuating compressed air pressures. These vacuum pumps, at an inlet pressure of only 50-psi, provide up to 27 -inHg of vacuum. Energy Saving (ES) system available.

Max. Vacuum (-inHg)	Pump Model PIAB-	Vacuum Flow in scfm at different vacuum level (-inHg) at 50 psi									
		0	3	6	9	12	15	18	21	24	27
27.1	M25LP/ES	13	5.8	4.24	2.59	1.44	1.12	0.85	0.57	0.23	0.026
	M50LP/ES	22	11.4	8.26	5.19	2.88	2.25	1.7	1.14	0.47	0.053
	M100LP/ES	32	19.1	14.2	9.54	5.76	4.49	3.39	2.29	0.93	0.11
Max. Vacuum (-inHg)	**Pump model PIAB-**	**Air Cons. (scfm)**	**Evacuation time in s/cubic foot to reach different vacuum levels (-inHg)**								
			3	6	9	12	15	18	21	24	27
27.1	M25LP/ES	4.0	0.57	1.59	3.4	6.8	12	19	29	46	130
	M50LP/ES	8.0	0.37	0.91	1.76	3.4	6.0	9.3	14	23	65
	M100LP/ES	16	0.23	0.51	0.91	1.8	3.1	4.7	7.2	12	33

* For values of vacuum flow and evacuation time at other feed pressures, please see pages 20-25.

CHARACTERISTICS

	Part Number for Ordering	Optimum Pressure psi	Maximum Vacuum at 50 psi	Temperature	Weight lb.	Sound Level dB(A)	Material
M 25LP	M25B5-EN	50	27.1 -inHg	-4° to +176°F	1.43	60-65	PPS, aluminum,nitrile rubber*
M 25LP ES	M25B5-ENAF	50	27.1 -inHg	-4° to +176°F	1.59	60-65	PPS, aluminum,nitrile rubber*
M 50LP	M50B5-EN	50	27.1 -inHg	-4° to +176°F	1.43	60-65	PPS, aluminum,nitrile rubber*
M 50LP ES	M50B5-ENAF	50	27.1 -inHg	-4° to +176°F	1.59	60-65	PPS, aluminum,nitrile rubber*
M 100LP	M100B5-EN	50	27.1 -inHg	-4° to +176°F	1.80	60-65	PPS, aluminum,nitrile rubber*
M 100LP ES	M100B5-ENAF	50	27.1 -inHg	-4° to +176°F	1.96	60-65	PPS, aluminum,nitrile rubber*

* Viton or EPDM optional (i.e. Part No. M25B5-EV or M25B5-EE) - See page 71 for mounting bracket.

ACCESSORIES

Recommended Plastic Filter

Filter Assembly Part Number	Connection Port (NPT)	Replacement Element Number	Replacement Element Packed
PPSF.75-X35	3/4"	PPX35RE3	3

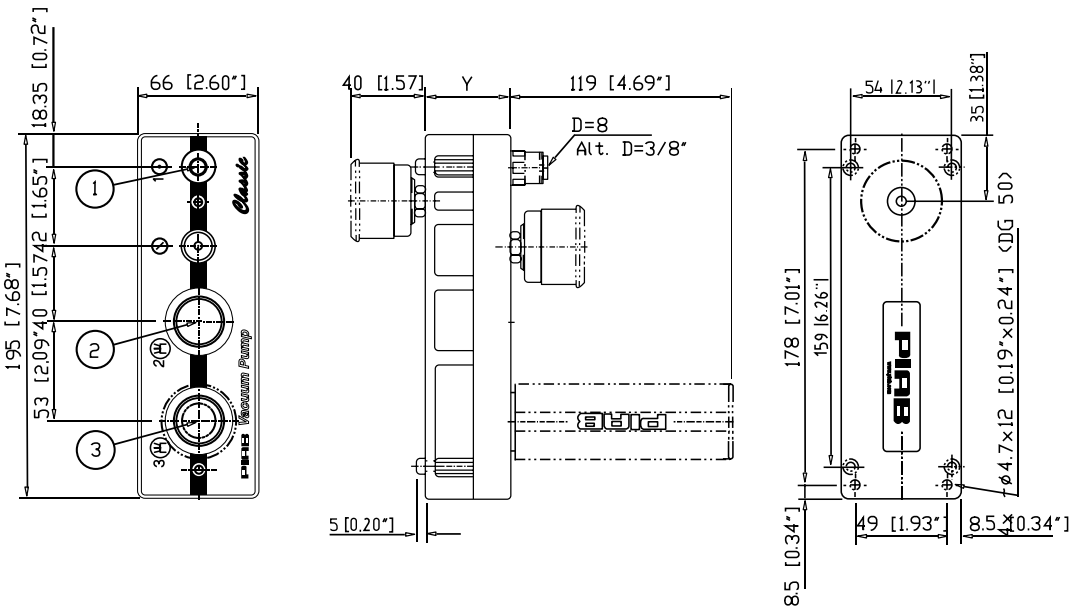
M-LP Pump Seal Kits

Nitrile	Viton	EPDM
32.01.069	32.01.069V	32.01.069E

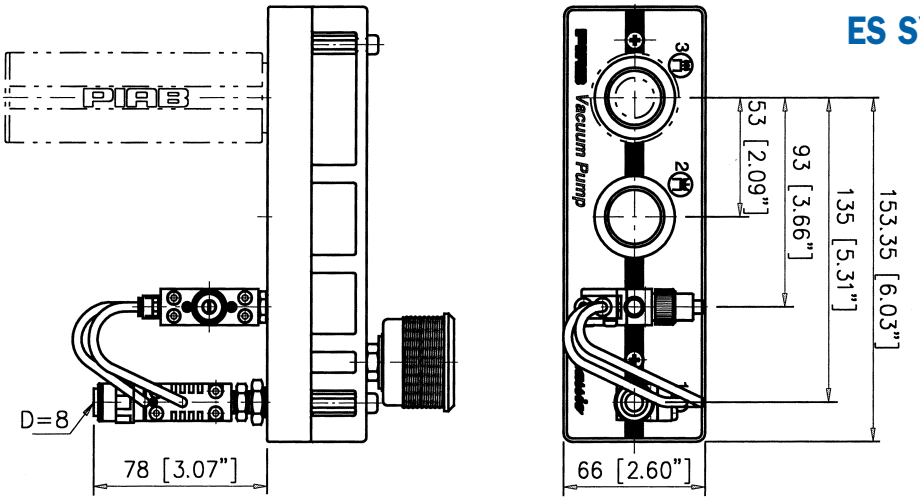
Kits include flap valves, gaskets, and compressed air filters.

PIAB Pump/Filter Special

Buy a PIAB Classic vacuum pump and a 3/4" NPT vacuum filter and receive a FREE 3-pack of filter elements. Add "PPFC" to the start of the Classic pump model number to order. (i.e. Part No. PPFCM25B5-EN)



ES SYSTEM



1. Compressed Air	NPT 1/4"
2. Vacuum	NPT 3/4"
3. Exhaust	NPT 3/4"

Size	Y
25, 50	45 (1.77")
100	65 (2.56")

CONNECTION SIZES

Pump	Compressed Air (1)	Vacuum (2)	Exhaust (3)
M 25LP	0.16" ID 1/4" NPT	0.47" ID 3/4" NPT	0.47" ID 3/4" NPT
M 50LP	0.24" ID 1/4" NPT	0.59" ID 3/4" NPT	0.59" ID 3/4" NPT
M 100LP	0.32" ID 1/4" NPT	0.75" ID 3/4" NPT	0.87" ID 3/4" NPT

ID size is minimum recommended hose size. NPT is shown in actual thread sizes.

***PIAB free-flow silencer, vacuum gauge and mounting brackets come standard with all M-LP pumps.**

ENERGY SAVING SYSTEM

The PIAB energy saving (ES) system operates on a roughly similar system to that of a thermostat in a heating system. The energy saving achieved by the ES system will be at maximum if the vacuum system is sealed. The ES system is available as a separate module (Part No. 01.03.110) for maximum flexibility or it can be integrated with the pump for a compact unit.

H SERIES

29.85 -inHg at 87 psi

- PPS body and aluminum connection plate
- Deep vacuum levels
- Noise level 60-65 dB(A)

The H Series vacuum pumps are designed to provide deeper levels of vacuum to 29.85 -inHg (5 mbar abs.).

Max. Vacuum (-inHg)	Pump Model PIAB-	Vacuum Flow in scfm at different vacuum level (-inHg) at 87 psi												
		0	3	6	9	12	15	18	21	24	27	28	29.2	
29.5 (15 mbar)	H 40	6.4	5.1	3.7	2.3	1.1	0.74	0.51	0.34	0.25	0.13	0.042	0.011	
29.85 (5 mbar)	H 120	18.2	14.8	10.8	7.0	3.7	2.8	1.9	1.4	0.95	0.28	0.13	0.017	

Max. Vacuum (-inHg)	Pump model PIAB-	Air Cons. (scfm)	Evacuation time in s/cubic foot to reach different vacuum levels (-inHg)												
			3	6	9	12	15	18	21	24	27	28	29.2	29.4	29.65
29.5 (15 mbar)	H 40	5.5	0.85	2.0	3.4	7.1	15.6	26	41.1	62	96	142	260	326	-
29.85 (5 mbar)	H 120	16.1	0.34	0.7	1.4	2.7	4.8	7.7	11.2	17	33	52	103	119	181

* For values of vacuum flow and evacuation time at other feed pressures, please see pages 20-23.

CHARACTERISTICS

	Part Number for Ordering	Optimum Pressure psi	Maximum Vacuum at 87 psi	Temperature	Weight lb.	Sound Level dB(A)	Material
H 40	H40B6-EN	87	29.5 -inHg (15 mbar)	-4° to +176°F	1.43	60-65	PPS, aluminum,nitrile rubber*
H 120	H120B6-EN	87	29.85 -inHg (5 mbar)	-4° to +176°F	1.80	60-65	PPS, aluminum,nitrile rubber*

* Viton or EPDM optional (i.e. code no. H40B6-EV or H40B6-EE) - See page 71 for mounting bracket.

ACCESSORIES

Recommended Plastic Filter

Filter Assembly Part Number	Connection Port (NPT)	Replacement Element Number	Replacement Element Packed
PPSF.75-X35	3/4"	PPX35RE3	3

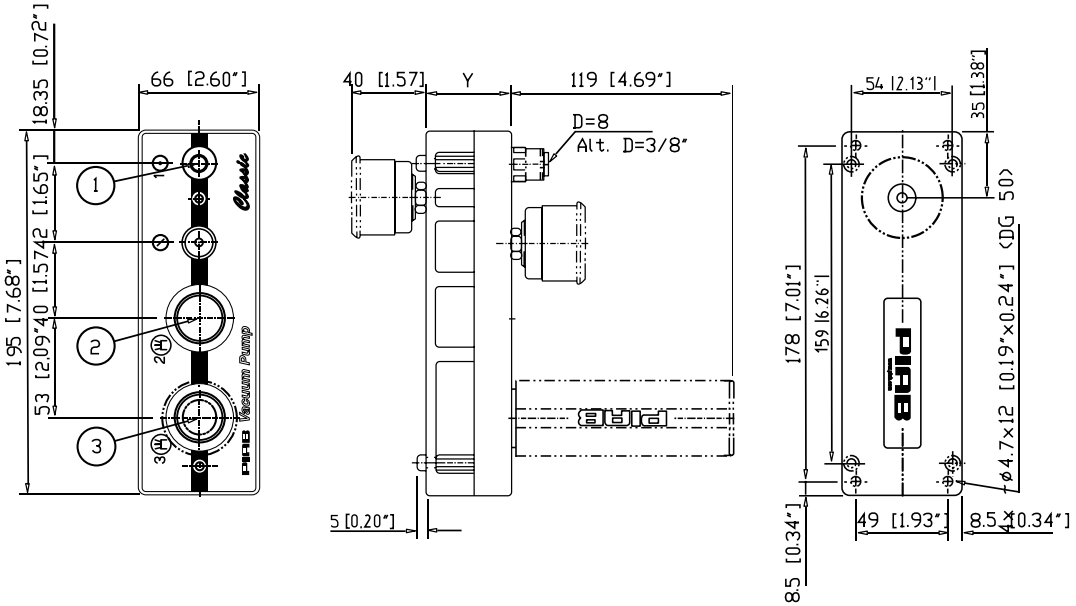
H Pump Seal Kits

Nitrile	Viton	EPDM
32.01.069	32.01.069V	32.01.069E

Kits include flap valves, gaskets, and compressed air filters.

PIAB Pump/Filter Special

Buy a PIAB Classic vacuum pump and a 3/4" NPT vacuum filter and receive a FREE 3-pack of filter elements. Add "PPFC" to the start of the Classic pump model number to order. (i.e. Part No. PPFCH40B6-EN)



1.	Compressed Air	NPT 1/4"
2.	Vacuum	NPT 3/4"
3.	Exhaust	NPT 3/4"

Size	Y
40	45 (1.77")
120	65 (2.56")

CONNECTION SIZES

Pump	Compressed Air (1)	Vacuum (2)	Exhaust (3)
H40	0.32" ID 1/4" NPT	0.32" ID 3/4" NPT	0.39" ID 3/4" NPT
H120	0.35" ID 1/4" NPT	0.59" ID 3/4" NPT	0.75" ID 3/4" NPT

ID size is minimum recommended hose size. NPT is shown in actual thread sizes.

*PIAB free-flow silencer, vacuum gauge and mounting brackets come standard with all H pumps.

CLASSIC MP

NEW

- Classic style body pumps mounted on a manifold
- Noise level 64-78 dB(A).

The Classic MP pumps are designed for applications that require large amounts of vacuum flow, such as packaging, assembly and other automation processes. They have a compact size and weigh only 7 to 12 lbs. Comparable mechanical vacuum pumps have a weight from between 30 to 50 lbs.

Pump Series	Pump Model PIAB-	Max Vacuum (inHg)	Feed Pressure (psi)	Air Cons. (scfm)	Vaccum flow in scfm at different vacuum levels (-inHg) at stated pressure											
					0	3	6	9	12	15	18	21	24	27	28	29.2
L	MP L150	22.3	87	23.3	55.1	34.3	26.3	17	10	8.1	5.7	3.6				
	MP L200	22.3	87	31.8	74.2	46.6	35	22.2	13.1	10.4	7.6	4.4				
	MP L300	22.3	87	47.7	86.9	65.7	48.7	31.8	20.1	16.3	11.7	7.2				
	MP L400	22.3	87	63.6	105.9	86.9	65.7	41.3	26.5	20.6	14.8	8.9				
M	MP M150LP	27.1	50	24.2	48.7	29.5	22.7	14.4	8.5	6.4	4.9	3.4	1.3	0.08		
	MP M200LP	27.1	50	32.2	58.3	37.7	27.5	17.6	10.6	8.5	6.4	4.2	1.7	0.13		
	MP M300LP	27.1	50	48.3	87.9	59.3	44.5	28.8	16.5	12.7	9.1	6.4	2.5	0.19		
	MP M400LP	27.1	50	64.4	98.5	76.3	56.8	36	21.8	17	14.8	8.5	3.2	0.25		
H	MP H240	5 mbar (abs)	87	32.2	37	28.6	19.7	10.6	6.6	4.7	3.8	2.8	1.9	0.42	0.19	0.02
	MP H480	5 mbar (abs)	87	64.4	69.9	57.2	39.2	23.3	12.7	10.6	7.8	5.3	3.8	0.85	0.38	0.04

Pump Series	Pump model PIAB-	Max Vacuum (inHg)	Feed Pressure (psi)	Air Cons. (scfm)	Evacuation time in s/cubic foot to reach different vacuum levels (inHg)										
					3	6	9	12	15	18	21	24	27	28	29.2
L	MP L150	22.3	87	23.3	0.20	0.37	0.62	1.05	1.76	2.69	4.25				
	MP L200	22.3	87	31.8	0.20	0.31	0.54	0.93	1.44	2.21	3.40				
	MP L300	22.3	87	47.7	0.11	0.17	0.31	0.54	0.88	1.33	2.07				
	MP L400	22.3	87	63.6	0.11	0.17	0.25	0.45	0.76	1.10	1.64				
M	MP M150LP	27.1	50	24.2	0.20	0.34	0.62	1.22	2.12	3.40	5.10	8.50	28.3		
	MP M200LP	27.1	50	32.2	0.20	0.37	0.59	1.08	1.70	2.55	3.97	6.52	19.8		
	MP M300LP	27.1	50	48.3	0.11	0.23	0.37	0.65	1.13	1.70	2.55	4.25	14.2		
	MP M400LP	27.1	50	64.4	0.08	0.20	0.31	0.54	0.85	1.30	1.98	3.40	11.3		
H	MP H240	5 mbar (abs)	87	32.2	0.28	0.54	0.85	1.59	2.72	3.97	6.23	9.07	18.7	29.7	62.3
	MP H480	5 mbar (abs)	87	64.4	0.17	0.28	0.45	0.79	1.36	2.04	3.40	4.53	9.63	15.9	32.6

* For values of vacuum flow and evacuation time at other feed pressures, please see pages 20-25.

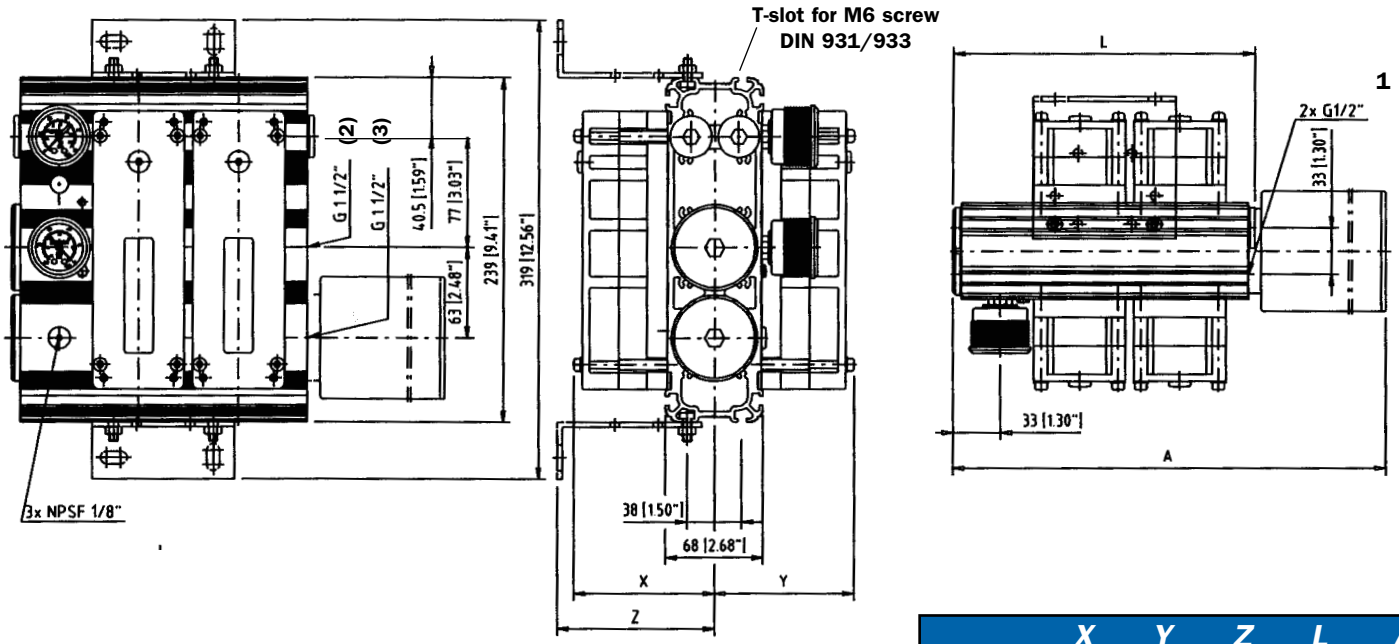
CHARACTERISTICS

	Part No. for Ordering	Optimum Pressure psi	Maximum Vacuum inHg	Temperature	Weight lb.	Sound Level dB(A)	Material
MP L150	L150B6-VN	87	27.1	-4 to +176F	7.5	64-78	PPS, aluminum,nitrile rubber*
MP L200	L200B6-VN	87	27.1	-4 to +176F	7.7	64-78	PPS, aluminum,nitrile rubber*
MP L300	L300B6-VN	87	27.1	-4 to +176F	12.3	64-78	PPS, aluminum,nitrile rubber*
MP L400	L400B6-VN	87	27.1	-4 to +176F	12.3	64-78	PPS, aluminum,nitrile rubber*
MP M150LP	M150B5-VN	50	27.1	-4 to +176F	7.5	64-78	PPS, aluminum,nitrile rubber*
MP M200LP	M200B5-VN	50	27.1	-4 to +176F	7.7	64-78	PPS, aluminum,nitrile rubber*
MP M300LP	M300B5-VN	50	27.1	-4 to +176F	12.3	64-78	PPS, aluminum,nitrile rubber*
MP M400LP	M400B5-VN	50	27.1	-4 to +176F	12.3	64-78	PPS, aluminum,nitrile rubber*
MP H240	H240B6-VN	87	5 mbar (abs)	-4 to +176F	7.7	64-78	PPS, aluminum,nitrile rubber*
MP H480	H480B6-VN	87	5 mbar (abs)	-4 to +176F	12.3	64-78	PPS, aluminum,nitrile rubber*

* Viton or EPDM optional (i.e. code no. L150B6-VV or L150B6-VE)

See page 71 for mounting bracket.

DIMENSIONAL DRAWINGS



	X	Y	Z	L	A
M150-200LP L150-200 H240	97.5 [3.84"]	97.5 [3.84"]	109 [4.29"]	140.5 [5.53"]	326 [12.83"]
M300-400LP L300-400 H480	97.5 [3.84"]	97.5 [3.84"]	109 [4.29"]	210.5 [8.29"]	396 [15.59"]

ACCESSORIES

Recommended Plastic Filter				
Filter Assembly Part Number	Connection Port (NPT)	Replacement Element Number	Replacement Element Packed	Filter Fitting Part Number
PPSF1.5-X75	1 1/2"	PPX75RE3	3	33.30.051

1. Compressed Air	2 x G 1/2"
2. Vacuum	2 x G 1 1/2"
3. Exhaust	2 x G 1 1/2"

Classic MP Seal Kits			
MP Pump Size	Nitrile	Viton	EPDM
150-240	01.04.634	01.04.634V	01.04.634E
300-480	(2x) 01.04.634	(2x) 01.04.634V	(2x) 01.04.634E

Kits include flap valves, gaskets, compressed air filters and o-rings

CONNECTION SIZES

Pump	Compressed Air (1)	Vacuum (2)	Exhaust (3)
MP L150	0.31" G 1/2"	0.98" G 1 1/2"	1.26" G 1 1/2"
MP L200	0.39" G 1/2"	1.26" G 1 1/2"	1.57" G 1 1/2"
MP L300	0.47" G 1/2"	1.57" G 1 1/2"	1.57" G 1 1/2"
MP L400	0.47" G 1/2"	1.57" G 1 1/2"	1.57" G 1 1/2"
MP M150LP	0.31" G 1/2"	0.98" G 1 1/2"	1.26" G 1 1/2"
MP M200LP	0.39" G 1/2"	1.26" G 1 1/2"	1.57" G 1 1/2"
MP M300LP	0.47" G 1/2"	1.57" G 1 1/2"	1.57" G 1 1/2"
MP M400LP	0.47" G 1/2"	1.57" G 1 1/2"	1.57" G 1 1/2"
MP H240	0.39" G 1/2"	1.26" G 1 1/2"	1.57" G 1 1/2"
MP H480	0.47" G 1/2"	1.26" G 1 1/2"	1.57" G 1 1/2"

ID Size is minimum recommended hose size. G is shown in actual thread sizes.

PIAB free-flow silencer, vacuum gauge, manometer and mounting brackets come standard with all Classic MP Pumps.

Cool running…

…clean…

…compact size…

…easy to install…

…environment-friendly…

…PIAB Vacuum Pumps.


Serie no:
1
2
V
ON
OFF
PIAB
Innovators in Vacuum Technology
PIAB Vacuum Pump

MLL - Maxi Pump

27.1 -inHg at 87 psi

- Aluminum body
- Noise level 72-76 dB(A)

Largest compressed air driven pump on the market, yet comparatively compact and lightweight. Energy Saving (ES) system available.

Max. Vacuum (-inHg)	Pump Model PIAB-	Vacuum Flow in scfm at different vacuum level (-inHg) at 87 psi									
		0	3	6	9	12	15	18	21	24	27
27.1	MLL 200/ES	85	59	39	20	10	7.6	5.1	2.8	1.0	0.21
	MLL 400/ES	170	119	78	41	20	15	10	5.5	2.5	0.42
	MLL 800/ES	340	240	160	81	41	31	20	11	5.1	0.85
	MLL 1200/ES	510	360	240	120	61	46	31	17	7.6	1.3
Max. Vacuum (-inHg)	**Pump model PIAB-**	**Air Cons. (scfm)**	**Evacuation time in s/cubic foot to reach different vacuum levels (-inHg)**								
			3	6	9	12	15	18	21	24	27
27.1	MLL 200/ES	29.7	0.06	0.16	0.35	0.85	1.6	2.6	4.4	7.8	19
	MLL 400/ES	59.3	0.03	0.08	0.18	0.42	0.79	1.3	2.2	3.9	9.5
	MLL 800/ES	118.7	0.017	0.04	0.09	0.21	0.40	0.65	1.1	2.0	4.8
	MLL 1200/ES	178	0.011	0.025	0.06	0.14	0.25	0.42	0.7	1.3	3.5

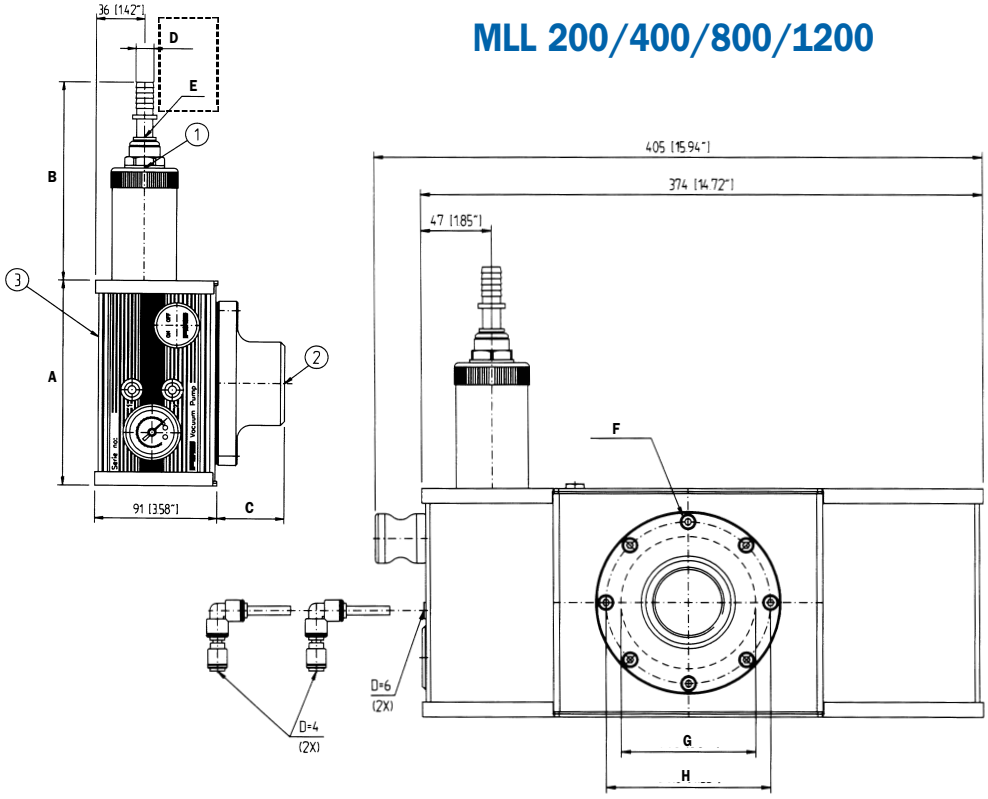
* For values of vacuum flow and evacuation time at other feed pressures, please see pages 20-23.

CHARACTERISTICS

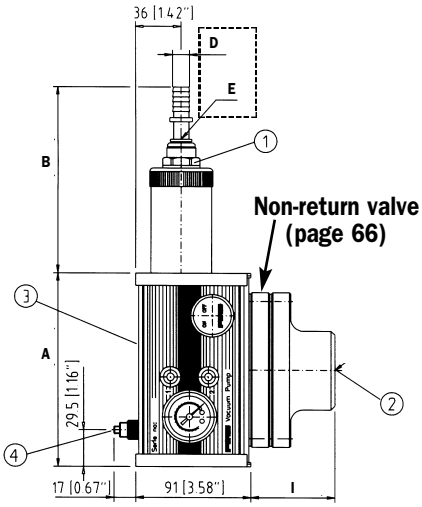
	Part Number for Ordering	Optimum Pressure psi	Maximum Vacuum at 87 psi	Temperature	Weight lb.	Sound Level dB(A)	Material
MLL200	31.01.056U	87	27.1 -inHg	-4° to +176°F	10.8	72-76	PPS, aluminum, nitrile rubber*
MLL200ES	01.00.742U	87	27.1 -inHg	-4° to +176°F	11.7	72-76	PPS, aluminum, nitrile rubber*
MLL400	31.01.057U	87	27.1 -inHg	-4° to +176°F	10.8	72-76	PPS, aluminum, nitrile rubber*
MLL400ES	01.00.742U	87	27.1 -inHg	-4° to +176°F	11.7	72-76	PPS, aluminum, nitrile rubber*
MLL800	31.01.058U	87	27.1 -inHg	-4° to +176°F	17	72-76	PPS, aluminum, nitrile rubber*
MLL800ES	01.00.743U	87	27.1 -inHg	-4° to +176°F	18.5	72-76	PPS, aluminum, nitrile rubber*
MLL1200	31.01.059U	87	27.1 -inHg	-4° to +176°F	20	72-76	PPS, aluminum, nitrile rubber*
MLL1200ES	01.00.744U	87	27.1 -inHg	-4° to +176°F	21.4	72-76	PPS, aluminum, nitrile rubber*

* Viton or EPDM optional (i.e. Part No. 31.01.056V or 31.01.056E).

MLL 200/400/800/1200



MLL 200/400/800/1200ES



④ Vacuum level adjustment

Pump	A	B	C	D	E	F	G	H	ES ONLY I
MLL200/400	155 (6.10")	150 (5.91")	50 (1.97")	Ø1/2"	D=12	M5(8X)	Ø90 (3.54")	Ø110 (4.33")	67 (2.64")
MLL800	307(12.09")	85 (3.35")	55 (2.17")	-	-	M6(8X)	Ø140 (5.51")	Ø160 (6.30")	72 (2.83")
MLL1200	407 (16.02")	85 (3.35")	55 (2.17")	-	-	ØM6(8X)	Ø140 (5.51")	Ø160 (6.30")	72 (2.83")

CONNECTION SIZES

Pump	Compressed Air (1)	Vacuum (2)	Exhaust (3)
MLL200	0.39" ID /G 3/4"	1.26" ID/1 1/2" NPT	1.57" ID/Vent
MLL400	0.47" ID /G 3/4"	1.57" ID/1 1/2" NPT	2.36" ID/Vent
MLL800	0.59" ID /G 3/4"	1.97" ID/2" NPT	2.96" ID/Vent
MLL1200	0.79" ID /G 3/4"	2.96" ID/2" NPT	3.94" ID/Vent

ID size is minimum recommended hose size. G/NPT is shown in actual thread sizes.

ACCESSORIES

PSF 1.5

Recommended Vacuum Filter

Filter Assembly Part Number	Connection Port (NPT)	Replacement Element Number	Replacement Element Packed
PPSF1.5-X75	1 1/2"	PPX75RE3	3
PSF1.5	1 1/2"	PSF1.5RE	1
PSF2.0	2"	PSF2.0RE	1

MLL Pump Seal Kits

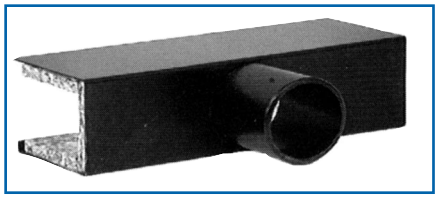
	Nitrile	Viton	EPDM
MLL200-400	31.01.091	31.01.091V	31.01.091E
MLL800	31.01.092	31.01.092V	31.01.092E
MLL1200	31.01.099	31.01.099V	31.01.099E

Kits include flap valves, gaskets, and compressed air filters.

ENERGY SAVING SYSTEM

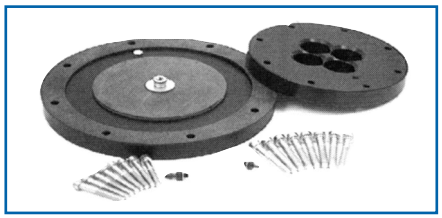
The PIAB energy saving (ES) system operates on a roughly similar system to that of a thermostat in a heating system. The energy saving achieved by the ES system will be at maximum if the vacuum system is sealed. The ES system is available installed on the ES versions of the MLL Vacuum Pump.

ACCESSORIES FOR PUMP MODEL MAXI MLL



Exhaust Adapter

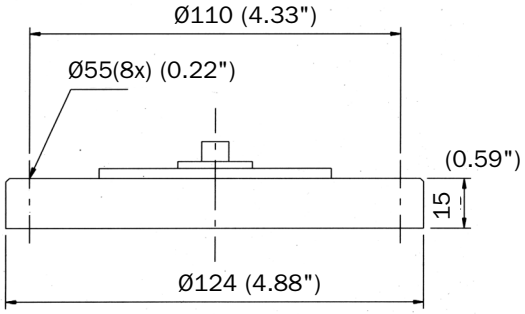
- Central Exhaust is used when a external silencer is desired or if a tube/hose is going to be connected for removing the exhaust.



Non return valve

- External non return valves are made of corrosion resistant material.

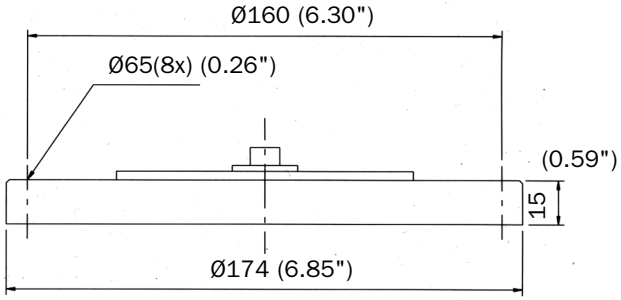
Non return valve for MLL 200-400



Technical Data & Part Numbers

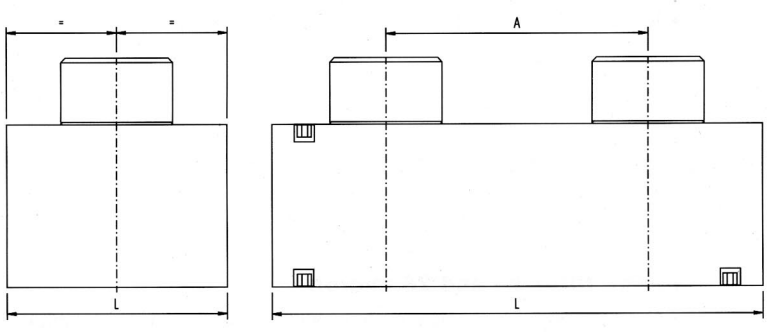
Type	Fits Pump Size	Material	Weight oz.	Part No.
Exhaust Adapter 148	MLL200-400	Al	18	31.16.017
Exhaust Adapter 300	MLL800	Al	32	31.16.018
Exhaust Adapter 400	MLL1200	Al	60	31.16.054
Non return valve	MLL200-400	Al, NBR	9	31.16.007
Non return valve	MLL800-1200	Al, NBR	19	31.16.008

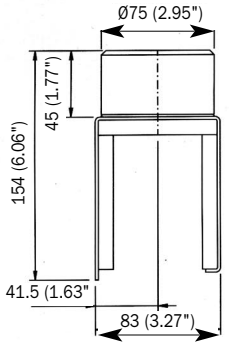
Non return valve for MLL 800-1200



Part No.	L mm	L [in]	A	For Vacuum Pump
31.16.017	148	[5.83]	–	MLL 200, MLL 400
31.16.018	300	[11.80]	–	MLL 800
31.16.054	400	[15.80]	200 [7.87]	MLL 1200

Exhaust Adapter for MLL





From the PIAB Vacuum Academy –

How do I turn on/off an MLL Maxi Vacuum Pump using the two remote connection ports?

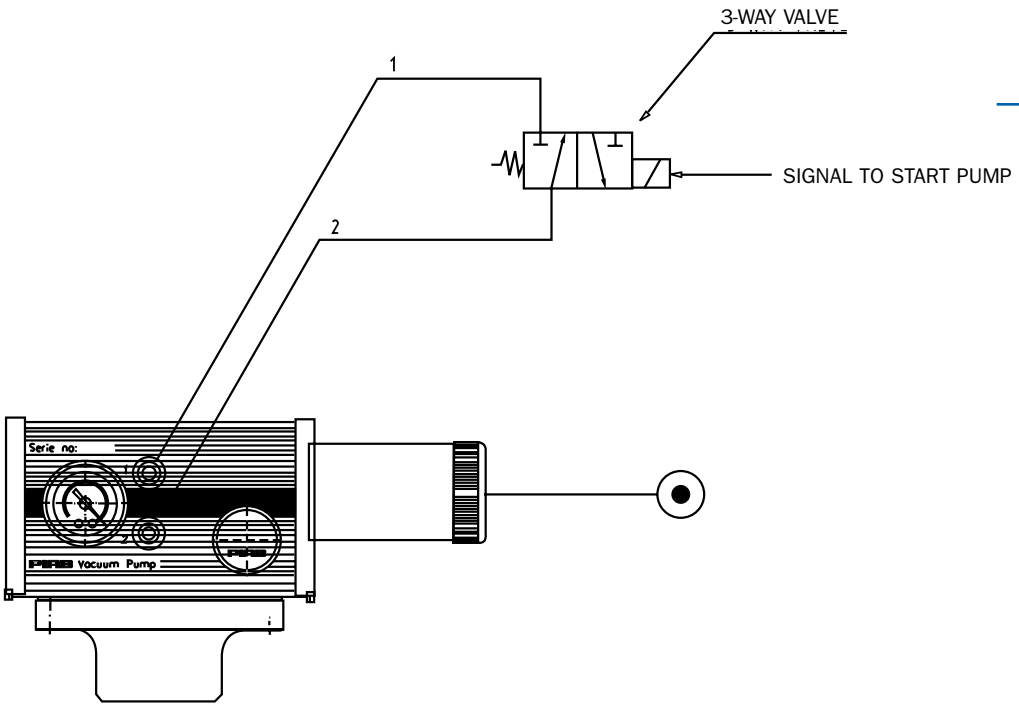
It is easy to control any PIAB pump on/off with an air valve. The amount of compressed air pressure, usually measured in pounds per square inch (psi), determines the amount of vacuum pressure you can achieve from the PIAB Vacuum Pump.

Bring compressed air to the MLL Maxi Pump via the main G 3/4" air connection port. This air generates the vacuum pressure and operates the internal valve of the pump.

The MLL Maxi Pump has two remote connection ports on its face, labeled (1) and (2). Using a separate 3-way air valve, connect to the remote connection ports as shown on the diagram.

Use a signal from the air valve to now start operation of the vacuum pump.

Note: The on/off knob on the pump should be in the off position (pushed out).



ROUND PUMPS

CORROSION-RESISTANT

- 100% chemical resistant material (PPS).
- In-line design for vacuum and exhaust.
- Easy installation in limited space.

The Round pump is designed for applications including vacuum molding, vacuum packaging of food and other consumer products, pressure impregnation and vacuum bagging.

VACUUM FLOW at optimum feed pressure (for non-sealed systems)

Pump Series	Model	Max Vacuum (-inHg)	Feed Pressure (psi)	Air Cons. (scfm)	Vaccum flow in scfm at different vacuum levels 0	3	6	9	12	15	18	21	24	27
L	Round L200	22.3	87	29.7	78	51	36	23	13	10.6	7.8	4.2		
M	Round M200	27.1	87	29.7	85	59	39	20	10	7.6	5.1	2.8	1.0	0.21

EVACUATION TIME at optimum feed pressure (for sealed systems)

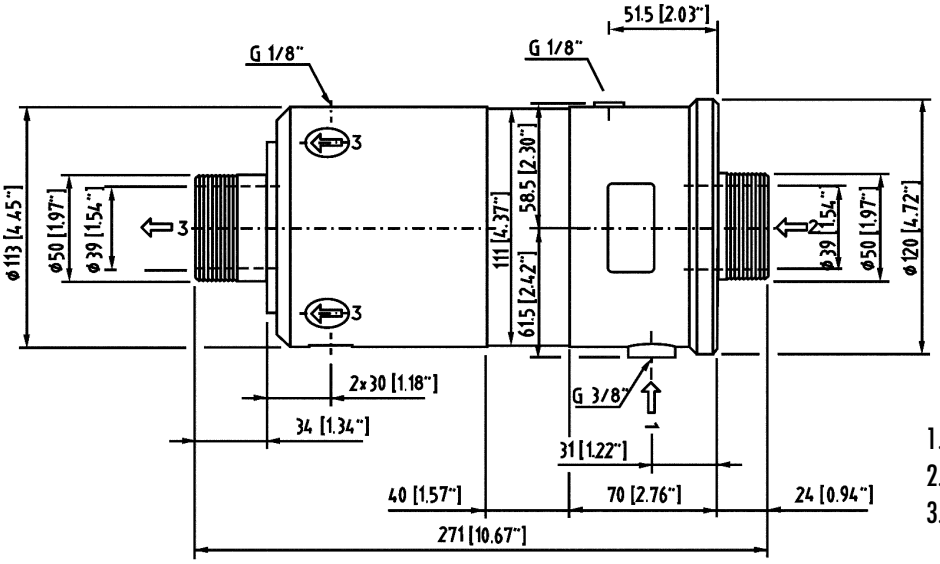
Pump Series	Model	Max Vacuum (-inHg)	Feed Pressure (psi)	Evacuation time in s/cubic foot to reach different vacuum levels (-inHg) 3	6	9	12	15	18	21	24	27
L	Round L200	22.3	87	0.08	0.23	0.42	0.76	1.3	2.1	3.3		
M	Round M200	27.1	87	0.06	0.16	0.35	0.85	1.6	2.6	4.4	7.8	19

* For values of vacuum flow and evacuation time at other feed pressures, please see pages 20-23.

CHARACTERISTICS

	Part Number for Ordering	Optimum Pressure psi	Maximum Vacuum @ 87 psi	Working Temperature	Weight lb.	Sound Level dB(A)	Material
L200	L200C6-GN	87	22.3 -inHg	-4° to 176° F	3.1	70-84	PPS, nitrile rubber*
M200	M200C6-GN	87	27.1 -inHg	-4° to 176° F	3.1	70-84	PPS, nitrile rubber*

* Viton or EPDM optional (I.E. Part no. L200C6-GV or L200C6-GE)



1. Compressed Air ..... G 3/8"
2. Vacuum ..... Cy. 2"
3. Exhaust ..... Cyl. 2"

CONNECTION SIZES

Pump	Compressed Air (1)	Vacuum (2)	Exhaust (3)
L200	0.39" G3/8"	1.26" Cyl 2"	1.26" Cyl 2"
M200	0.39" G3/8"	1.26" Cyl 2"	1.26" Cyl 2"

1. Compressed Air	G 3/8"
2. Vacuum	Cyl 2"
3. Exhaust	Cyl 2"

ID Size is minimum recommended hose size.
G is shown in actual thread sizes.

ACCESSORIES

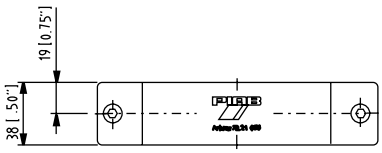
Recommended Plastic Filter

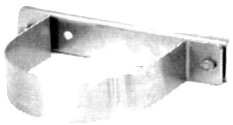
Filter Assembly Part Number	Connection Port (NPT)	Replacement Element Number	Replacement Element Packed	Filter Fitting Part Number
PPSF1.5-X75	1 1/2"	PPX75RE3	3	33.30.051

Round Pump Seal Kits

Pump Size	Nitrile	Viton	EPDM
150-240	01.00.159	01.00.159V	01.00.159E
300-480	(2x) 01.00.159	(2x) 01.00.159V	(2x) 01.00.159E

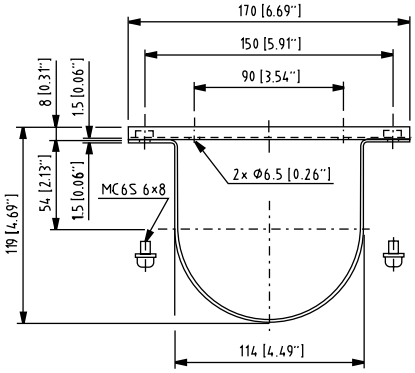
Kits include flap valves and o-rings.





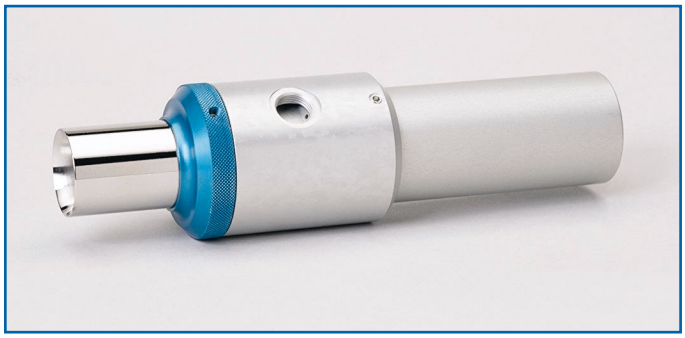
Fitting

- Corrosion-resistant material.



TECHNICAL DATA

Fitting for pump model	Part No.	Material	Weight
Round	32.21.055	SS 2333	9.2 oz.



EJECTOR 300

- Split ejector used when a large flow with low vacuum is desired.
- Available in stainless steel or aluminum.
- When fitted with an insert, the ejector changes characteristics providing a high vacuum at low flow. This ejector is called Ejector 300/200.
- Air consumption and capacity can be adjusted to your application.

TECHNICAL DATA

Model	Recom. Feed Pressure psi	Max. Feed Pressure psi	Air Consumption scfm, at 87 psi	Maximum Vacuum (-inHg)	Working Temp.	Weight lb.	Material
Ejector 300	14.5-87	87	70.6	3.9	-4° to +302°F	2.6	aluminum, steel, nitrile
Ejector 300 SS	14.5-87	87	70.6	3.9	-4° to +302°F	5.1	stainless steel, nitrile

Accessory	Recom. Feed Pressure psi	Max. Feed Pressure psi	Air Consumption scfm, at 87 psi	Maximum Vacuum (-inHg)	Working Temp.
Ejector 300/Insert 200	14.5-87	87	70.6	6.6	-4° to +302°F

HOW TO ORDER

Model	Part Number
Ejector 300 Al	31.08.001
Ejector 300 SS	31.08.002

Model	Material	Part Number
Insert 200 Al	Aluminum	31.08.003
Insert 200 SS	Stainless Steel	31.08.004

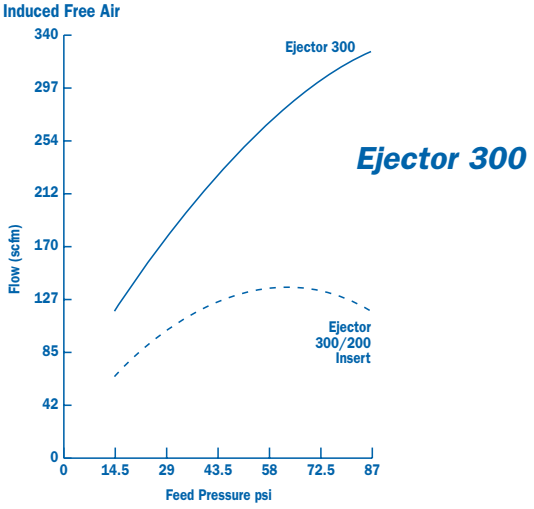
CONVEYING CHART

Conveying Objects	Conveying Length Feet	Conveying Height feet	lbs/h
PEAS	16	0	2,600
dry	65	16	1,700
PLASTIC GRANULAR	16	0	1,700
Polystyrene	65	16	1,500
COFFEE	16	0	1,100
Grained	65	16	1,000
SUGAR	16	0	1,200
Powdered	65	16	1,000

At a conveying length of >16 ft., Insert 200 is required

VACUUM PERFORMANCE

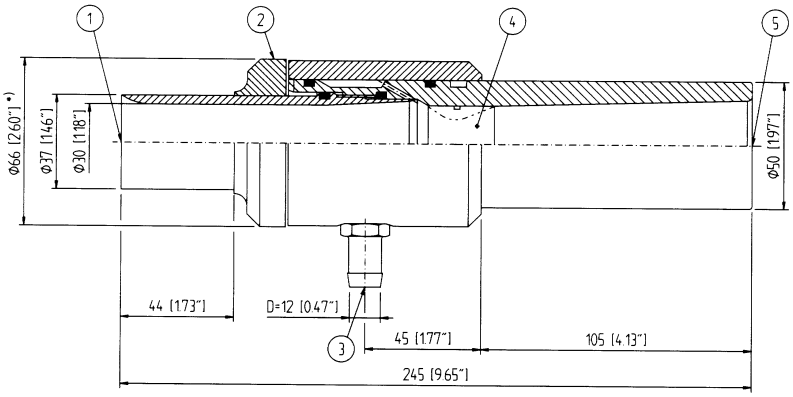
Feed Pressure psi	Vacuum 300 (-inHg)	Vacuum 300/200 (-inHg)	Air Consumption 300 & 300/200 scfm
14.5	1.05	1.5	17.6
21.8	1.35	2.4	22.9
29	1.8	3.3	28.2
36.2	2.1	4.2	33.5
43.5	2.4	4.8	38.8
50.8	2.8	5.6	44.1
58	3.2	6	49.4
65.2	3.3	6.2	54.7
72.5	3.6	6.4	60.0
79.8	3.9	6.6	65.3
87	3.8	6.54	70.6



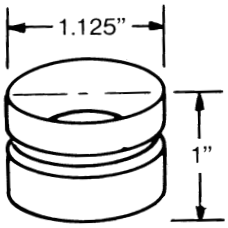
Ejector 300

DIMENSIONAL DRAWINGS

Ejector 300



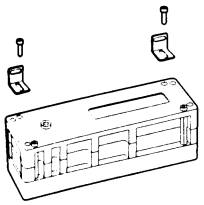
1. Suction Inlet
2. Capacity Control
3. Compressed Air Inlet
4. Insertion Nozzle
5. Exhaust



INSERT 200

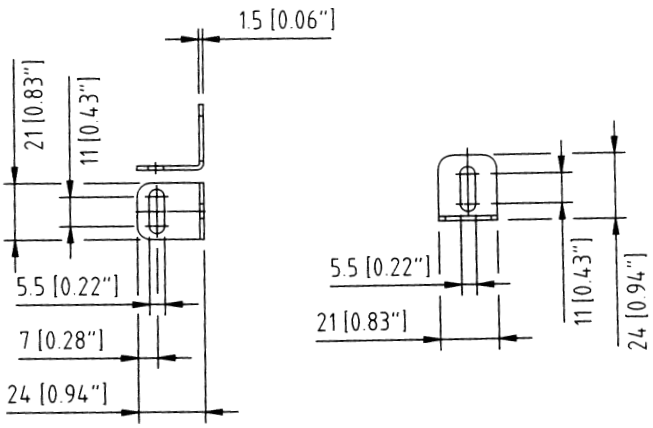
- Modifies the characteristics of Ejector 300
- Used for conveying lengths over 16 ft.
- PART NO.: 31.08.003 (Al)
  31.08.004 (SS)

MOUNTING BRACKETS

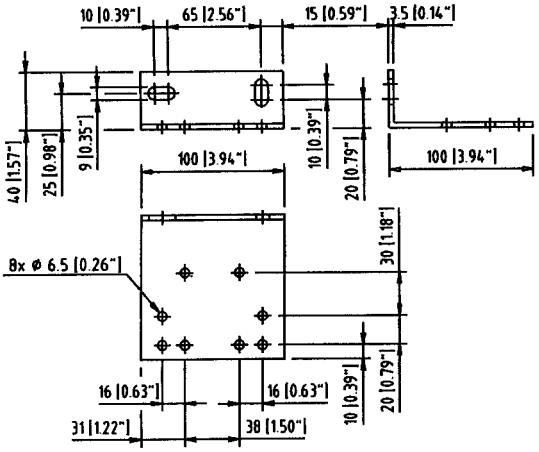


- Corrosion-resistant material
- Included as a set (2 pieces) with each Classic pump.

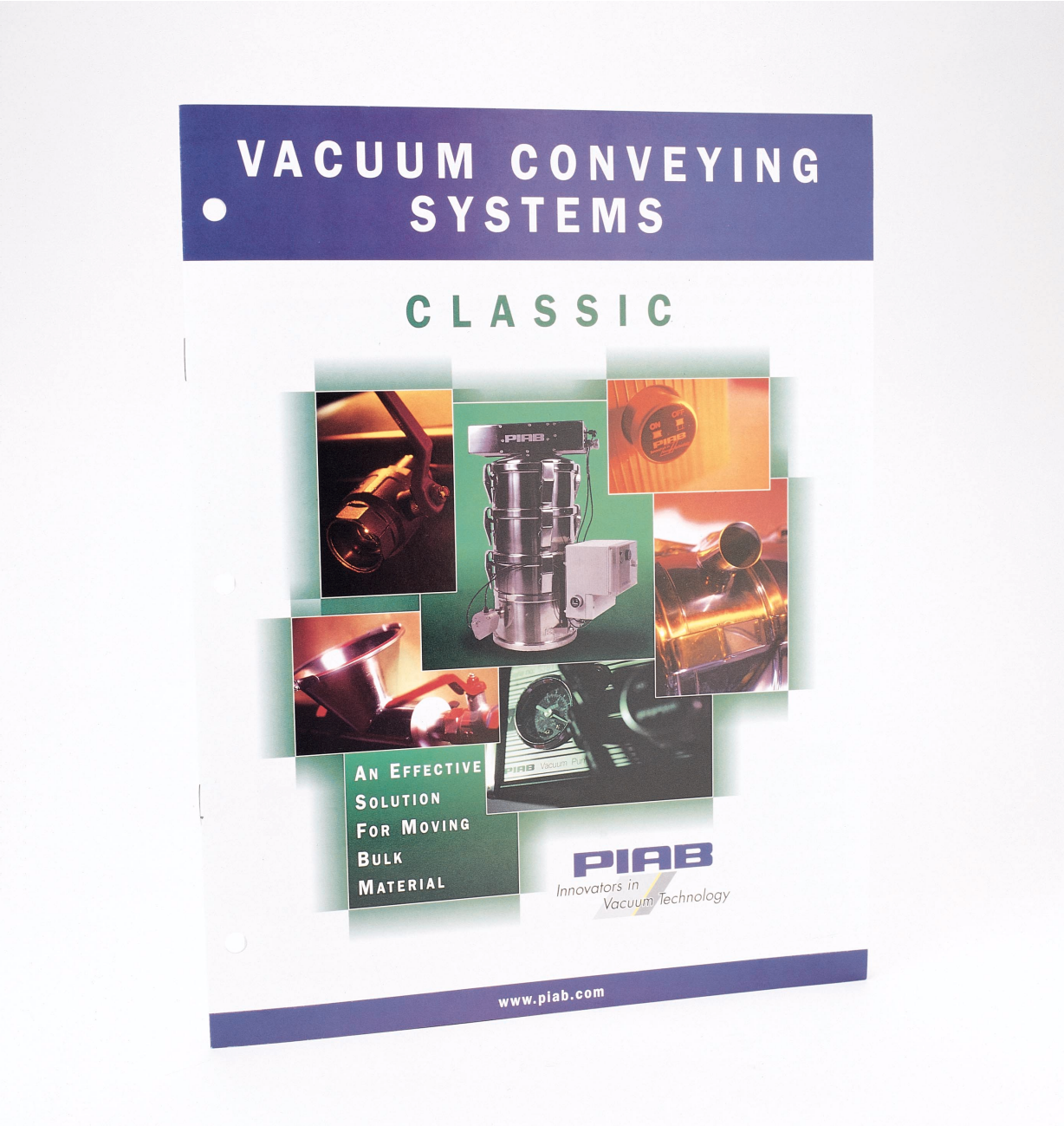
For pump model	Part no	Material	Weight
Classic	01.00.505	SS 2333	17g



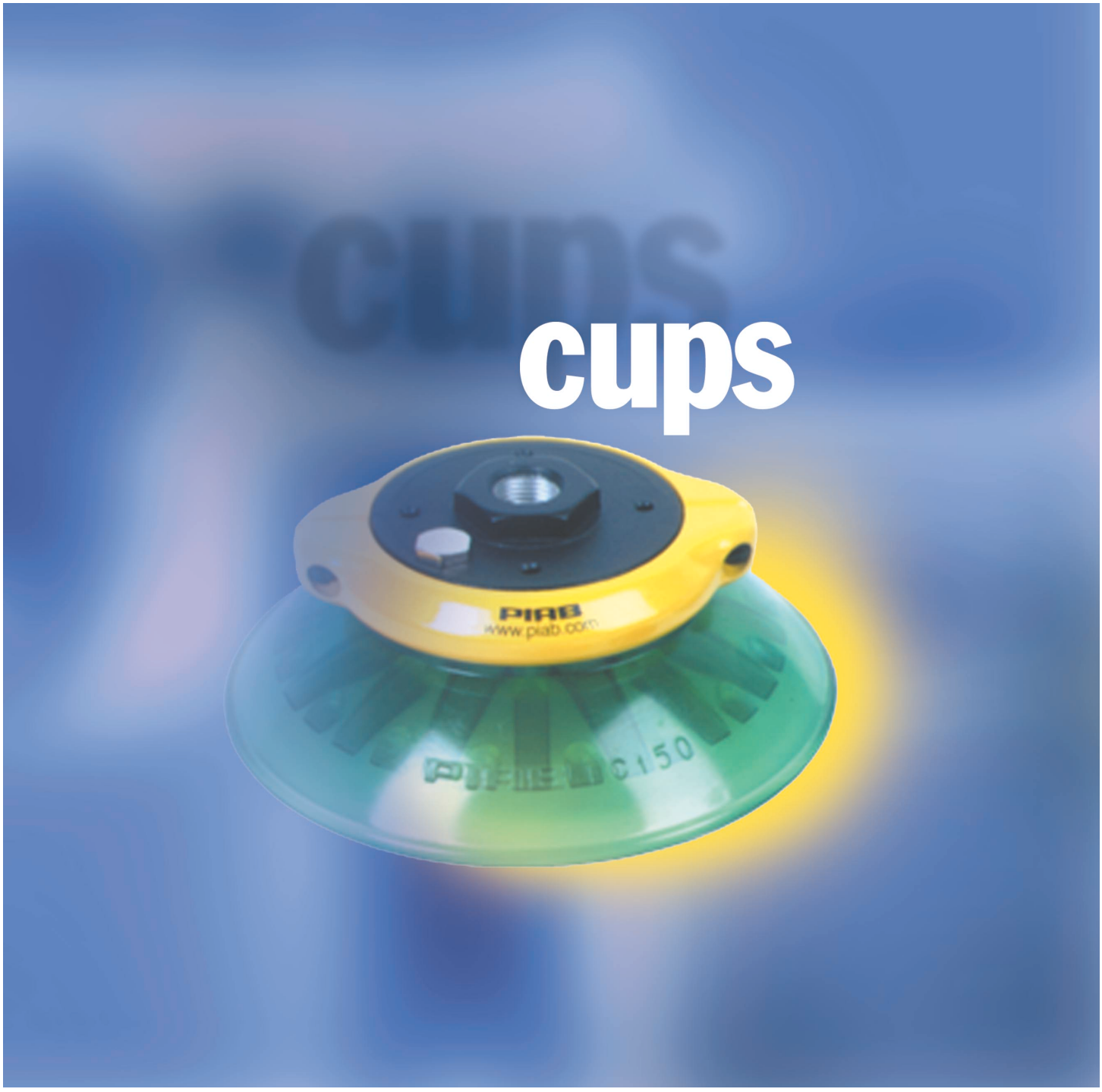
CLASSIC MP MOUNTING BRACKETS (2x)



For pump model	Part no	Material	Weight
Classic MP	01.03.599	SS 2333	10.8 oz.



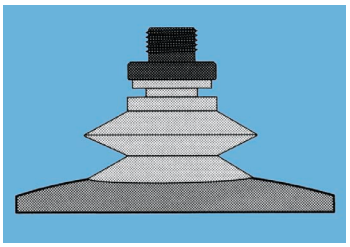
PIAB also sells vacuum conveying systems, powered by PIAB s multi-ejector vacuum pumps, for bulk material handling. Please call PIAB Customer Service at 1-800-321-7422 or use the enclosed postcard to order a copy of the Vacuum Conveying Systems Classic brochure.



PIAB
Innovators in Vacuum Technology

Innovators in Vacuum Technology

What's a benefit to using PIAB Suction Cups?

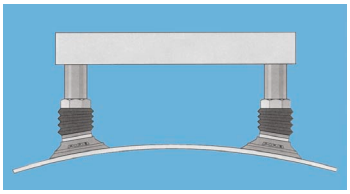


15 Different Shapes

A suction cup is as gentle as a human hand, but strong enough to grip almost anything. Suction cups can be used for holding, picking, lifting or turning different products. Suction cups provide an easy, inexpensive and reliable means for handling materials. Now with PIAB Suction Cups, you can lift, hold, and move anything from light bulbs to sheet metal. Forget the limitations of mechanical grippers or magnets. Just team PIAB's compact, easily positioned vacuum pump with the right PIAB Suction Cups and watch your production quality and efficiency...pick right up. PIAB Suction Cups are durable, strong and secure. Soft and pliable at any angle. The solution for materials that are hard to handle. Porous. Flat. Spherical. Angled. Curved. Or irregular. PIAB Suction Cups. They hang right in there.

Innovators in Vacuum Technology

What's a benefit to using PIAB Suction Cups?



Accessories to Solve Any Handling Problems

To increase the working life of the suction cups and to provide solutions for difficult material handling applications, PIAB has the proper suction cup accessory. To properly fit your application, PIAB's one -piece suction cup fittings give you the flexibility that you need with five different connection thread options. Saving energy in your vacuum system is a snap with PIAB's suction cup valves. If you're handling objects that aren't at the same level or aligned perfectly flat, PIAB's level compensators and ball joint connections give you the added measure to ensure success. Flexibility. Reliability. Durability. PIAB's suction cup accessories and suction cups put it all together to give you a complete material handling solution.

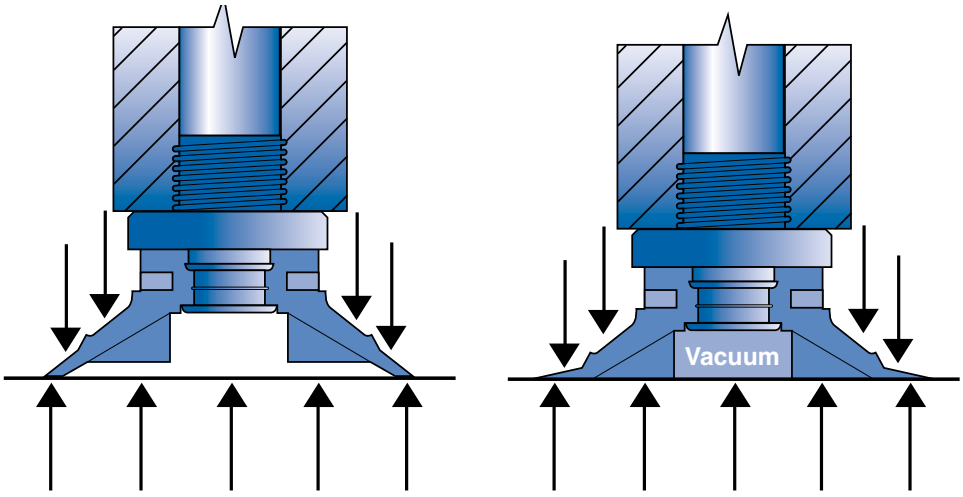
How does a suction cup work?

Advantages

+ Easy installation
+ Low service requirements
+ Low price
+ Does not damage the products
+ Quick attachment and detachment

Disadvantages

– Limited force (atmospheric pressure)



A Suction Cup's Function

A suction cup adheres to a surface when the surrounding pressure (atmospheric pressure) is higher than the pressure between the suction cup and the surface. To create the low pressure in the suction cup it is connected to a vacuum pump. The lower the pressure (higher vacuum), the greater the force on the suction cup.

Advantages and Limitations of the Suction Cup

Material handling with suction cups is a simple, low-priced and reliable technology. It is therefore a solution worth considering first before going over to more complicated methods. Suction cups can lift, move and hold objects from a few ounces up to several hundred pounds.

What size suction cup do I need?

Sizing Suction Cups

When sizing a suction cup, it is the required lifting force that is crucial. To determine the right size, the following simple correlation applies.

Force = Pressure x Area

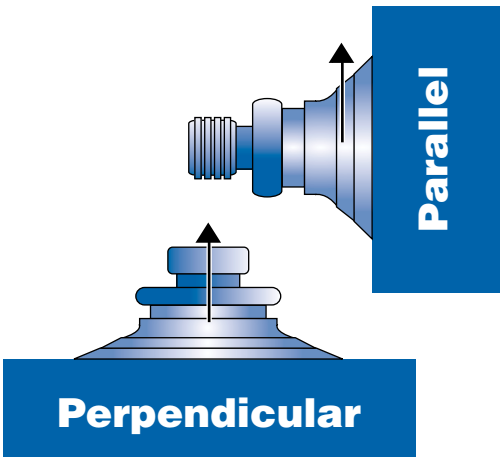
As the weight of the object being handled is often known and the diameter (area) of the suction cup is required, a simple equation for rough estimates can be used. Consideration should also be taken to the safety factor (normally = 2) and the number of suction cups.

$$D = 1.64 \times \frac{\sqrt{m \times n}}{\sqrt{U \times s}}$$

D = diameter of suction cup (in)
m = weight of object (lb)
U = vacuum (-inHg)
n = safety factor
s = number of suction cups

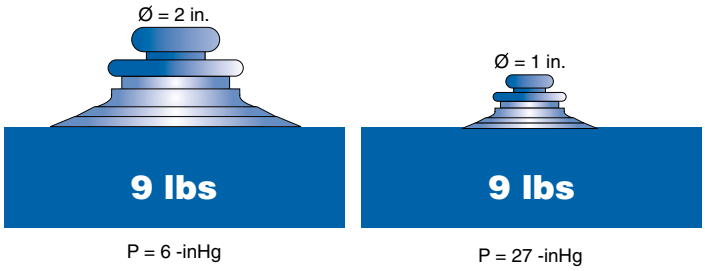
Consider the Elevation Above Sea Level

Atmospheric pressure decreases with increased elevation. This means that available force decreases at the same rate. An application designed for lifting 100 lbs at sea level, can only manage to hold 89 lbs at 3,330 feet. A vacuum gauge is normally calibrated with atmospheric pressure as a reference. This means that the gauge shows available vacuum levels at different elevations.



Energy Requirements at Different Vacuum Levels

High levels of vacuum for suction cups should be avoided. A deep vacuum means that the suction cup must work more and the wear on the suction cup increases accordingly. With an increase of the vacuum level from 18 -inHg to 27 -inHg the force increases by 1.5 while the energy requirements increase by a factor of 10. It is usually preferable to maintain a lower vacuum and increase the area of the suction cup accordingly. (The effective force is directly proportional to area.)



Example

Suppose you want to lift a barrel weighing 44 lb. The Safety factor is n = 2, one suction cup and a suitable vacuum level is 18 -inHg. In the equation this gives a suction cup with approximately 3.63 inches in diameter.

$$D = 1.64 \times \frac{\sqrt{44 \times 2}}{\sqrt{18 \times 1}} \approx 3.63$$

Lifting Force in Different Directions

A suction cup can be used irrespective of whether the force is perpendicular or parallel to the surface. If the force is parallel it is transferred through friction between the suction cup and the surface. A suction cup with cleats is most suitable in this case because it is rigid and provides high friction.

In the following pages, there is information on both horizontal and vertical lifting forces for each cup respectively. The stated values are measured values for a dry steel plate.

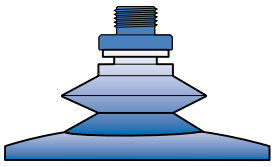
To select model

The object to be handled can have different shapes and surfaces. The application may also involve special requirements such as level adjustment or separation of thin objects.

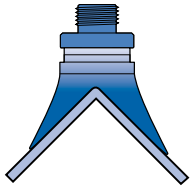
SUMMARY OF THE PRIMARY PARAMETERS TO CONSIDER WHEN SELECTING THE RIGHT SUCTION CUP

Suction Cup	OBJECT: Shape: Flat	Slightly Curved	With Corners	Slightly Concave	Oblong	OBJECT: Surface: Even	Uneven	APPLICATION: Special Requirements: Level Adjustments	Separation of Thin Objects	Support When Handling Thin Objects	Mark-Free Handling	Stability	Lifting Force Parallel to the surface	Assembly without Fittings
B	+++	+++				+++		+++	+++			++	+	
BF*	+++	+++				+++		+++	+++		+++	++	+	
B-MF	+++	+++				+++		+++	+++		+++	+++	+	
B-MF-M	+++	+++				+++		+++	+++		+++	+++	+	+++
B-M	+++	+++				+++		+++	+++	+		++	+	+++
BL	+++	+++				+++		+++	+++			+		
B-BL	+++	+++				+++		+++	+++			+		+++
D		+++	+++			+++	+					++		
U	+++	+++		+++		+++						+	++	
F	+++					+++				++		+++	+++	
FC	+++	+++				+++				++	+++*	+++	+++	
F-MF	+++					+++				++	+++	+++	+++	
F-MF-M	+++					+++				++	+++	+++	+++	+++
OC	+++	++			+++	+++					+++*	+++	+	
P	+++					+++	+++			+++	+	+++		
OP	+++				+++	+++	+++				+	+++		
FP	+++					+++					+++	+++		

*+++ Excellent ++ Very Good + Good *Duraflex™ series only*

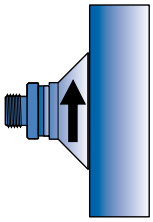


Slightly Curved Surface
Model B

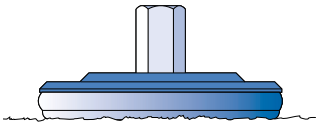


Around Corners
Model D

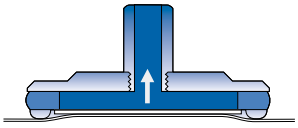
Concave Surface
Model U



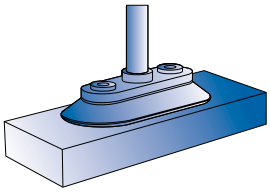
Force Parallel to the Surface
Model F



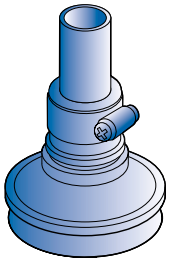
Uneven Surface
Model P



Thin Objects
Model P



Oblong Objects
Model OC



Assembly without Fitting
Model -M

Why do PIAB suction cups maximize productivity?

MATERIAL QUALITIES AND EXAMPLES OF APPLICATIONS

	Chloroprene TWO	Silicone SIL	Conductive Silicone CSIL
MATERIAL PROPERTIES			
Wear Resistance	+++	++	++
Working Temperature	-40°F to 230°F	-94°F to 392°F	-67°F to 446°F
Color	Black	Red	Black
Volume Resistivity Ω in			3.9
Durometer	50°±5 or 60°±5 Shore A	50°±5 Shore A	50°±5 Shore A
RESISTANCE AGAINST			
Ozone	++	+++	+++
Weather	++	+++	+++
Oxidation	++	+++	+++
Hydrolysis	++	+	+
Oils	+	—	—
Gasoline	+	—	—
Vegetable Oils	++	—	—
Diluted Acids	++	+	+
Concentrated Acids	—	—	—
Alcohol	++	++	++
APPLICATIONS			
Food-Stuffs		•	
Oily Objects	•		
Mark-Free Requirements			
High Temperature Environments		•	•
Low Temperature Environments	•	•	•
Rough/Uneven Surfaces			
Electrical Components			•
Sensitivity to Static Electricity			•

PIAB Suction Cups have outlasted others by more than 5-10 times.

+++ Excellent ++ Very Good + Good — Unsuitable • Use of Application

The table is limited to certain qualities and properties. The values are indications only and should not be used as facts.

If you are handling products on which surface cleanliness is vital, you can specify one of three different types of polyurethane for the suction cups. These materials leave no marks on work-pieces such as: windows, lenses, windshields, sheet metal and pressed plastic parts, or credit cards.

When suction cups begin to wear, small cracks and loss of material memory result in lower vacuum levels due to leakage. Suction cups made from materials such as vinyl wear out quickly and need to be replaced often. Increases in downtime and re-ordering of cups are the result. Ultimately, more durable suction cups work better and cost less in the long run.

PIAB suction cups are molded from the highest quality materials for maximum performance. Two suction cups that look the same may perform quite differently. Choose the suction cup that lasts longer, PIAB!

MATERIAL QUALITIES AND EXAMPLES OF APPLICATIONS - continued

	Nitrile NPV	Polyurethane Duraflex™ PU	Polyurethane PUR	Polyurethane TPU	Ethylene Propylene EPDM	Duro-Buna DB
MATERIAL PROPERTIES						
Wear Resistance	+++	+++	+++	+++	++	+
Working Temperature	32°F to 194°F	-40° to 198°F	32°F to 176°F	-4°F to 176°F	-40°F to 212°F	-40°F to 275°F
Color	Black	Yellow/Red/Blue/Green	Clear yellow/white	Clear white	Gray or black	Black
Durometer	50°±5 Shore A	30°/40°/50°/60°±5 Shore A	65°±5 Shore A	81°±2 Shore A	—	50°±5 Shore A
RESISTANCE TO						
Ozone	++	+++	+++	+++	+++	—
Weather	++	+++	+++	+++	+++	—
Oxidation	++	+++	++	++	+++	—
Hydrolysis	++	++	—	—	++	+
Oils	+++	+++	+++	+++	—	+++
Gasoline	+++	++	+	—	—	+++
Vegetable Oils	++	+++	+++	+++	++	+++
Diluted Acids	++	+++	+	+	+++	+
Concentrated Acids	+	++	—	—	—	depends on acid
Alcohol	++	+++	+	++	+++	depends on alcohol
APPLICATIONS						
Food-Stuffs						
Oily Objects	•	•	•		•	•
Mark-Free Requirements		•	•		•	
High Temperature Environments						
Low Temperature Environments		•			•	•
Rough/Uneven Surfaces		•			•	
Electrical Components						
Sensitivity to Static Electricity						

+++ Excellent ++ Very Good + Good — Unsuitable • Use of Application

The table is limited to certain qualities and properties. The values are indications only and should not be used as facts.

Valve

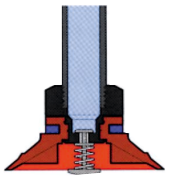
When one or more suction cups do not make contact with the workpiece, the vacuum pump must compensate for the leakage by pulling large volumes of air (vacuum flow). The solution to this problem is to use fittings with valves.

Cone valve for tight or porous materials
for models F and P

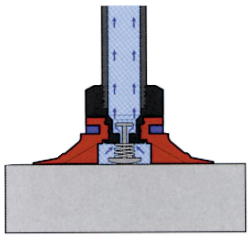
(1) When the suction cup is not in contact with the workpiece, the cone valve shuts off the opening in the fitting. So if there s no contact, there s no risk of leakage either.

(2) The cone valve opens only when the suction cup is pressed against the workpiece.

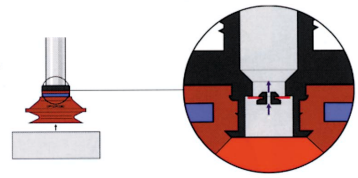
1



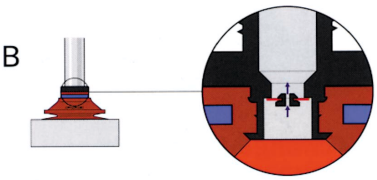
2



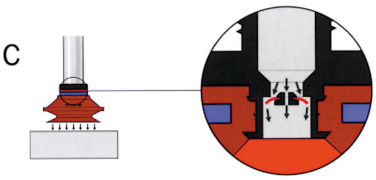
A



B



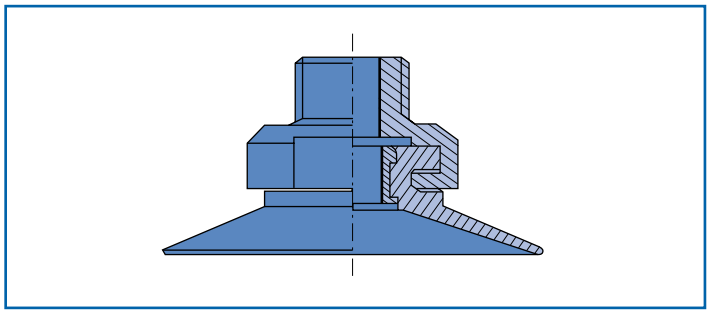
C



Dual Flow control valve for non-porous materials Ø20-50mm

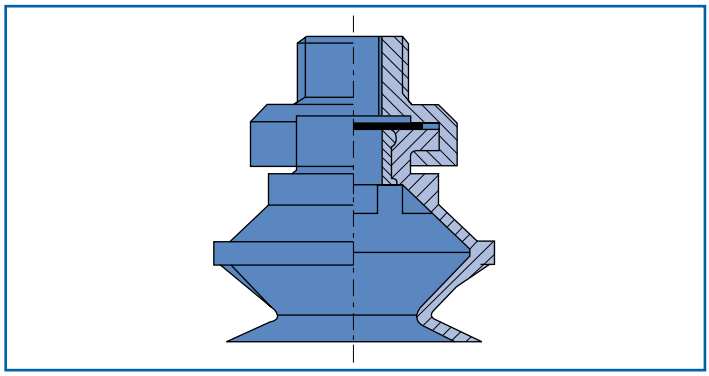
(A) The air drawn in can flow only through a small opening, which minimizes the leakage. (B) When the suction cup comes into contact with the workpiece, it is only the volume of the suction cup remains to be evacuated. (C) when the vacuum is no longer needed, the air opens the built-in flap valves and flows out through a larger opening. So the object is released very quickly.

What type of cups does PIAB offer?



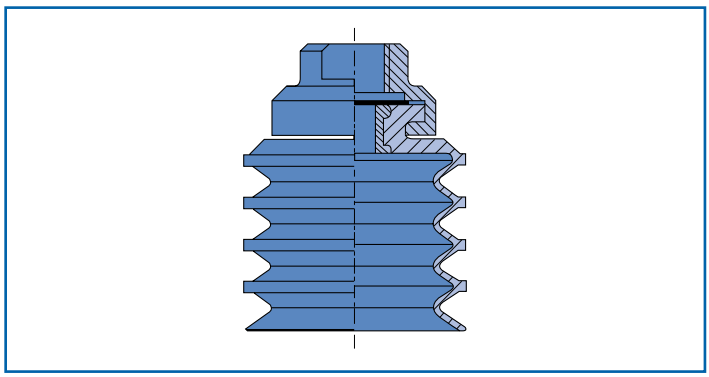
UNIVERSAL SUCTION CUP, MODEL U

The simplest type for handling objects with flat or slightly curved surfaces. See pages ***95-97****.*



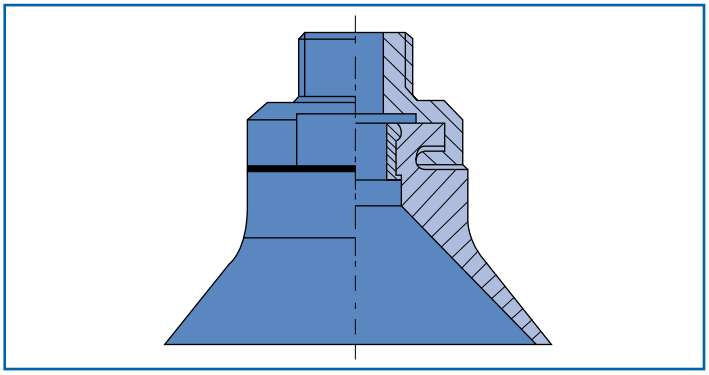
SUCTION CUP WITH SHORT BELLOWS, MODEL B

Suitable when level adjustment is required. Several short bellows in one lifting device can handle objects with height differences and varying shape, for example, corrugated plate. The bellows also provide a slight lifting movement that can be used to separate thin items. It is less suitable for vertical lifts. See pages ***86-90****.*



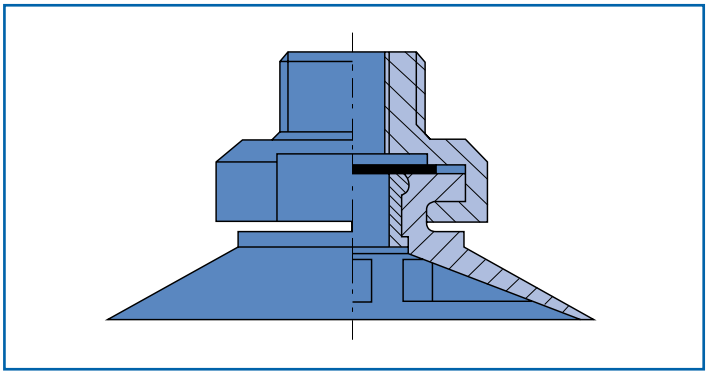
SUCTION CUP WITH LONG BELLOWS, MODEL BL

The same applications as short bellows but can cope with greater differences in levels and provides a longer lifting movement. Not suitable for deep vacuum. Can be equipped with reinforcement rings of polyamide to give extra stability. See pages ***91-92****.*



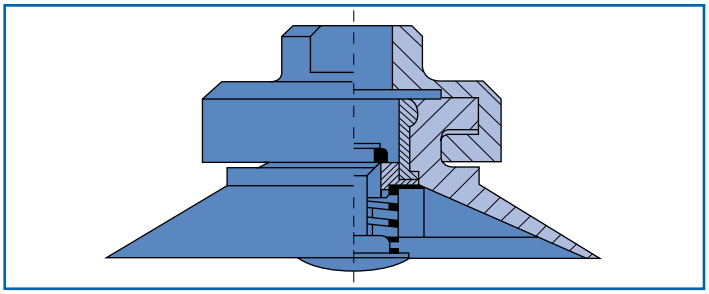
DEEP SUCTION CUP, MODEL D

Used for curved and irregular surfaces. Can even lift over corners and edges. Not suitable for use on flat surfaces. See pages ***93-94****.*



FLAT SUCTION CUP WITH CLEATS, MODEL F

Suitable for flat objects such as cardboard, sheet metal and porous materials. The cleats stop the object being deformed by being drawn into the cup. The suction cup has good stability and very little movement. Also suitable when applied with parallel force as the cleats increase friction. See pages ***98-101****.*

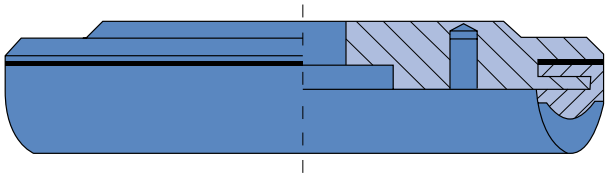


FLAT SUCTION CUP WITH CONE VALVE, MODEL F

When several cups are connected together in a single system, for example in a lifting device, the system can be disrupted if a suction cup leaks or misses the object to be lifted. To avoid this, each suction cup can be provided with a valve that opens only when the suction cup is pressed against the object. The advantages are increased safety, less air consumption and faster action since there is vacuum throughout the system right up to the suction cup. See pages ***102-103****.*

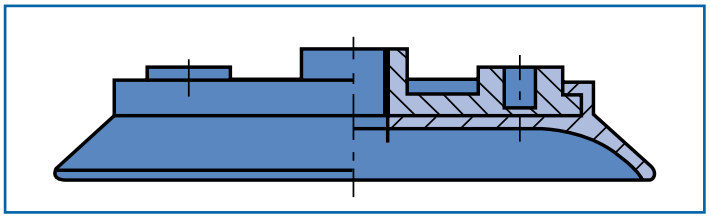
Different Types of Suction Cups

Every application requires its particular design of suction cup. The varieties described here will cover virtually any need.



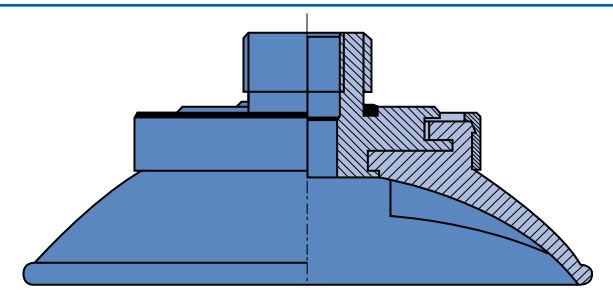
SUCTION CUP WITH PROFILE RUBBER STRIP, MODEL P/OP

Suitable for uneven and rough surfaces, for example blocks of stone and concrete and channeled plate. This type of suction cup can easily be made in different shapes and sizes - round, oval, square, long and narrow - all depending on the object to be handled. When the suction cup is exposed to bending moments, a ball joint fitting should be installed. See pages ***106-108*** *and* ***111-112****.*



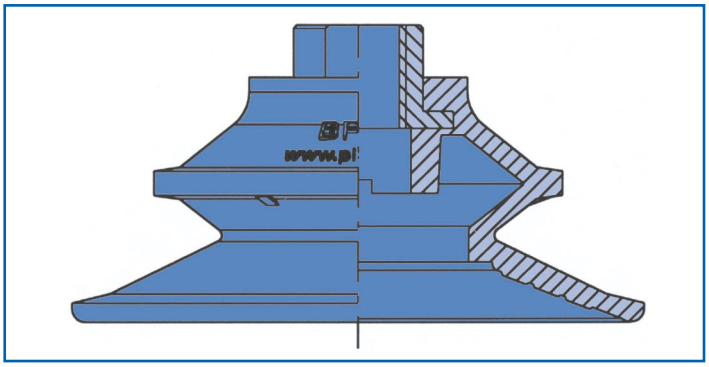
OVAL, CONCAVE SUCTION CUP, MODEL OC

Suitable for long objects with flat or curved surfaces. Good stability and little inherent movement of the suction cup. This cup should be used if the lifting force is parallel with the surface of the object being handled. Available in a flexible version for the packaging industry or with a thicker lip for general applications. See page ***113****. This model is also available in the Duraflex™ material. See pages* ***84-85****.*



FLAT, CONCAVE SUCTION CUP WITH CLEATS, MODEL FC

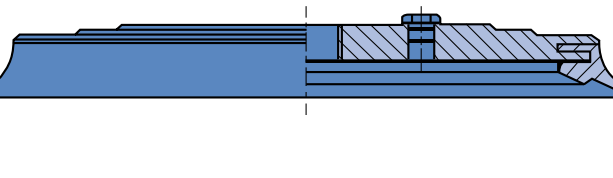
Suitable for flat or curved surfaces. This cup provides good stability and little inherent movement of the suction cup. This cup should be used if the lifting force is parallel with the surface being handled. It has a thick and durable lip. See pages ***104-105****. This model is also available in the Duraflex™ material. See pages* ***84-85****.*



SUCTION CUP WITH BELLOWS AND FLAT SHAPE, MODEL BF

This unique cup has a sturdy and "forgiving" bellows and a large flexible flat sealing surface that works well on rough surfaces. The bellows and the flat sealing surface have different hardnesses making the suction cup both strong and flexible.

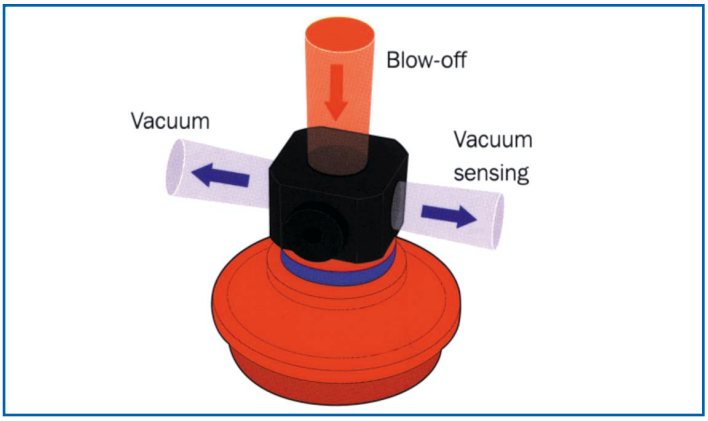
This model is available in Duraflex™ material. See pages ***84-85****.*



FLAT, PROFILE SUCTION CUP, MODEL FP

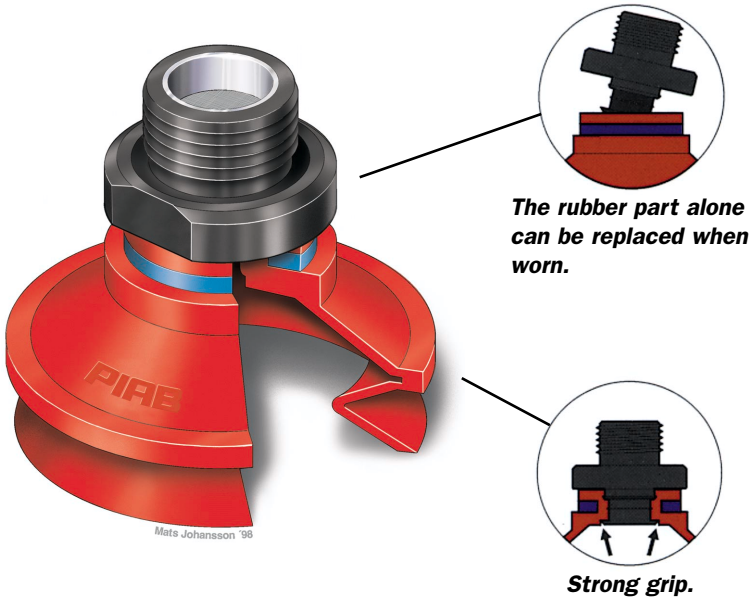
Suitable for large heavy objects with flat surfaces. A ball joint accessory should be fitted if bending movements are applied. See pages ***109-110****.*

SUCTION CUP ACCESSORIES



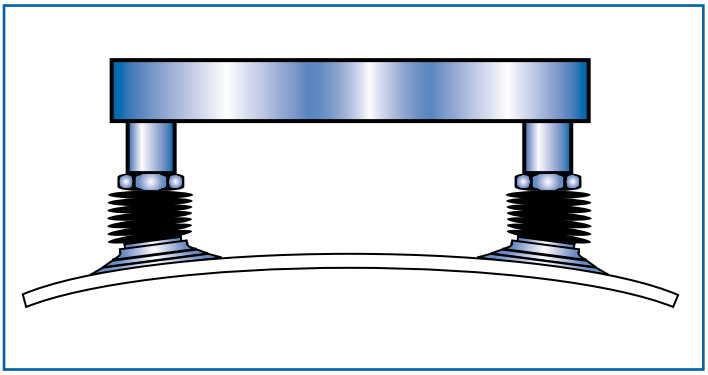
ANGLE ADAPTOR MULTI-PORT FITTING

Angle adaptors facilitate vacuum connections when the space and the headroom are limited. These can also be used as T-connectors. Suction cups Ø20-50mm: The multi-port M5 (10-32UNF) and NPSF 1/8" female fittings (Fittings 20-30 [0.8-1.2"], respective Fitting 40 [1.6"] and Fitting 50 [2.0"]) can be used as angle adaptors. They are also suitable when connecting a series of suction cups in a system.



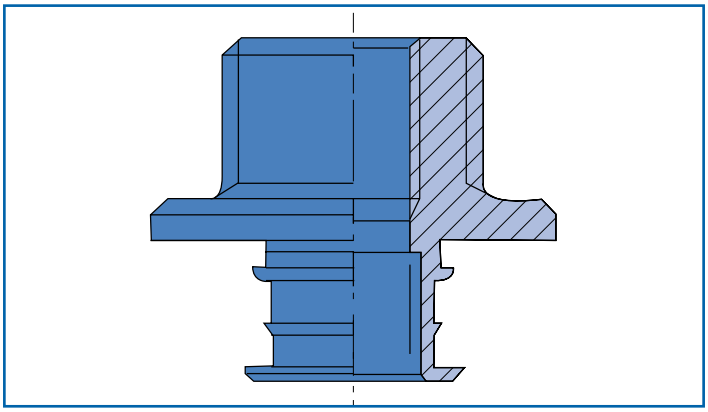
The rubber part alone can be replaced when worn.

Strong grip.



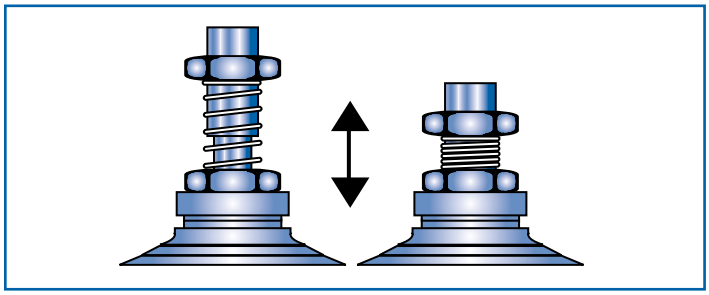
BALL JOINT FITTING

When heavier objects are to be handled, bending stresses can easily arise on the suction cup. In order to avoid this, the suction cup can be provided with a ball joint fitting. Ball joint fitting is also used when lifting plates using several suction cups in a lifting device. These devices normally have a jointed fitting which adapts itself to the deflection caused by the weight of the plate itself.



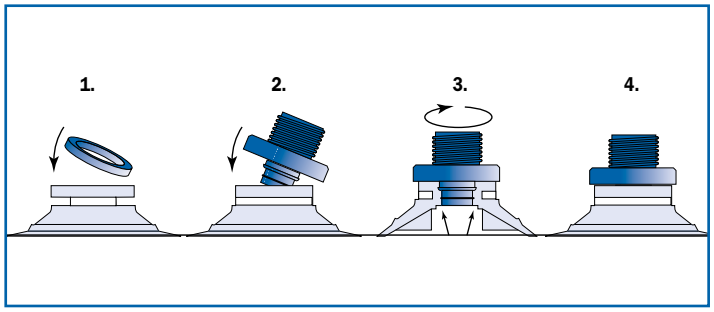
SIMPLE FITTING

The one-piece suction cup fitting is made of Aluminum. The suction cup can easily be removed from the fitting for replacement. It gives good stability with the strengthening ring and can withstand high temperatures. A filter is mounted within the fitting in order to eliminate contamination in the vacuum line/pump. The fitting can be reused when replacing the worn rubber part of the suction cup. (The fitting is also available in a dual flow control valve version. See page 79.)



LEVEL COMPENSATOR

A level compensator is used to compensate differences in level, particularly on lifting devices with several suction cups on a steel frame. When a suction cup is used in handling robot or similar device, a level compensator is often advantageous because it places fewer demands on exact vertical positioning. The level compensator also provides a certain amount of shock absorption.



STRENGTHENING RINGS

PIAB suction cups are supplied with a strengthening ring fitted in the neck of the suction cup. The strengthening ring improves the stability of the suction cup.

EXPLANATION OF SUCTION CUP PART NUMBER:

B20.10.02AF

Cup Model	refer to pages	Cup Model & Size
Duraflex™	84-85	BF80P
Duraflex™	84-85	FC35P to FC150P
Duraflex™	84-85	OC35x90P
B (Bellows)	86-90	B5 to B150
BL (Multiple Bellows)	91-92	BL20-2 to BL50-2
D (Deep)	93-94	D15-2 to D50
U (Universal)	95-97	U2 to U50-2
F (Flat)	102-103	F15 to F150
FC (Flat, Concave)	104-105	FC50 to FC100
P (Profile)	106-108	P25 to P300
FP (Flat Profile)	109-110	FP200 to FP300
OP (Oval Profile)	111-112	OP20x100 to OP40x200
OC (Oval Cup)	113	OC60x140

Suction Cup Material	
Chloroprene TWO	10
Silicone SIL	20
Conductive Silicone CSIL	25
Nitrile NPV	30
Duro-Buna DB	35
Polyurethane TPU	40
Polyurethane PUR	45
EPDM	50
Duraflex™ PU Red 40	4C
Duraflex™ PU Blue 50	4D
Duraflex™ PU Green 60	4E
Duraflex™ PU Yellow 30/Blue 50	4H

- This example of a suction cup part number is a B20 Bellows cup in the Chloroprene TWO material with a G 1/8" male/M5 (10-32UNF) female fitting.
- The B20 Bellows cup in the Chloroprene TWO material without a fitting would be a B20.10 part number.

Suction Cup Fitting*	
M2.5 (3-56UNF) male	01AA
M5 (10-32UNF) male	01AB
M5 (10-32UNF) male	01AC
G1/8" male /M5(10-32UNF) female	02AF
NPSF 1/8" female	04AG
NPSF 1/8" female	05AG
G 3/8" male/NPSF 1/8" female	05UB
NPSF 1/8" female	07UA
NPSF 3/8" female	07UB
G 1/2" female	07UD
G 3/8" male/NPSF 1/8" female	07UF
NPSF 3/8" female	07NE
NPSF 3/8" female	11NB
G 1/2" female	11UA
G 1/2" female	15UA

** More fittings on pages 116-120.*

Duraflex™ Series

MATERIAL PROPERTIES

Material	Color & Durometer	Material Code for Part No.	Working Temperature	Wear Resistance	Oil Resistance	Weather & Ozone Resistance
	Red 40	4C	-40° to +194° F	Excellent	Excellent	Excellent
Polyurethane PU	Blue 50	4D	-40° to +194° F	Excellent	Excellent	Excellent
	Green 60	4E	-40° to +194° F	Excellent	Excellent	Excellent
	Yellow 30/Blue 50	4H	-40° to +194° F	Excellent	Excellent	Excellent

DIMENSIONAL DATA

Size	Outer Dia. in.	Weight without fitting oz.	Weight with fitting oz.	Volume in3	Cup Fitting Thread Size	Cup Fitting Part Number
FC35P	1.38	–	0.37	0.37	NPSF 1/8"	04AG
FC50P	1.97	–	0.95	0.95	G3/8/NPSF 1/8"	05UB
FC75P	2.95	–	1.51	1.51	G3/8/NPSF 1/8"	07UF
FC100P	3.94	2.2	4.45	4.45	NPSF 3/8"	07NE
FC150P	5.91	7.2	15.3	15.3	NPSF 3/8"	11NB
OC35x90	3.31	–	0.89	0.89	NPSF 3/8"	39UB
BF80	3.7x1.5	–	1.63	1.63	NPSF 3/8"	08UB

All suction cup measurements are at static position.

Explanation of Suction Cup Part Number:
The part number is split into three parts. Size. Material. Fitting. i.e. FC100P.4C.07NE = FC-100P size cup in Red Polyurethane material with NPSF 3/8" female fitting. *See Page 83.*

LIFTING POWER

Size	Perpindicular Lifting Power 6 -inHg	Perpindicular Lifting Power 18 -inHg	Perpindicular Lifting Power 27 -inHg	Parallel Lifting Power 6 -inHg	Parallel Lifting Power 18 -inHg	Parallel Lifting Power 27 -inHg	Minimum Curve Radius in.	Maximum Vertical Movement in.
FC35P	2.5	8.1	11.5	6.1	11.5	13.9	1.26	0.22
FC50P	6.3	17.3	23.2	11.0	18.4	22.5	2.09	0.95
FC75P	16.4	35.3	48.3	24.1	45.0	51.7	3.07	1.51
FC100P	30.8	63.8	84.7	39.6	71.5	94.4	4.33	4.45
FC150P	61.6	161.0	209.5	77.1	172.0	202.8	6.50	15.3
OC35x90	11.0	26.3	38.4	11.9	25.2	33.0	–	0.89
BF80	16.4	35.3	44.1	12.1	19.8	26.3	5.20	1.63

Vacuum= -inHg, Lifting Power=lbf, Maximum measured values are given.

ORDERING INFORMATION

FC35P-FC150P

Size	Material & Part Number Polyurethane (PU) Red 40 without fitting	Red 40 with fitting	Blue 50 without fitting	Blue 50 with fitting	Green 60 without fitting	Green 60 with fitting
FC35P	–-	–	FC35P.4D	FC35P.4D.04AG	FC35P.4E	FC35P.4E.04AG
FC50P	–	FC50P.4C.05UB	–	–	–	FC50P.4E.05UB
FC75P	–	FC75P.4C.07UF	–	–	–	FC75P.4E.07UF
FC100P	–	FC100P.4C.07NE	–	–	–	FC100P.4E.07NE
FC150P	–	FC150P.4C.11NB	–	–	–	FC150P.4E.11NB

BF80

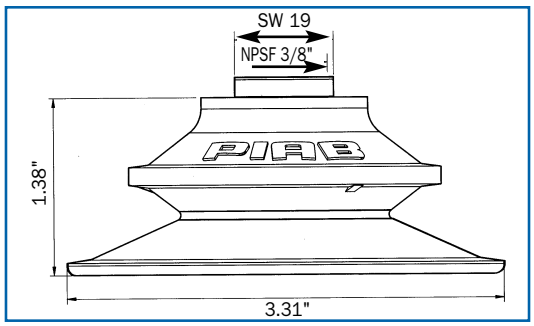
Size	Material & Part Number Polyurethane (PU) Yellow30/Blue50 with fitting	Green 60 with fitting
BF80	BF80P.4H.08UB	BF80P.4E.08UB

OC35x90

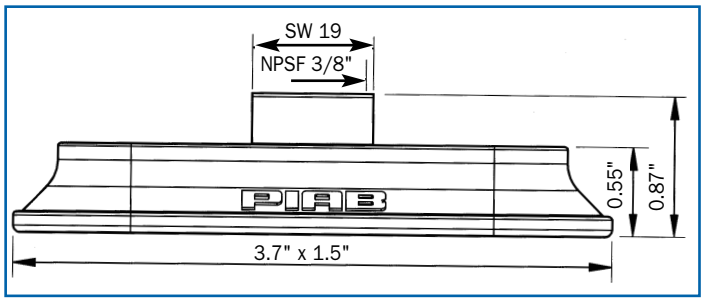
Size	Material & Part Number Polyurethane (PU) Red 40 with fitting	Green 60 with fitting
OC35x90	OC35x90.4C.39UB	OC35x90.4E.39UB

See pages 116-118 for other suction cup fitting options.

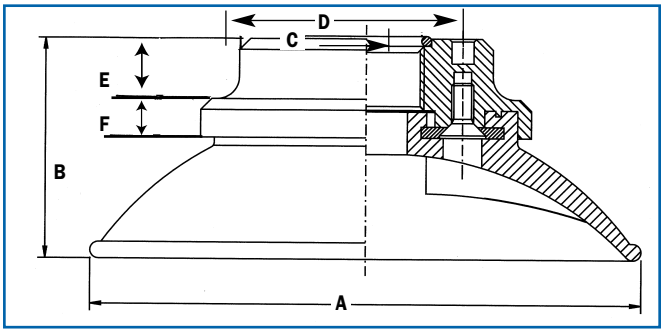
BF80 with fitting



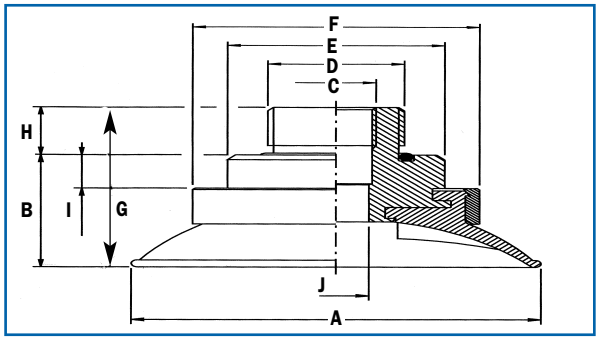
OC 35X90 with fitting



FC100P-FC150P with fitting



FC50P - FC75P with fitting



FC50P-FC75P

Model	Fitting Part No.	A Outer Dia.	B Height	C	D	E	F	G	H	I	J
FC50P	05UB	1.97	0.93	NPSF 1/8″	G3/8″	1.04	1.38	1.32	0.39	0.28	SW8
FC75P	07UF	2.95	0.93	NPSF 1/8″	G3/8″	1.3	1.77	1.32	0.39	–	SW8

FC100P-FC150P

Model	Fitting Part No.	A Outer Dia.	B Height	C	D	E	F	G	H
FC100P	07NE	3.94	1.57	NPSF3/8″	–	2.95	0.71	0.28	SW25
FC150P	11NB	5.91	2.22	NPSF3/8″	NPSF1/8″	4.37	0.88	0.26	SW30

FC100P-FC150P SERIES CUPS FITTINGS*

Fits Cup Size	Part No.	Description	Cup Fitting Weight oz.	Materials	Working Temp.
FC100P	07NE	Clamp Ring NPSF 3/8″female fitting w/filter screen	2.46	Aluminum/SS	-40F-+230F
FC150P	11NB	Clamp Ring NPSF 3/8″ female fitting w/ 1/8″ fem. addl. conn.	8.62	Aluminum/SS	-40F-+230F

*Only use Clamp Ring fittings with Duraflex suction cups.

See pages 116-118 for other suction cup fitting options.

DURAFLEX SERIES SUCTION CUP ACCESSORIES

Fits Cup Size	Part No.	Description	Weight oz.	Materials	Working Temp
FC35P-FC75P	33.50.065	Ball Joint G 1/8″	0.71	Steel/Therban®	-40F-+230F
FC100P-FC150P/ BF80/OC35x90	33.00.A02	Ball Joint NPT 3/8″	4.8	Steel/Therban®	-40F-+230F
FC35P-FC75P	33.50.069	Level Compensator G 1/8″	2.6	Steel/Brass	-40F-+230F
FC100P-FC150P/ BF80/OC35x90	33.00.A09	Level Compensator NPT 3/8″	7.5	Steel	-40F-+230F
FC35P-FC75P	01.04.108	T-Slot Adapter G 1/8″	2.2	Aluminum/Nitrile	-40F-+176F
FC100P-FC150P/ BF80/OC35x90	01.04.111	T-Slot Adapter NPT 3/8″	2.2	Aluminum/Nitrile	-40F-+176F

See pages 114-115 for dimensional information.

Model B

Suction Cup with Short Bellows

MATERIAL PROPERTIES

Material	Color	Material Code for Part No.	Working Temperature	Wear Resistance	Oil Resistance	Weather & Ozone Resistance
Chloroprene TWO 50°/60°	Black	10	-40 F to +230 F	Excellent	Good	Very Good
Silicone SIL 50°	Red	20	-94 F to +392 F	Very Good	Unsuitable	Excellent
Conductive Silicone CSIL 50°	Black	25	-67 F to +446 F	Very Good	Unsuitable	Excellent
Nitrile NPV 50°	Black	30	+32 F to +194 F	Excellent	Excellent	Very Good
Polyurethane TPU 81°	Clear	40	+32 F to +176 F	Excellent	Excellent	Excellent

DIMENSIONAL DATA

Size	Cup Fitting Part Number	Outer Dia. in.	Weight without fitting oz.	Weight with fitting oz.	Volume in3	Cup Fitting Thread Size
B5	01AB	0.22	0.004	0.064	0.003	M5 (10-32UNF)
B8	01AB	0.35	0.01	0.07	0.009	M5 (10-32UNF)
B10-2	01AC	0.43	0.026	0.106	0.03	M5 (10-32UNF)
B15-2	01AC	0.61	0.05	0.13	0.067	M5 (10-32UNF)
B15MF	01AC	0.63	0.04	0.12	0.067	M5 (10-32UNF)
B20	02AF	0.87	0.10	0.171	0.16	G 1/8"/M5 (10-32UNF)
B20MF	02AF	0.87	0.08	0.151	0.16	G 1/8"/M5 (10-32UNF)
B20MF-M	–	0.87	0.08	–	0.16	–
B30	02AF	1.30	0.26	0.33	0.60	G 1/8"/M5 (10-32UNF)
B30-2	04AG	1.34	0.26	0.45	0.60	NPSF 1/8"
B30-M	–	1.34	0.35	–	0.60	–
B30MF	04AG	1.34	0.26	0.45	0.60	NPSF 1/8"
B30MF-M	–	1.34	0.26	–	0.60	–
B40	04AG	1.69	0.46	0.65	0.90	NPSF 1/8"
B40MF	05AG	1.65	0.37	0.56	0.90	NPSF 1/8"
B40MF-M	–	1.65	0.37	–	0.90	–
B50/B50-2	05AG	2.09/2.07	0.71	1.08	2.00	NPSF 1/8"
B50-M	–	2.09	0.95	–	2.00	–
B50MF	05AG	2.09	0.71	1.08	2.00	NPSF 1/8"
B50MF-M	–	2.09	0.71	–	2.00	–
B75/B75-2	07UA/07UB/07UD	3.07	1.30	4.20	6.70	NPSF 1/8"/NPSF 3/8"/G 1/2"
B75-M	–	3.07	2.70	–	6.70	–
B110/B110-2	11UA	4.53	4.60	9.80	19.0	G 1/2"
B150	15UA	6.14	9.70	19.40	40.0	G 1/2"

All suction cup measurements are at static position. / MF-M and -M cups do not require a fitting.

Chloroprene Durometers ±5 Shore A	
50°	60°
B5	B10-2
B8	B15-2
B30-M	B20
B50-M	B30-2
B75-M	B40

"-2" signifies the cup's 2nd generation. The B50/B75/B110 cups are offered in both their 1st and 2nd generation sizes.

Explanation of Suction Cup Part Number:
The part number is split into three parts. Size. Material. Fitting. i.e. B40.20.04AG = B-40 size cup in Silicone material with NPSF 1/8" female fitting. *See Page 83.*

LIFTING POWER

Size	Perpendicular Lifting Power 6 -inHg	Perpendicular Lifting Power 18 -inHg	Perpendicular Lifting Power 27 -inHg	Parallel (Shear) Lifting Power 6 -inHg	Parallel (Shear) Lifting Power 18 -inHg	Parallel (Shear) Lifting Power 27 -inHg	Minimum Curve Radius in.	Maximum Vertical Movement in.
B5	0.067	0.1	0.22	–	–	–	0.06	0.06
B8	0.18	0.36	0.96	–	–	–	0.07	0.14
B10-2	0.33	0.76	1.10	–	–	–	0.16	0.18
B15-2	0.65	1.3	2.00	–	–	–	0.20	0.25
B15MF	0.90	1.8	2.70	1.0	1.5	2.2	0.43	0.08
B20	1.3	2.2	3.10	–	–	–	0.39	0.39
B20MF/B20MF-M	1.0	3.5	4.70	1.4	2.5	4.2	0.43	0.32
B30/B30-2	2.7	4.9	6.00	–	–	–	0.60	0.60
B30-M	3.4	4.7	8.60	–	–	–	0.35	0.43
B30MF/B30MF-M	2.7	9.0	12	3.2	7.2	9.2	0.65	0.47
B40	4.9	8.7	11	–	–	–	0.79	0.60
B40MF/B40MF-M	4.0	13	16	3.0	9.0	10	0.87	0.43
B50/B50-2	7.4	14	18	–	–	–	1.20	0.51
B50-M	7.2	17	23	–	–	–	0.79	0.47
B50MF/B50MF-M	6.7	21	30	5.1	14	22	1.00	0.51
B75/B75-2	16	37	50	–	–	–	1.60	0.94
B75-M	17	41	57	–	–	–	1.40	0.98
B110/B110-2	30	77	103	–	–	–	2.40	1.40
B150	66	154	198	–	–	–	3.00	1.70

Vacuum = -inHg, Lifting Power = lbf, Maximum measured values are given. Always use a safety factor of >2.

ORDERING INFORMATION

B5 - B15MF

Size	Material & Part Number Chloroprene TWO		Material & Part Number Silicone SIL		Material & Part Number Conductive Silicone CSIL		Material & Part Number Polyurethane TPU	
	without fitting	w/1-pc. fitting	without fitting	w/1-pc. fitting	without fitting	w/1-pc. fitting	without fitting	w/1-pc. fitting
B5	B5.10	B5.10.01AB	B5.20	B5.20.01AB	B5.25	B5.25.01AB	–	–
B8	B8.10	B8.10.01AB	B8.20	B8.20.01AB	B8.25	B8.25.01AB	–	–
B10-2	B10-2.10	B10-2.10.01AC	B10-2.20	B10-2.20.01AC	–	–	–	–
B15-2	B15-2.10	B15-2.10.01AC	B15-2.20	B15-2.20.01AC	–	–	–	–
B15MF	–	–	–	–	–	–	B15MF.40	B15MF.40.01AC

B20-B40, B50-M & B75-M

Size	Material & Part Number Chloroprene TWO			Material & Part Number Silicone SIL		
	without fitting	w/1-pc fitting	w/flow valve	without fitting	w/1-pc fitting	w/flow valve
B20	B20.10	B20.10.02AF	B20.10.02DD	B20.20	B20.20.02AF	B20.20.02DD
B30	B30.10	B30.10.02AF	B30.10.02DD	B30.20	B30.20.02AF	B30.20.02DD
B30-2	B30-2.10	B30-2.10.04AG	B30-2.10.04DA	B30-2.20	B30-2.20.04AG	B30-2.20.04DA
B30-M*	B30-M.10	–	–	–	–	–
B40	B40.10	B40.10.04AG	B40.10.04DA	B40.20	B40.20.04AG	B40.20.04DA
B50-M*	B50-M.10	–	–	–	–	–
B75-M*	B75-M.10	–	–	–	–	–

*-M version sold with a PE filter disk.

B20MF - B50MF-M

Size	Material & Part Number Polyurethane TPU		
	without fitting	w/1-pc fitting	w/flow valve
B20MF	B20MF.40	B20MF.40.02AF	B20MF.40.02DD
B20MF-M	B20MF-M.40	–	–
B30MF	B30MF.40	B30MF.40.04AG	B30MF.40.04DA
B30MF-M	B30MF-M.40	–	–
B40MF	B40MF.40	B40MF.40.04AG	B40MF.40.04DA
B40MF-M	B40MF-M.40z	–	–
B50MF-M	B50MF-M.40	–	–

The porous plastic PE filter disk should be used in extremely dusty applications or to prevent thin parts (i.e. plastic bags) from being drawn into the cup under vacuum. The B50-2, B75-2, B110-2 and -M suction cups should always use the included filter disk.

B50 - B50-2

Size	Material & Part Number Nitrile NPV			Material & Part Number Silicone SIL		
	without fitting	w/1-pc fitting	w/flow valve	without fitting	w/1-pc fitting	w/flow valve
B50	B50.30	B50.30.05AG	B50.30.05DA	B50.20	B50.20.05AG	B50.20.05DA
B50-2*	B50-2.30	B50-2.30.05AG	B50-2.30.05DA	B50-2.20	B50-2.20.05AG	B50-2.20.05DA

* B50-2 version sold with a PE filter disk.

B75 - B75-2

Size	Material & Part Number Nitrile NPV				Material & Part Number Silicone SIL			
	without fitting	NPSF 1/8" fitting	NPSF 3/8" fitting	G 1/2" fitting	without fitting	NPSF 1/8" fitting	NPSF 3/8" fitting	G 1/2" fitting
B75	B75.30.W	B75.30.07UA	B75.30.07UB	B75.30.07UD	B75.20.W	B75.20.07UA	B75.20.07UB	B75.20.07UD
B75-2*	B75-2.30.W	B75-2.30.07UA	B75-2.30.07UB	B75-2.30.07UD	B75-2.20.W	B75-2.20.07UA	B75-2.20.07UB	B75-2.20.07UD

* B75-2 version sold with a PE filter disk – See page 117 for other '75' size suction cup fitting options.

B110 - B150

Size	Material & Part Number Nitrile NPV		Material & Part Number Silicone SIL	
	without fitting	with fitting	without fitting	with fitting
B110	B110.30.W	B110.30.11UA	B110.20.W	B110.20.11UA
B110-2*	B110-2.30.W	B110-2.30.11UA	B110-2.20.W	B110-2.20.11UA
B150	B150.30.W	B150.30.15UA	B150.20.W	B150.20.15UA

* B110-2 version sold with a PE filter disk.

See pages 116-118 for other suction cup fitting options.

DIMENSIONAL DRAWINGS

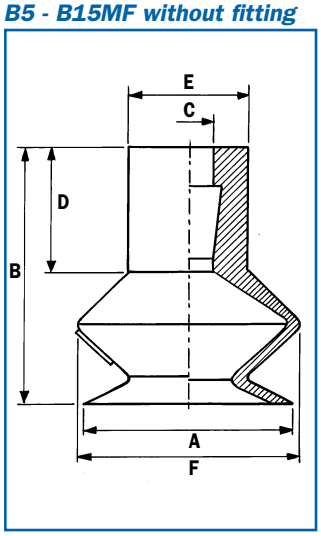
B5 - B15MF without fitting

Model	A Outer Dia.	B Height	C Top Hole Size	D	E	F
B5	0.22	0.36	0.08	0.24	0.18	0.24
B8	0.35	0.47	0.08	0.25	0.22	0.38
B10-2	0.43	0.63	0.15	0.39	0.35	0.47
B15-2	0.61	0.77	0.15	0.37	0.35	0.69
B15MF	0.63	0.77	0.15	0.38	0.35	0.67

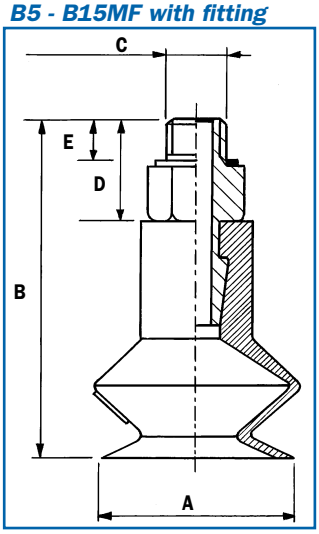
B5 - B15MF with fitting

Model	Fitting Part No.	A Outer Dia.	B Height	C	D	E
B5	01AB	0.22	0.52	M5 (10-32UNF)	0.34	0.14
B8	01AB	0.35	0.63	M5 (10-32UNF)	0.34	0.14
B10-2	01AC	0.43	0.83	M5 (10-32UNF)	0.34	0.14
B15-2	01AC	0.61	0.96	M5 (10-32UNF)	0.34	0.14
B15MF	01AC	0.63	0.96	M5 (10-32UNF)	0.34	0.14

B5 - B15MF without fitting



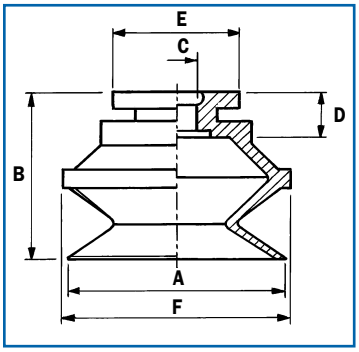
B5 - B15MF with fitting



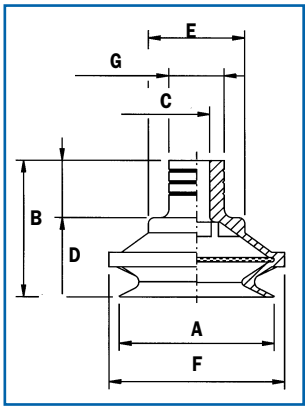
B20 - B50MF without fitting

Model	A Outer Dia.	B Height	C Top Hole Size	D	E	F
B20	0.87	0.75	0.20	0.20	0.55	0.95
B20MF	0.87	0.75	0.31	0.20	0.57	0.91
B30	1.30	1.02	0.28	0.20	0.59	1.42
B30-2	1.34	1.02	0.26	0.28	0.79	1.42
B30MF	1.34	1.02	0.43	0.28	0.79	1.42
B40	1.69	1.10	0.26	0.28	0.79	1.81
B40MF	1.65	1.10	0.43	0.28	0.79	1.77
B50	2.09	1.38	0.41	0.35	1.06	2.28
B50-2	2.07	1.38	0.41	0.35	1.06	2.32
B50MF	2.09	1.38	0.59	0.35	1.06	2.24

B20 - B50MF without fitting



B30-M - B50-M without fitting



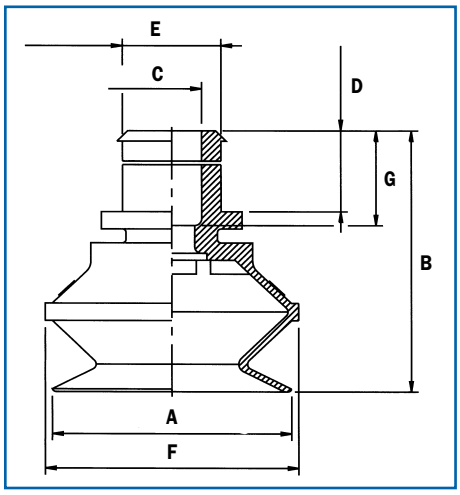
B30-M - B50-M without fitting

Model	A Outer Dia.	B Height	C Top Hole Size	D	E	F	G
B30-M	1.34	1.26	0.24	0.41	0.94	1.50	0.55
B50-M	2.09	1.87	0.35	0.78	1.30	2.36	0.75

B20MF-M - B50MF-M without fitting

Model	A Outer Dia.	B Height	C Top Hole Size	D	E	F	G
B20MF-M	0.87	1.10	0.24	0.35	0.39	0.91	0.41
B30MF-M	1.34	1.57	0.33	0.55	0.55	1.42	0.63
B40MF-M	1.65	1.65	0.33	0.55	0.55	1.77	0.63
B50MF-M	2.09	2.05	0.49	0.67	0.79	2.24	0.79

B20MF-M - B50MF-M without fitting



Note: All dimensions are in inches unless otherwise noted.

B20 - B50MF with fitting*

Model	Fitting Part No.	A Outer Dia.	B Height	B1 Height	C	D	E	F
B20	02AF	0.87	1.05	0.81	G 1/8"	M5 (10-32UNF)	0.24	0.30
B20MF	02AF	0.87	1.05	0.81	G 1/8"	M5 (10-32UNF)	0.24	0.30
B30	02AF	1.30	1.32	1.08	G 1/8"	M5 (10-32UNF)	0.24	0.30
B30-2	04AG	1.34	1.30	–	SW17	NPSF 1/8"	–	0.28
B30MF	04AG	1.34	1.30	–	SW17	NPSF 1/8"	–	0.28
B40	04AG	1.69	1.38	–	SW17	NPSF 1/8"	–	0.28
B40MF	04AG	1.65	1.38	–	SW17	NPSF 1/8"	–	0.28
B50	05AG	2.09	1.69	–	SW22	NPSF 1/8"	–	0.31
B50-2	05AG	2.07	1.69	–	SW22	NPSF 1/8"	–	0.31
B50MF	05AG	2.09	1.69	–	SW22	NPSF 1/8"	–	0.31

*See pages 116-117 for other suction cup fitting options.

B75 - B150 without fitting

Model	A Outer Dia.	B Height	C Top Hole Size	D	D1	E	F	G
B75	3.07	1.46	0.39	0.59	–	2.17	3.27	0.20
B75-2	3.07	1.46	0.59	–	0.35	2.17	3.35	0.20
B110	4.53	2.13	0.98	0.83	–	3.15	4.89	0.24
B110-2	4.53	2.13	0.98	–	0.51	3.15	4.96	0.24
B150	6.14	2.80	0.98	1.06	–	4.33	6.54	0.28

B75-M without fitting

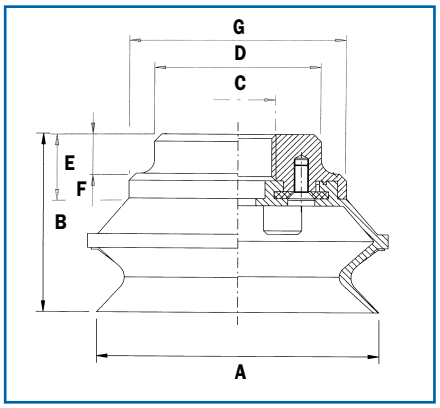
Model	A Outer Dia.	B Height	C Top Hole Size	D	E	F	G
B75-M	3.07	2.24	0.47	0.79	2.36	3.35	1.14

B75 - B75-2 with fitting*

Model	Fitting Part No.	A Outer Dia.	B Height	C	D	E	F	G
B75/B75-2 (1/8")	07UA	3.07	1.97	NPSF 1/8"	1.81	0.71	0.43	2.36
B75/B75-2 (3/8")	07UB	3.07	1.97	NPSF 3/8"	1.81	0.71	0.43	2.36
B75/B75-2 (1/2")	07UD	3.07	1.97	G 1/2"	1.81	0.71	0.43	2.36

*See pages 116-117 for other suction cup fitting options.

B75/B75-2 with fitting



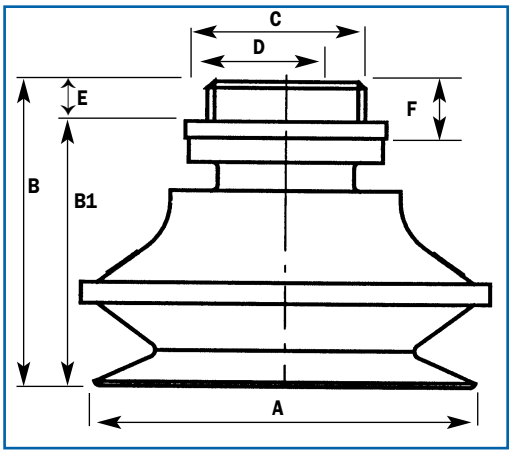
B110 - B150 with fitting*

Model	Fitting Part No.	A Outer Dia.	B Height	C	D	E	F	G	H
B110/B110-2	11UA	4.53	2.48	G 1/2"	NPSF 1/8"	0.59	0.31	2.83	1.08
B150	15UA	6.14	3.07	G 1/2"	NPSF 1/8"	0.55	0.24	3.54	1.38

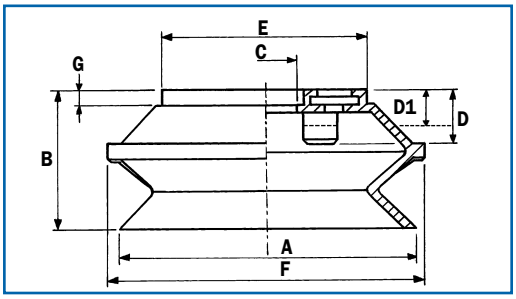
Note: All dimensions are in inches unless otherwise noted.

*See pages 116-117 for other suction cup fitting options.

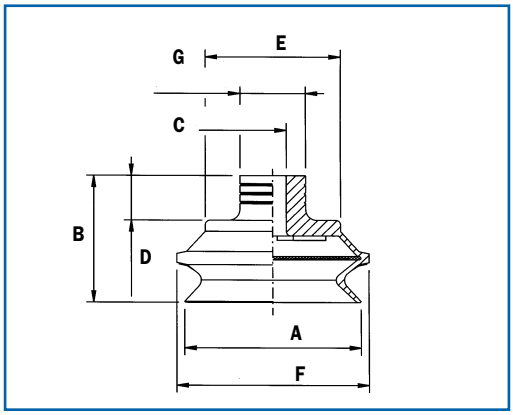
B20 - B50MF with fitting



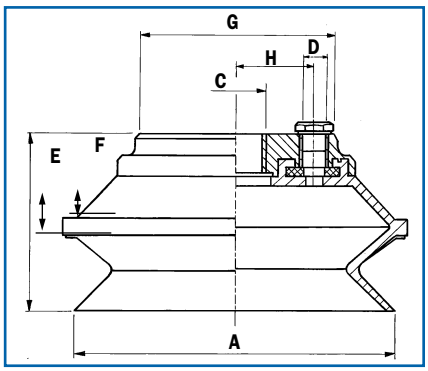
B75 - B150 without fitting



B75-M without fitting



B110 - B150 with fitting



MODEL B CUP FITTINGS*

Fits Cup Sizes	Part No.	Description	Cup Fitting Weight oz.	Materials	Working Temp.
B5/B8	01AB	1-piece Cup Fitting M5 (10-32UNF) male	0.06	Brass/Nylon	-40F - +194F
B10-2/B15MF	01AC	1-piece Cup Fitting M5 (10-32UNF) male	0.08	Brass/Nylon	-40F - +194F
B20/B30	02AF	1-piece Cup Fitting w/filter screen G 1/8"/M5 (10-32UNF) male/female	0.071	Aluminum/SS	-40F - +230F
	02DD	1-piece Cup Fitting w/flow valve G 1/8"/M5 (10-32UNF) male/female	0.071	Aluminum/PUR	-40F - +176F
	01.01.084	Strengthening Ring	*	Chloroprene	-40F - +230F
	01.01.084S	Strengthening Ring	*	Silicone	-94F - +392F
B30-M	31.50.242	Filter	*	Polyethylene	-40F - +176F
B30-2/B30MF/B40/B40MF	04AG	1-piece Cup Fitting w/filter screen NPSF 1/8" female	0.194	Aluminum/SS	-40F - +230F
	04DA	1-piece Cup Fitting w/flow valve NPSF 1/8" female	0.194	Aluminum/PUR	-40F - +176F
	01.01.085	Strengthening Ring	*	Chloroprene	-40F - +230F
	01.01.085S	Strengthening Ring	*	Silicone	-94F - +392F
B50/B50-2	05AG	1-piece Cup Fitting w/filter screen NPSF 1/8" female	0.406	Aluminum/SS	-40F - +230F
	05DA	1-piece Cup Fitting w/flow valve NPSF 1/8" female	0.406	Aluminum/PUR	-40F - +176F
	01.01.086	Strengthening Ring	*	Chloroprene	-40F - +230F
	01.01.086S	Strengthening Ring	*	Silicone	-94F - +392F
B50-2/B50-M	31.50.243	Filter	*	Polyethylene	-40F - +176F
B75/B75-2	07UA	Complete Fitting NPSF 1/8" female	1.99	Aluminum/SS	-40F - +230F
	07UB	Complete Fitting NPSF 3/8" female	2.56	Aluminum/SS	-40F - +230F
	07UD	Complete Fitting G 1/2" female	2.43	Aluminum/SS	-40F - +230F
B75-2/B75-M	31.50.244	Filter	*	Polyethylene	-40F - +176F
B110	11UA	Complete Fitting G 1/2" female	4.81	Aluminum/SS	-40F - +230F
B150	15UA	Complete Fitting G 1/2" female	9.75	Aluminum/SS	-40F - +230F
B110-2	31.50.249	Filter	*	Polyethylene	-40F - +176F

*Included in weight of suction cup without fitting.

See pages 116-118 for other suction cup fitting options.

MODEL B SUCTION CUP ACCESSORIES

Fits Cup Sizes	Part No.	Description	Weight oz.	Materials	Working Temp.
B20/B30	02AE	Angle Adaptor 5xM5 (10-32UNF) female	0.35	Aluminum	-40F - +230F
B30-2/B40	04AF	Angle Adaptor 5xNPSF 1/8" female	0.75	Aluminum	-40F - +230F
B50/B50-2	05AF	Angle Adaptor 5xNPSF 1/8" female	1.16	Aluminum	-40F - +230F
B75	31.50.053U	Angle Adaptor NPSF 1/8" - NPSF 1/8" male	0.71	Steel	-40F - +230F
B75-B150	31.50.054U	Angle Adaptor G 1/2" - G 1/2" male	3.9	Steel	-40F - +230F
B75	33.00.A02	Ball Joint NPT 3/8" male	4.8	Steel/Therban®	-40F - +230F
B30-2-B75	33.50.065	Ball Joint G 1/8" male	0.71	Steel/Therban®	-40F - +230F
B75-B150	33.50.066	Ball Joint G 1/2" male	3.9	Steel/Therban®	-40F - +230F
B5-B30	33.50.068	Level Compensator M5 (10-32UNF) female	0.35	Steel/Brass	-40F - +230F
B20-B75	33.50.069	Level Compensator G 1/8" male	2.6	Steel/Brass	-40F - +230F
B75	33.00.A09	Level Compensator NPT 3/8" male	7.5	Steel	-40F - +230F
B75-B150	33.50.071	Level Compensator NPSM 1/2" male	5.6	Steel	-40F - +230F

See pages 114-115 for dimensional information.

Model BL

Suction Cup with Long Bellows

MATERIAL PROPERTIES

Material	Material Code for Part No.	Color	Working Temperature	Wear Resistance	Oil Resistance	Weather & Ozone Resistance
Chloroprene TWO 60°	10	Black	-40 F to +230 F	Excellent	Good	Very Good
Silicone SIL 30°/50°	20	White/Red	-94 F to +392 F	Very Good	Unsuitable	Excellent

DIMENSIONAL DATA

Size	Cup Fitting Part Number	Outer Dia. in.	Weight without fitting oz.	Weight with fitting oz.	Volume in3	Cup Fitting Thread Size
BL20-2	02AF	0.79	0.06	0.13	0.24	G 1/8"/M5(10-32UNF)
BL30-2	04AG	1.18	0.18	0.37	0.80	NPSF 1/8"
BL40-2	04AG	1.57	0.37	0.56	1.6	NPSF 1/8"
B-BL40-2	–	1.57	0.37	–	1.6	–
BL50-2	05AG	1.97	0.71	1.08	0.71	NPSF 1/8"

All suction cup measurements are at static position. / B-BL40-2 cup does not require a fitting.

Explanation of Suction Cup Part Number: *The part number is split into three parts. Size. Material. Fitting. i.e. BL40-2.20.04AG = BL-40-2 size cup in Silicone material with NPSF 1/8" female fitting.* *See Page 83.*

"-2" signifies the cup's 2nd generation.

LIFTING POWER

Size	Perpendicular Lifting Power 6 -inHg	Perpendicular Lifting Power 18 -inHg	Perpendicular Lifting Power 27 -inHg	Parallel (Shear) Lifting Power 6 -inHg	Parallel (Shear) Lifting Power 18 -inHg	Parallel (Shear) Lifting Power 27 -inHg	Minimum Curve Radius in.	Maximum Vertical Movement in.
BL20-2	.07/.70*	.14/1.4*	–	–	–	–	0.16	0.51
BL30-2	.14/1.4*	.36/3.6*	–	–	–	–	0.31	0.79
BL40-2	.25/2.5*	.49/4.9*	–	–	–	–	0.60	1.30
B-BL40-2	.25/2.5*	.49/4.9*	–	–	–	–	0.60	1.30
BL50-2	.38/3.8*	.96/9.6*	–	–	–	–	0.60	1.30

* Lifting force is with reinforcement rings. Always use a safety factor of >2.

ORDERING INFORMATION

BL20-2 - BL50-2

Size	Material & Part Number Chloroprene TWO			Material & Part Number Silicone SIL		
	without fitting	w/1-pc. fitting	with flow valve	without fitting	w/1-pc. fitting	with flow valve
BL20-2	BL20-2.10	BL20-2.10.02AF	BL20-2.10.02DD	BL20-2.20	BL20-2.20.02AF	BL20-2.20.02DD
BL30-2	BL30-2.10	BL30-2.10.04AG	BL30-2.10.04DA	BL30-2.20	BL30-2.20.04AG	BL30-2.20.04DA
BL40-2	BL40-2.10	BL40-2.10.04AG	BL40-2.10.04DA	BL40-2.20	BL40-2.20.04AG	BL40-2.20.04DA
B-BL40-2*	–	–	–	B-BL40-2	–	–
BL50-2	BL50-2.10	BL50-2.10.05AG	BL50-2.10.05DA	BL50-2.20	BL50-2.20.05AG	BL50-2.20.05DA

* B-BL40-2 cup has a durometer of 30°±5 Shore A and is white in color.

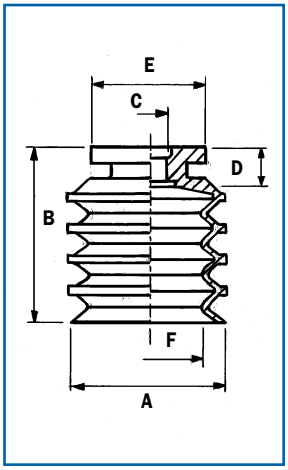
See pages 116-117 for other suction cup fitting options.

DIMENSIONAL DRAWINGS

BL20-2 - BL50-2 without fitting

Model	A Outer Dia.	B Height	C Top Hole Size	D	E	F
BL20-2	0.79	1.20	0.20	0.20	0.57	0.55
BL30-2	1.18	1.26	0.26	0.28	0.79	0.83
BL40-2	1.57	1.65	0.26	0.28	0.79	1.10
B-BL40-2	1.57	1.46	0.55	–	–	1.10
BL50-2	1.97	2.36	0.41	0.39	1.06	1.38

BL20-2 - BL50-2 without fitting



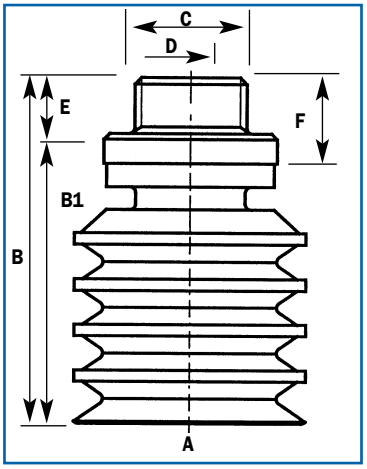
BL20-2 - BL50-2 with fitting

Model	Fitting Part No.	A Outer Dia.	B Height	B1 Height	C	D	E	F
BL20-2	02AF	0.79	1.20	0.96	G 1/8"	M5 (10-32UNF)	0.24	0.30
BL30-2	04AG	1.18	1.54	–	SW17	NPSF 1/8"	–	0.28
BL40-2	04AG	1.57	1.93	–	SW17	NPSF 1/8"	–	0.28
BL50-2	05AG	1.97	2.36	–	SW22	NPSF 1/8"	–	0.28

Note: All dimensions are in inches unless otherwise noted.

See pages 116-117 for other suction cup fitting options.

BL20-2 - BL50-2 with fitting



MODEL BL CUP FITTINGS

Fits Cup Sizes	Part No.	Description	Cup Fitting Weight oz.	Materials	Working Temp.
BL20-2	02AF	1-piece Cup Fitting w/filter screen G 1/8"/M5 (10-32UNF) male/female	0.071	Aluminum/SS	-40F - +230F
	02DD	1-piece Cup Fitting w/flow valve G 1/8"/M5 (10-32UNF) male/female	0.071	Aluminum/PUR	-40F - +176F
	01.01.084	Strengthening Ring	*	Chloroprene	-40F - +230F
	01.01.084S	Strengthening Ring	*	Silicone	-94F - +392F
	31.50.071	Reinforcement Rings	–	Polyamide	-40F - +230F
BL30-2	04AG	1-piece Cup Fitting w/filter screen NPSF 1/8" female	0.194	Aluminum/SS	-40F - +230
	04DA	1-piece Cup Fitting w/flow valve NPSF 1/8" female	0.194	Aluminum/PUR	-40F - +176F
	01.01.085	Strengthening Ring	*	Chloroprene	-40F - +230F
	01.01.085S	Strengthening Ring	*	Silicone	-94F - +392F
	31.50.072	Reinforcement Rings	–	Polyamide	-40F - +230F
BL40-2	04AG	1-piece Cup Fitting w/filter screen NPSF 1/8" female	0.194	Aluminum/SS	-40F - +230
	04DA	1-piece Cup Fitting w/flow valve NPSF 1/8" female	0.194	Aluminum/PUR	-40F - +176F
	01.01.085	Strengthening Ring	*	Chloroprene	-40F - +230F
	01.01.085S	Strengthening Ring	*	Silicone	-94F - +392F
	31.50.073	Reinforcement Rings	–	Polyamide	-40F - +230F
BL50-2	05AG	1-piece Cup Fitting w/filter screen NPSF 1/8" female	0.406	Aluminum/SS	-40F - +230
	05DA	1-piece Cup Fitting w/flow valve NPSF 1/8" female	0.406	Aluminum/PUR	-40F - +176F
	01.01.086	Strengthening Ring	*	Chloroprene	-40F - +230F
	01.01.086S	Strengthening Ring	*	Silicone	-94F - +392F
	31.50.074	Reinforcement Rings	–	Polyamide	-40F - +230F

*Included in weight of suction cup without fitting.

See pages 116-117 for other suction cup fitting options.

MODEL BL SUCTION CUP ACCESSORIES

Fits Cup Sizes	Part No.	Description	Weight oz.	Materials	Working Temp.
BL20-2	02AE	Angle Adaptor 5xM5 (10-32UNF) female	0.35	Aluminum	-40F - +230F
BL30-2/BL40-2	04AF	Angle Adaptor 5xNPSF 1/8" female	0.75	Aluminum	-40F - +230F
BL50-2	05AF	Angle Adaptor 5xNPSF 1/8" female	1.16	Aluminum	-40F - +230F
BL30-2/BL40-2	33.50.065	Ball Joint G 1/8" male	0.71	Steel/Therban®	-40F - +230F
BL20-2	33.50.068	Level Compensator M5 (10-32UNF) female	0.35	Steel/Brass	-40F - +230F
BL30-2 - BL50-2	33.50.069	Level Compensator G 1/8" male	2.6	Steel/Brass	-40F - +230F

See pages 114-115 for dimensional information.

Model D
Deep Suction Cups

MATERIAL PROPERTIES

Material	Color	Material Code for Part No.	Working Temperature	Wear Resistance	Oil Resistance	Weather & Ozone Resistance
Chloroprene TWO 50°	Black	10	-40 F to +230 F	Excellent	Good	Very Good
Silicone SIL 50°	Red	20	-94 F to +392 F	Very Good	Unsuitable	Excellent

DIMENSIONAL DATA

Size	Cup Fitting Part Number	Outer Dia. in.	Weight without fitting oz.	Weight with fitting oz.	Volume in3	Cup Fitting Thread Size
D15-2	01AC	0.65	0.01	0.09	0.055	M5(10-32UNF)
D20-2	02AF	0.87	0.06	0.131	0.15	G 1/8"/M5(10-32UNF)
D30-2	02AF	1.26	0.14	0.211	0.30	G 1/8"/M5(10-32UNF)
D50	05AG	2.09	0.56	0.93	0.90	NPSF 1/8"

All suction cup measurements are at static position.

Explanation of Suction Cup Part Number: *The part number is split into three parts. Size. Material. Fitting. i.e. D50.20.05AG = D50 size cup in Silicone material with NPSF 1/8" female fitting.* *See Page 83.*

"-2" signifies the cup's 2nd generation.

LIFTING POWER

Size	Perpendicular Lifting Power 6 -inHg	Perpendicular Lifting Power 18 -inHg	Perpendicular Lifting Power 27 -inHg	Parallel (Shear) Lifting Power 6 -inHg	Parallel (Shear) Lifting Power 18 -inHg	Parallel (Shear) Lifting Power 27 -inHg	Minimum Curve Radius in.	Maximum Vertical Movement in.
D15-2	0.65	1.7	2.5	–	–	–	0.24	0.12
D20-2	1.3	3.3	4.0	–	–	–	0.32	0.18
D30-2	3.1	5.8	7.0	–	–	–	0.51	0.20
D50	8.1	17	22	–	–	–	0.98	0.39

Vacuum = -inHg, Lifting Power = lbf, Maximum measured values are given. Always use a safety factor of >2.

ORDERING INFORMATION

D15-2 - D50

Size	Material & Part Number Chloroprene TWO			Material & Part Number Silicone SIL		
	without fitting	w/1-pc. fitting	with flow valve	without fitting	w/1-pc.fitting	with flow valve
D15-2	D15-2.10	D15-2.10.01AC	–	D15-2.20	D15-2.20.01AC	–
D20-2	D20-2.10	D20-2.10.02AF	D20-2.10.02DD	D20-2.20	D20-2.20.02AF	D20-2.20.02DD
D30-2	D30-2.10	D30-2.10.02AF	D30-2.10.02DD	D30-2.20	D30-2.20.02AF	D30-2.20.02DD
D50	D50.10	D50.10.05AG	D50.10.05DA	D50.20	D50.20.05AG	D50.20.05DA

See pages 116-117 for other suction cup fitting options.

DIMENSIONAL DRAWINGS

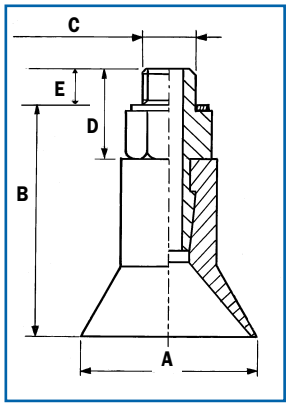
D15-2 without fitting

Model	A Outer Dia.	B Height	C Top Hole Size	D	E	F	G
D15-2	0.65	0.65	0.15	0.26	0.35	0.59	0.28

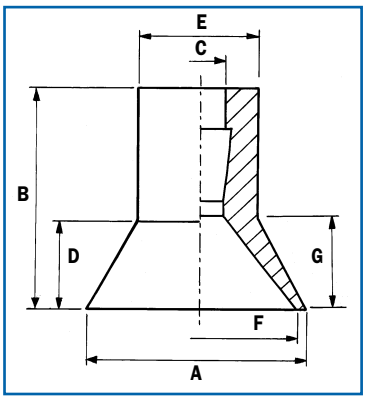
D15-2 with fitting

Model	Fitting Part No.	A Outer Dia.	B Height	C	D	E
D15-2	01AC	0.65	0.85	M5 (10-32UNF)	0.34	0.14

D15-2 with fitting



D15-2 without fitting



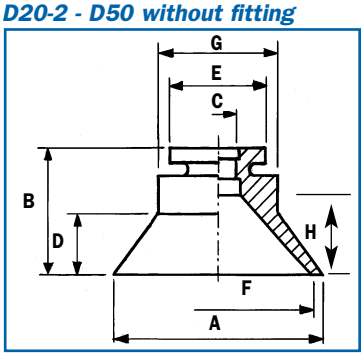
D20-2 - D50 with fitting*

Model	Fitting Part No.	A Outer Dia.	B Height	B1 Height	C	D	E	F
D20-2	02AF	0.87	0.81	0.57	G 1/8"	M5 (10-32UNF)	0.24	0.30
D30-2	02AF	1.26	1.05	0.81	G 1/8"	M5 (10-32UNF)	0.24	0.30
D50	05AG	2.09	1.55	–	SW22	NPSF 1/8"	–	0.31

Note: All dimensions are in inches unless otherwise noted.

See pages 116-117 for other suction cup fitting options.

D20-2 - D50 without fitting



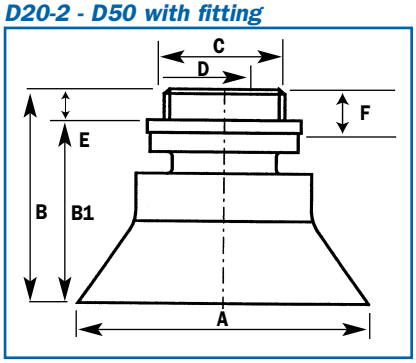
D20-2 - D50 with fitting*

Model	Fitting Part No.	A Outer Dia.	B Height	B1 Height	C	D	E	F
D20-2	02AF	0.87	0.81	0.57	G 1/8"	M5 (10-32UNF)	0.24	0.30
D30-2	02AF	1.26	1.05	0.81	G 1/8"	M5 (10-32UNF)	0.24	0.30
D50	05AG	2.09	1.55	–	SW22	NPSF 1/8"	–	0.31

Note: All dimensions are in inches unless otherwise noted.

See pages 116-117 for other suction cup fitting options.

D20-2 - D50 with fitting



MODEL D CUP FITTINGS

Fits Cup Sizes	Part No.	Description	Cup Fitting Weight oz.	Materials	Working Temp.
D15-2	01AC	1-piece Cup Fitting M5 (10-32UNF) male		Brass/Nylon	-40F - +194F
D20-2/D30-2	02AF	1-piece Cup Fitting w/filter screen G 1/8"/M5 (10-32UNF) male/female	0.071	Aluminum/SS	-40F - +230F
	02DD	1-piece Cup Fitting w/flow valve G 1/8"/M5 (10-32UNF) male/female	0.071	Aluminum/PUR	-40F - +176F
	01.01.084	Strengthening Ring	*	Chloroprene	-40F - +230F
	01.01.084S	Strengthening Ring	*	Silicone	-94F - +392F
D50	05AG	1-piece Cup Fitting w/filter screen NPSF 1/8" female	0.406	Aluminum/SS	-40F - +230
	05DA	1-piece Cup Fitting w/flow valve NPSF 1/8" female	0.406	Aluminum/PUR	-40F - +176
	01.01.086	Strengthening Ring	*	Chloroprene	-40F - +230F
	01.01.086S	Strengthening Ring	*	Silicone	-94F - +392F

*Included in weight of suction cup without fitting.

See pages 116-117 for other suction cup fitting options.

MODEL D SUCTION CUP ACCESSORIES

Fits Cup Sizes	Part No.	Description	Weight oz.	Materials	Working Temp.
D20-2/D30-2	02AE	Angle Adaptor 5xM5 (10-32UNF) female	0.35	Aluminum	-40F - +230F
D50-2	05AF	Angle Adaptor 5xNPSF 1/8" female	1.16	Aluminum	-40F - +230F
D50-2	33.50.065	Ball Joint G 1/8" male	0.71	Steel/Therban®	-40F - +230F
D15-2-D30-2	33.50.068	Level Compensator M5 (10-32UNF) female	0.35	Steel/Brass	-40F - +230F
D50-2	33.50.069	Level Compensator G 1/8" male	2.6	Steel/Brass	-40F - +230F

See pages 114-115 for dimensional information.

Model U
Universal Suction Cup

MATERIAL PROPERTIES

Material	Material Code for Part No.	Color	Working Temperature	Wear Resistance	Oil Resistance	Weather & Ozone Resistance
Chloroprene TWO 50°	10	Black	-40 F to +230 F	Excellent	Good	Very Good
Silicone SIL 50°	20	Red	-94 F to +392 F	Very Good	Unsuitable	Excellent
Conductive Silicone CSIL 50°	25	Black	-67 F to +446 F	Very Good	Unsuitable	Excellent
Nitrile NPV 50°	30	Black	+32 F to +194 F	Excellent	Excellent	Very Good

DIMENSIONAL DATA

Size	Cup Fitting Part Number	Outer Dia. in.	Weight without fitting oz.	Weight with fitting oz.	Volume in3	Cup Fitting Thread Size
U2	01AA	0.102	0.0004	0.0184	0.0001	M2.5 (3-56UNF)
U3	01AA	0.150	0.001	0.019	0.0003	M2.5 (3-56UNF)
U4	01AB	0.20	0.003	0.063	0.0018	M5 (10-32UNF)
U6	01AB	0.28	0.005	0.065	0.003	M5 (10-32UNF)
U8	01AB	0.35	0.006	0.066	0.006	M5 (10-32UNF)
U10	01AC	0.43	0.023	0.103	0.01	M5 (10-32UNF)
U15	01AC	0.65	0.025	0.105	0.03	M5 (10-32UNF)
U20	02AF	0.87	0.04	0.111	0.06	G 1/8"/M5 (10-32UNF)
U30	02AF	1.26	0.06	0.131	0.12	G 1/8"/M5 (10-32UNF)
U40-2	04AG	1.65	0.14	0.33	0.33	NPSF 1/8"
U50-2	05AG	2.09	0.35	0.72	0.70	NPSF 1/8"

All suction cup measurements are at static position.

Explanation of Suction Cup Part Number:
The part number is split into three parts. Size. Material. Fitting. i.e. U50.20.05AG = U50 size cup in Silicone material with NPSF 1/8" female fitting. *See Page 83.*

"-2" signifies the cup's 2nd generation.

LIFTING POWER

Size	Perpendicular Lifting Power 6 -inHg	Perpendicular Lifting Power 18 -inHg	Perpendicular Lifting Power 27 -inHg	Parallel (Shear) Lifting Power 6 -inHg	Parallel (Shear) Lifting Power 18 -inHg	Parallel (Shear) Lifting Power 27 -inHg	Minimum Curve Radius in.	Maximum Vertical Movement in.
U2	0.0067	0.022	0.033	–	–	–	0.16	0.004
U3	0.02	0.09	0.15	–	–	–	0.20	0.006
U4	0.045	0.20	0.29	0.045	0.18	0.22	0.12	0.008
U6	0.11	0.38	0.56	0.11	0.33	0.45	0.20	0.012
U8	0.22	0.65	0.87	0.22	0.65	0.76	0.24	0.02
U10	0.33	1.0	1.5	0.33	1.0	1.1	0.32	0.02
U15	0.78	1.8	2.5	0.78	1.2	1.3	0.32	0.06
U20	1.3	2.7	3.6	1.3	2.0	2.2	0.51	0.10
U30	2.7	5.6	6.7	1.7	2.2	2.5	0.79	0.13
U40-2	4.5	8.7	11	3.1	4.9	6.0	1.18	0.18
U50-2	7.8	16	20	4.5	8.3	9.9	1.4	0.23

Vacuum = -inHg, Lifting Power = 1bf, Maximum measured values are given. Always use a safety factor of >2.

ORDERING INFORMATION

U2 - U3

Size	Material & Part Number Conductive Silicone CSIL	
	without fitting	w/1-pc. fitting
U2	U2.25	U2.25.01AA
U3	U3.25	U3.25.01AA

U4 - U15

Size	Material & Part Number Chloroprene TWO		Material & Part Number Silicone SIL	
	without fitting	w/1-pc fitting	without fitting	w/1-pc fitting
U4	U4.10	U4.10.01AB	U4.20	U4.20.01AB
U6	U6.10	U6.10.01AB	U6.20	U6.20.01AB
U8	U8.10	U8.10.01AB	U8.20	U8.20.01AB
U10	U10.10	U10.10.01AC	U10.20	U10.20.01AC
U15	U15.10	U15.10.01AC	U15.20	U15.20.01AC

U20

Size	Material & Part Number Chloroprene TWO			Material & Part Number Silicone SIL		
	without fitting	w/1-pc fitting	w/flow valve	without fitting	w/1-pc fitting	w/flow valve
U20	U20.10	U20.10.02AF	U20.10.02DD	U20.20	U20.20.02AF	U20.20.02DD

U30 - U50-2

Size	Material & Part Number Nitrile NPV			Material & Part Number Silicone SIL		
	without fitting	w/1-pc fitting	w/flow valve	without fitting	w/1-pc fitting	w/flow valve
U30	U30.30	U30.30.02AF	U30.30.02DD	U30.20	U30.20.02AF	U230.20.02DD
U40-2	U40-2.30	U40-2.30.04AG	U40-2.30.04DA	U40-2.20	U40-2.20.04AG	U40-2.20.04DA
U50-2	U50-2.30	U50-2.30.05AG	U50-2.30.05DA	U50-2.20	U50-2.20.05AG	U50-2.20.05DA

See pages 116-117 for other suction cup fitting options.

DIMENSIONAL DRAWINGS

U2 - U4, U15 without fitting

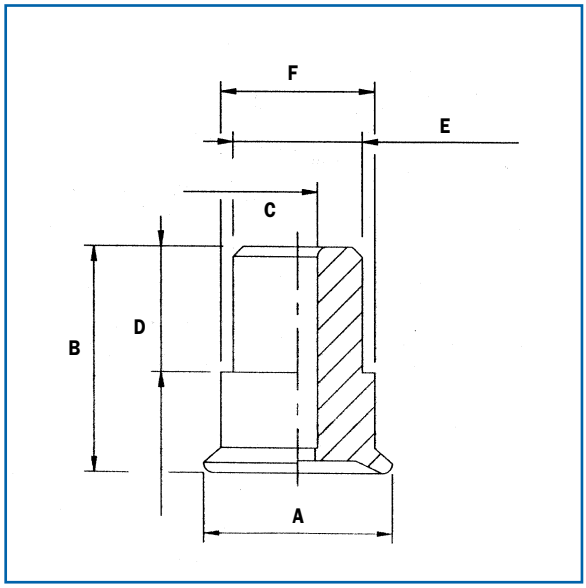
Model	A Outer Dia.	B Height	C Top Hole Size	D	E	F
U2	0.102	0.138	0.031	0.075	0.079	0.091
U3	0.150	0.177	0.031	0.098	0.102	0.122
U4	0.20	0.24	0.08	0.14	0.16	0.18
U15	0.65	0.45	0.15	0.28	0.33	0.35

Note: All dimensions are in inches unless otherwise noted.

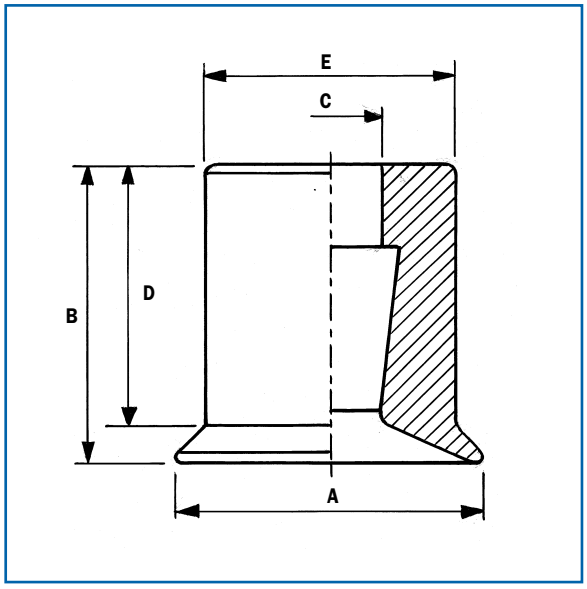
U6 - U10 without fitting

Model	A Outer Dia.	B Height	C Top Hole Size	D	E
U6	0.28	0.26	0.08	0.24	0.20
U8	0.35	0.28	0.08	0.22	0.20
U10	0.43	0.41	0.15	0.36	0.35

U2 - U4, U15 without fitting



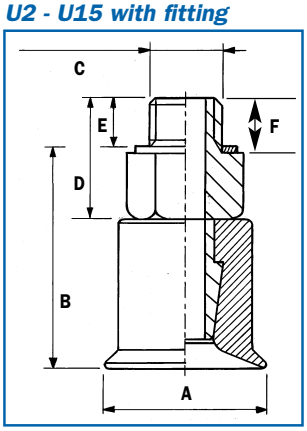
U6 - 10 without fitting



U2 - U15 with fitting

Model	Fitting Part No.	A Outer Dia.	B Height	C	D	E	F
U2	01AA	0.102	0.24	M2.5 (3-56UNF)	0.22	0.08	0.12
U3	01AA	0.150	0.28	M2.5 (3-56UNF)	0.22	0.08	0.12
U4	01AB	0.20	0.39	M5 (10-32 UNF)	0.34	0.14	–
U6	01AB	0.28	0.41	M5 (10-32 UNF)	0.34	0.14	–
U8	01AB	0.35	0.43	M5 (10-32 UNF)	0.34	0.14	–
U10	01AC	0.43	0.61	M5 (10-32 UNF)	0.34	0.14	–
U15	01AC	0.65	0.65	M5 (10-32 UNF)	0.34	0.14	–

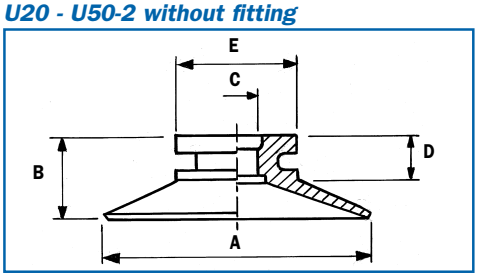
U2 - U15 with fitting



U20 - U50-2 without fitting

Model	A Outer Dia.	B Height	C Top Hole Size	D	E
U20	0.87	0.32	0.20	0.20	0.57
U30	1.26	0.37	0.20	0.22	0.57
U40-2	1.65	0.51	0.26	0.28	0.79
U50-2	2.09	0.69	0.41	0.37	1.06

U20 - U50-2 without fitting



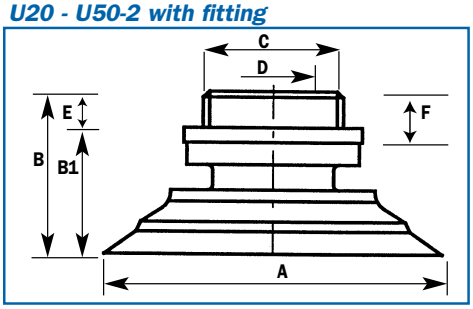
U20 - U50-2 with fitting*

Model	Fitting Part No.	A Outer Dia.	B Height	B1 Height	C	D	E	F
U20	02AF	0.87	0.61	0.37	G 1/8"	M5 (10-32UNF)	0.24	0.30
U30	02AF	1.26	0.67	0.43	G 1/8"	M5 (10-32UNF)	0.24	0.30
U40-2	04AG	1.65	0.79	–	SW17	NPSF 1/8"	–	0.28
U50-2	05AG	2.09	1.00	–	SW22	NPSF 1/8"	–	0.31

Note: All dimensions are in inches unless otherwise noted.

*See pages 116-117 for other suction cup fitting options.

U20 - U50-2 with fitting



MODEL U CUP FITTINGS

Fits Cup Sizes	Part No.	Description	Cup Fitting Weight oz.	Materials	Working Temp.
U2/U3	01AA	1-piece Cup Fitting M2.5 (3-56UNF) male	0.018	Brass/Nylon	-40F - +194F
U4-U8	01AB	1-piece Cup Fitting M5 (10-32UNF) male	0.06	Brass/Nylon	-40F - +194F
U10/U15	01AC	1-piece Cup Fitting M5 (10-32UNF) male	0.08	Brass/Nylon	-40F - +194F
U20-U30	02AF	1-piece Cup Fitting w/filter screen G 1/8"/M5 (10-32UNF) male/female	0.071	Aluminum/SS	-40F - +230F
	02DD	1-piece Cup Fitting w/flow valve G 1/8"/M5 (10-32UNF) male/female	0.071	Aluminum/PUR	-40F - +176F
	01.01.084	Strengthening Ring	*	Chloroprene	-40F - +230
	01.01.084S	Strengthening Ring	*	Silicone	-94F - +392F
U40-2	04AG	1-piece Cup Fitting w/filter screen NPSF 1/8" female	0.194	Aluminum/SS	-40F - +230
	04DA	1-piece Cup Fitting w/flow valve NPSF 1/8" female	0.194	Aluminum/PUR	-40F - +176F
	01.01.085	Strengthening Ring	*	Chloroprene	-40F - +230F
	01.01.085S	Strengthening Ring	*	Silicone	-94F - +392F
U50-2	05AG	1-piece Cup Fitting w/filter screen NPSF 1/8" female	0.406	Aluminum/SS	-40F - +230
	05DA	1-piece Cup Fitting w/flow valve NPSF 1/8" female	0.406	Aluminum/PUR	-40F - +176F
	01.01.086	Strengthening Ring	*	Chloroprene	-40F - +230F
	01.01.086S	Strengthening Ring	*	Silicone	-94F - +392F

*Included in weight of suction cup without fitting.

See pages 116-117 for other suction cup fitting options.

MODEL U SUCTION CUP ACCESSORIES

Fits Cup Sizes	Part No.	Description	Weight oz.	Materials	Working Temp.
U20-30	02AE	Angle Adaptor 5xM5 female	0.35	Aluminum	-40F - +230F
U40-2	04AF	Angle Adaptor 5xNPSF 1/8" female	0.75	Aluminum	-40F - +230F
U50	05AF	Angle Adaptor 5xNPSF 1/8" female	1.16	Aluminum	-40F - +230F
U40-2/U50-2	33.50.065	Ball Joint G 1/8" male	0.71	Steel/Therban®	-40F - +230F
U10-U30	33.50.068	Level Compensator M5 (10-32UNF) female	0.35	Steel/Brass	-40F - +230F
U40-2/U50-2	33.50.069	Level Compensator G 1/8" male	2.6	Steel/Brass	-40F - +230F

See pages 114-115 for dimensional information.

Model F

Flat Suction Cup with Cleats

MATERIAL PROPERTIES

Material	Material Code for Part No.	Color	Working Temperature	Wear Resistance	Oil Resistance	Weather & Ozone Resistance
Chloroprene TWO 50°	10	Black	-40 F to +230 F	Excellent	Good	Very Good
Silicone SIL 50°	20	Red	-94 F to +392 F	Very Good	Unsuitable	Excellent
Nitrile NPV 50°	30	Black	+32 F to +194 F	Excellent	Excellent	Very Good
Polyurethane TPU 81°	40	Clear	+32 F to +176 F	Excellent	Excellent	Excellent

DIMENSIONAL DATA

Size	Cup Fitting Part Number	Outer Dia. in.	Weight without fitting oz.	Weight with fitting oz.	Volume in3	Cup Fitting Thread Size
F15/F15MF	01AC	0.65	0.025	0.105	0.022	M5 (10-32UNF)
F20	02AF	0.87	0.04	0.111	0.06	G 1/8"/M5 (10-32UNF)
F20MF	02AF	0.87	0.05	0.121	0.06	G 1/8"/M5 (10-32UNF)
F20MF-M	-	0.87	0.05	–	0.06	–
F25	02AF	1.06	0.05	0.121	0.07	G 1/8"/M5 (10-32UNF)
F25MF	02AF	1.06	0.07	0.141	0.07	G 1/8"/M5 (10-32UNF)
F25MF-M	-	1.06	0.07	–	0.07	–
F30-2/F30MF	02AF	1.26	0.09	0.161	0.12	G 1/8"/M5 (10-32UNF)
F30MF-M	-	1.26	0.09	–	0.12	–
F40-2	04AG	1.65	0.19	0.38	0.29	NPSF 1/8"
F40MF	04AG	1.65	0.23	0.42	0.29	NPSF 1/8"
F40MF-M	-	1.65	0.23	–	0.29	–
F50-2	05AG	2.09	0.42	0.79	0.60	NPSF 1/8"
F50MF	05AG	2.09	0.47	0.84	0.60	NPSF 1/8"
F50MF-M	-	2.09	0.47	–	0.60	–
F75	07UA/07UB/07UD	3.03	0.85	3.60	1.20	NPSF 1/8"/NPSF 3/8"/G 1/2"
F110	11UA	4.41	2.40	7.94	4.30	G 1/2"
F150	15UA	5.98	7.00	16.1	9.80	G 1/2"

All suction cup measurements are at static position. MF-M cups do not require a fitting.

Explanation of Suction Cup Part Number:
The part number is split into three parts. Size. Material. Fitting. i.e. F50-2.20.05AG = F50-2 size cup in Silicone material with NPSF 1/8" female fitting. *See Page 83.*

"-2" signifies the cup's 2nd generation.

LIFTING POWER

Size	Perpendicular Lifting Power 6 -inHg	Perpendicular Lifting Power 18 -inHg	Perpendicular Lifting Power 27 -inHg	Parallel (Shear) Lifting Power 6 -inHg	Parallel (Shear) Lifting Power 18 -inHg	Parallel (Shear) Lifting Power 27 -inHg	Minimum Curve Radius in.	Maximum Vertical Movement in.
F15	0.78	1.8	2.5	0.78	1.4	1.7	0.51	0.04
F15MF	0.9	1.8	2.7	1.0	2.0	3.2	0.67	0.04
F20	1.3	3.2	4.2	1.1	1.8	1.9	0.70	0.06
F20MF/F20MF-M	0.8	3.2	4.9	1.8	3.2	4.7	0.70	0.08
F25	2.0	4.3	5.6	1.8	2.0	2.2	0.87	0.06
F25MF/F25MF-M	1.4	5.5	7.8	2.0	5.5	8.1	0.90	0.06
F30-2	2.7	5.6	7.0	2.5	3.6	4.5	0.98	0.08
F30MF/F30MF-M	2.5	7.7	11	3.0	6.3	9.4	1.7	0.06
F40-2	4.5	9.0	11	3.4	5.6	6.7	2.0	0.10
F40MF/F40MF-M	4.0	13	18	3.6	11	13	2.4	0.08
F50-2	8.1	16	21	5.4	9.0	11	2.2	0.12
F50MF/F50MF-M	5.5	20	31	6.9	18	24	3.8	0.08
F75	18	45	60	13	24	31	5.9	0.12
F110	31	94	126	31	56	67	9.9	0.16
F150	67	191	240	56	134	180	20	0.23

Vacuum = -inHg, Lifting Power = lbf, Maximum measured values are given. Always use a safety factor of >2.

ORDERING INFORMATION

F15 - F30-2

Size	Material & Part Number Chloroprene TWO			Material & Part Number Silicone SIL		
	without fitting	w/1-pc. fitting	w/flow valve	without fitting	w/1-pc. fitting	w/flow valve
F15	F15.10	F15.10.01AC	–	F15.20	F15.20.01AC	–
F20	F20.10	F20.10.02AF	F20.10.02DD	F20.20	F20.20.02AF	F20.20.02DD
F25	F25.10	F25.10.02AF	F25.10.02DD	F25.20	F25.20.02AF	F25.20.02DD
F30-2	F30-2.10	F30-2.10.02AF	F30-2.10.02DD	F30-2.20	F30-2.20.02AF	F30-2.20.02DD

F15MF - F50MF-M

Size	Material & Part Number Polyurethane TPU		
	without fitting	w/1-pc. fitting	w/flow valve
F15MF	F15MF.40	F15MF.40.01AC	–
F20MF	F20MF.40	F20MF.40.02AF	–
F20MF-M	F20MF-M.40	–	–
F25MF	F25MF.40	F25MF.40.02AF	F25MF.40.02DD
F25MF-M	F25MF-M.40	–	–
F30MF	F30MF.40	F30MF.40.02AF	F30MF.40.02DD
F30MF-M	F30MF-M.40	–	–
F40MF	F40MF.40	F40MF.40.04AG	F40MF.40.04DA
F40MF-M	F40MF-M.40	–	–
F50MF	F50MF.40	F50MF.40.05AG	F50MF.40.05DA
F50MF-M	F50MF-M.40	–	–

F40-2 - F50-2

Size	Material & Part Number Nitrile NPV			Material & Part Number Silicone SIL		
	without fitting	w/1-pc fitting	w/flow valve	without fitting	w/1-pc fitting	w/flow valve
F40-2	F40-2.30	F40-2.30.04AG	F40-2.30.04DA	F40-2.20	F40-2.20.04AG	F40-2.20.04DA
F50-2	F50-2.30	F50-2.30.05AG	F50-2.30.05DA	F50-2.20	F50-2.20.05AG	F50-2.20.05DA

F75*

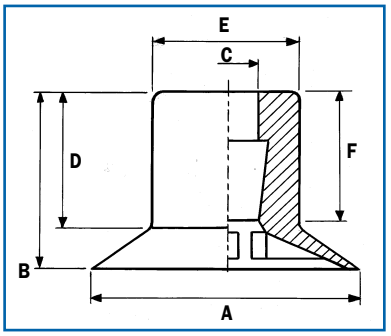
Size	Material & Part Number Nitrile NPV				Material & Part Number Silicone SIL			
	without fitting	NPSF 1/8" fitting	NPSF 3/8" fitting	G 1/2" fitting	without fitting	NPSF 1/8" fitting	NPSF 3/8" fitting	G 1/2" fitting
F75	F75.30.W	F75.30.07UA	F75.30.07UB	F75.30.07UD	F75.20.W	F75.20.07UA	F75.20.07UB	F75.20.07UD

*See page 117 for other '75' size suction cup fitting options

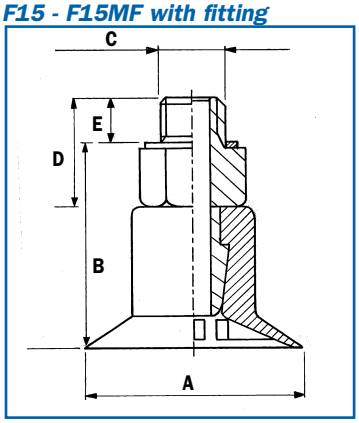
F110 - F150

Size	Material & Part Number Nitrile NPV		Material & Part Number Silicone SIL	
	without fitting	with fitting	without fitting	with fitting
F110	F110.30.W	F110.30.11UA	F110.20.W	F110.20.11UA
F150	F150.30.W	F150.30.15UA	F150.20.W	F150.20.15UA

F15 - F15MF without fitting



F15 - F15MF with fitting



DIMENSIONAL DRAWINGS

F15 - F15MF without fitting

Model	A Outer Dia.	B Height	C Top Hole Size	D	E	F
F15	0.65	0.43	0.15	0.33	0.35	0.31
F15MF	0.65	0.43	0.15	0.32	0.35	–

Note: All dimensions are in inches unless otherwise noted.

F15 - F15MF with fitting

Model	Fitting Part No.	A Outer Dia.	B Height	C	D	E
F15	01AC	0.65	0.63	M5 (10-32UNF)	0.34	0.14
F15MF	01AC	0.65	0.63	M5 (10-32UNF)	0.34	0.14

See pages 116-118 for other suction cup fitting options.

F20 - F50MF without fitting

Model	A Outer Dia.	B Height	C Top Hole Size	D	E
F20	0.87	0.32	0.20	0.20	0.57
F20MF	0.87	0.32	0.31	0.20	0.57
F25	1.06	0.35	0.20	0.20	0.57
F25MF	1.06	0.35	0.31	0.20	0.57
F30-2	1.26	0.39	0.20	0.22	0.57
F30MF	1.26	0.39	0.31	0.22	0.57
F40-2	1.65	0.51	0.26	0.28	0.79
F40MF	1.65	0.51	0.43	0.28	0.79
F50-2	2.09	0.69	0.41	0.37	1.06
F50MF	2.09	0.69	0.59	0.37	1.06

F20MF-M - F50MF-M without fitting

Model	A Outer Dia.	B Height	C Top Hole Size	D	E	F
F20MF-M	0.87	0.67	0.24	0.41	0.39	0.35
F25MF-M	1.06	0.71	0.24	0.41	0.39	0.35
F30MF-M	1.26	0.75	0.24	0.41	0.39	0.35
F40MF-M	1.65	1.06	0.33	0.63	0.55	0.55
F50MF-M	2.09	1.36	0.49	0.79	0.79	0.67

F20 - F50MF with fitting*

Model	Fitting Part No.	A Outer Dia.	B Height	B1 Height	C	D	E	F
F20	02AF	0.87	0.61	0.37	G 1/8"	M5 (10-32UNF)	0.24	0.30
F20MF	02AF	0.87	0.61	0.37	G 1/8"	M5 (10-32UNF)	0.24	0.30
F25	02AF	1.06	0.65	0.41	G 1/8"	M5 (10-32UNF)	0.24	0.30
F25MF	02AF	1.06	0.65	0.41	G 1/8"	M5 (10-32UNF)	0.24	0.30
F30-2	02AF	1.26	0.69	0.45	G 1/8"	M5 (10-32UNF)	0.24	0.30
F30MF	02AF	1.26	0.69	0.45	G 1/8"	M5 (10-32UNF)	0.24	0.30
F40-2	04AG	1.65	0.79	–	SW17	NPSF 1/8"	–	0.28
F40MF	04AG	1.65	0.79	–	SW17	NPSF 1/8"	–	0.28
F50-2	05AG	2.09	1.00	–	SW22	NPSF 1/8"	–	0.31
F50MF	05AG	2.09	1.00	–	SW22	NPSF 1/8"	–	0.31

*See pages 116-117 for other suction cup fitting options.

F75 - 150 without fitting

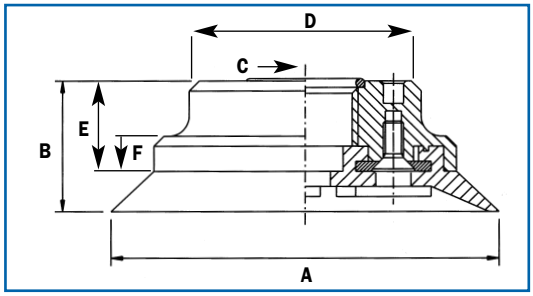
Model	A Outer Dia.	B Height	C	D	E
F75	3.03	0.51	0.39	0.20	2.17
F110	4.41	0.79	0.98	0.24	3.15
F150	5.98	1.02	0.98	0.28	4.33

F75 with fitting*

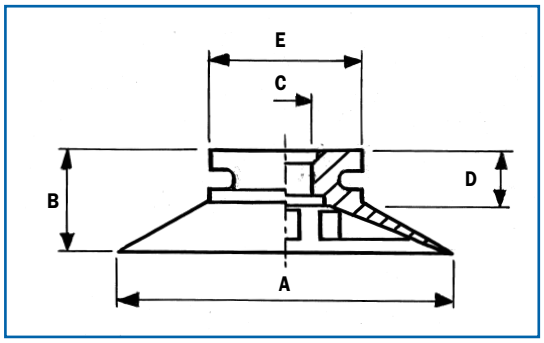
Model	Fitting Part No.	A Outer Dia.	B Height	C	D	E	F
F75 (1/8")	07UA	3.03	1.02	NPSF 1/8"	1.81	0.71	0.43
F75 (3/8")	07UB	3.03	1.02	NPSF 3/8"	1.81	0.71	0.43
F75 (1/2")	07UD	3.03	1.02	G 1/2"	1.81	0.71	0.43

*See page 117 for other suction cup fitting options.

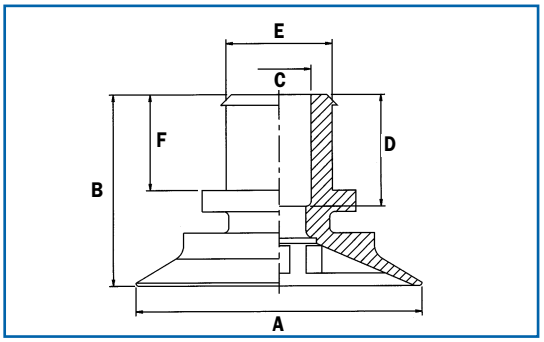
F75 with fitting



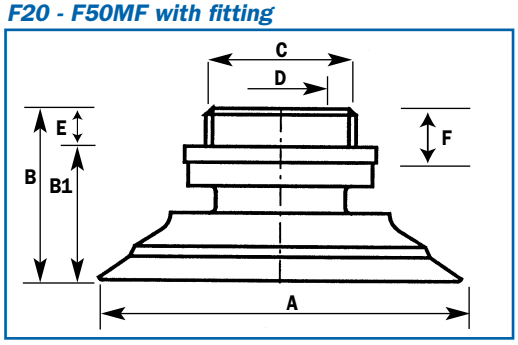
F20 - F50MF without fitting



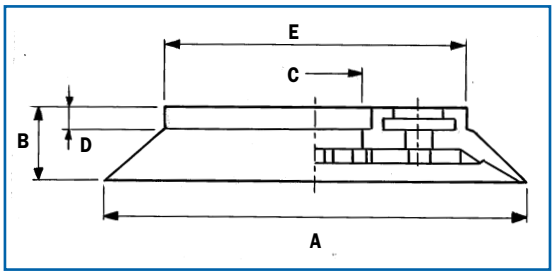
F20MF-M - F50MF-M without fitting



F20 - F50MF with fitting



F75 - 150 without fitting



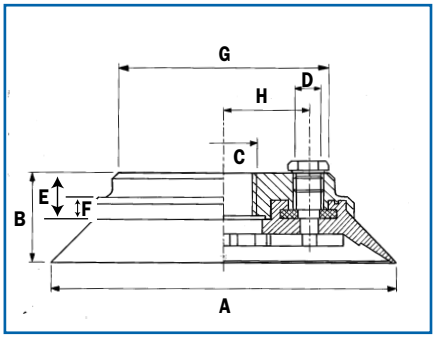
Note: All dimensions are in inches unless otherwise noted.

F110 - F150 with fitting*

Model	Fitting Part No.	A Outer Dia.	B Height	C	D	E	F	G	H
F110	11UA	4.41	1.14	G 1/2"	NPSF 1/8"	0.59	0.31	2.83	1.08
F150	15UA	5.98	1.30	G 1/2"	NPSF 1/8"	0.55	0.24	3.54	1.38

*See page 117 for other suction cup fitting options.

F110 - F150 with fitting



MODEL F CUP FITTINGS

Fits Cup Sizes	Part No.	Description	Cup Fitting Weight	Materials	Working Temp.
F15/F15MF	01AC	1-piece Cup Fitting M5 (10-32UNF) male	0.08	Brass/Nylon	-40F - +194F
F20-F30MF	02AF	1-piece Cup Fitting w/filter screen G 1/8"/M5 (10-32UNF) male/female	0.71	Aluminum/SS	-40F - +230F
	02DD	1-piece Cup Fitting w/flow valve G 1/8"/M5 (10-32UNF) male/female	0.71	Aluminum/PUR	-40F - +176F
	01.01.084	Strengthening Ring	*	Chloroprene	-40F - +230F
	01.01.084S	Strengthening Ring	*	Silicone	-94F - +392F
F40-2/F40MF	04AG	1-piece Cup Fitting w/filter screen NPSF 1/8" female	0.194	Aluminum/SS	-40F - +230F
	04DA	1-piece Cup Fitting w/flow valve NPSF 1/8" female	0.194	Aluminum/PUR	-40F - +176F
	01.01.085	Strengthening Ring	*	Chloroprene	-40F - +230F
	01.01.085S	Strengthening Ring	*	Silicone	-94F - +392F
F50-2/F50MF	05AG	1-piece Cup Fitting w/filter screen NPSF 1/8" female	0.406	Aluminum/SS	-40F - +230F
	05DA	1-piece Cup Fitting w/flow valve NPSF 1/8" female	0.406	Aluminum/PUR	-40F - +176F
	01.01.086	Strengthening Ring	*	Chloroprene	-40F - +230F
	01.01.086S	Strengthening Ring	*	Silicone	-94F - +392F
F75	07UA	Complete Fitting NPSF 1/8" female	1.99	Aluminum/SS	-40F - +230F
	07UB	Complete Fitting NPSF 3/8" female	2.56	Aluminum/SS	-40F - +230F
	07UD	Complete Fitting G 1/2" female	2.43	Aluminum/SS	-40F - +230F
F110	11UA	Complete Fitting G 1/2" female	4.81	Aluminum/SS	-40F - +230F
F150	15UA	Complete Fitting G 1/2" female	9.75	Aluminum/SS	-40F - +230F

*Included in weight of suction cup without fitting.

See pages 116-118 for other suction cup fitting options.

MODEL F SUCTION CUP ACCESSORIES

Fits Cup Sizes	Part No.	Description	Weight oz.	Materials	Working Temp.
F20-F30MF	02AE	Angle Adaptor 5xM5 (10-32UNF) female	0.35	Aluminum	-40F - +230F
F40-2	04AF	Angle Adaptor 5xNPSF 1/8" female	0.75	Aluminum	-40F - +230F
F50-2	05AF	Angle Adaptor 5xNPSF 1/8" female	1.16	Aluminum	-40F - +230F
F75	31.50.053U	Angle Adaptor G 1/8" - G 1/8" male	0.71	Steel	-40F - +230F
F75-F150	31.50.054U	Angle Adaptor G 1/2" - G 1/2" male	3.9	Steel	-40F - +230F
F75	33.00.A02	Ball Joint NPT 3/8" male	4.8	Steel/Therban®	-40F - +230F
F40-2-F75	33.50.065	Ball Joint G 1/8" male	0.71	SteelTherban®	-40F - +230F
F75-F150	33.50.066	Ball Joint G 1/2" male	3.9	SteelTherban®	-40F - +230F
F15-F30MF	33.50.068	Level Compensator M5 (10-32UNF) female	0.35	Steel/Brass	-40F - +230F
F20-F75	33.50.069	Level Compensator G 1/8" male	2.6	Steel/Brass	-40F - +230F
F75	33.00.A09	Level Compensator NPT 3/8" male	7.5	Steel	-40F - +230F
F75-F150	33.50.071	Level Compensator NPSM 1/2" male	5.6	Steel	-40F - +230F

See pages 114-115 for dimensional information.

Cone Valve Cups

MATERIAL PROPERTIES

Material	Color	Material Code for part No.	Working Resistance	Wear Resistance	Oil Resistance	Weather & Ozone Resistance
Chloroprene TWO 50°	Black	10	-40 F to +230 F	Excellent	Good	Very Good
Silicone SIL 50°	Red	20	-94 F to +392 F	Very Good	Unsuitable	Excellent
Nitrile NPV 50°	Black	30	+32 F to +194 F	Excellent	Excellent	Very Good
Ethylene Propylene EPDM	Gray/Black	50	-40F to +212F	Very Good	Good	Excellent

DIMENSIONAL DATA

Size	Cup Fitting Part Number	Outer Dia. in.	Weight oz.	Volume in3	Cup Fitting Thread Size
F30-2	02UV	1.26	0.19	0.09	G 1/8"/M5 (10-32UNF)
F40-2	04UV	1.65	0.39	0.29	NPSF 1/8"
F50-2	05UV	2.09	0.92	0.6	NPSF 1/8"
F75	07UV	3.03	2.5	1.2	G 1/2"
F110	11UV	4.41	10.4	4.3	G 1/2"
F150	15UV	5.98	19.8	9.8	G 1/2"
P35	03UV	1.67	1.1	0.4	NPSF 1/8"
P60	03UV	2.66	2.5	1.20	NPSF 1/8"
P100	10UV	4.23	10.3	3.40	G 1/2"

All suction cup measurements are at static position.

Explanation of Suction Cup Part Number:
The part number is split into three parts. Size. Material. Fitting.
i.e. F50.2.20.05UV = F50-2 size cup in Silicone material with NPSF 1/8" female fitting and cone valve. *See Page 83.*

LIFTING POWER

"-2" signifies the cup's 2nd generation.

Size	Perpendicular Lifting Power 6 -inHg	Perpendicular Lifting Power 18 -inHg	Perpendicular Lifting Power 27 -inHg	Parallel (Shear) Lifting Power 6 -inHg	Parallel (Shear) Lifting Power 18 -inHg	Parallel (Shear) Lifting Power 27 -inHg	Minimum Curve Radius in.	Maximum Vertical Movement in.
F30-2	2.7	5.6	7.0	2.5	3.6	4.5	0.98	0.08
F40-2	4.5	9.0	11	3.4	5.6	6.7	2.0	0.10
F50-2	8.1	16	21	5.4	9.0	11	2.2	0.12
F75	18	45	60	13	24	31	5.9	0.12
F110	31	94	126	31	56	67	9.9	0.16
F150	67	191	240	56	134	180	20	0.23
P35	4.5	11	15	–	–	–	–	0.12
P60	13	33	49	–	–	–	–	0.12
P100	40	101	148	–	–	–	–	0.12

Vacuum = -inHg, Lifting Power = lbf, Maximum measured values are given. Always use a safety factor of >2.

ORDERING INFORMATION

F30-2

Size	Material & Part Number Chloroprene TWO	Silicone SIL
F30-2	F30-2.10.02UV	F30-2.20.02UV

F40-2 - F150

Size	Material & Part Number Nitrile NPV	Silicone SIL
F40-2	F40-2.30.04UV	F40-2.20.04UV
F50-2	F50-2.30.05UV	F50-2.20.05UV
F75	F75.30.07UV	F75.20.07UV
F110	F110.30.11UV	F110.20.11UV
F150	F150.30.15UV	F150.20.15UV

P35 - P100

Size	Material & Part Number Ethylene Propylene EPDM
P35	P35.50.03UV
P60	P60.50.03UV
P100	P100.50.10UV

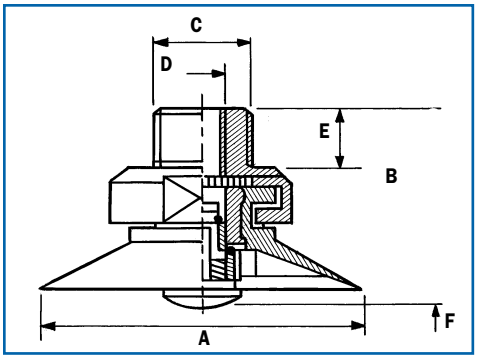
DIMENSIONAL DRAWINGS

F30-2 - F50-2 cone valve cup

Model	Fitting Part No.	A Outer Dia.	B Height	B1 Height	C	D	E	F Travel
F30-2	02UV	1.26	0.78	0.54	G 1/8"	M5 (10-32UNF)	0.24	0.01-0.02
F40-2	04UV	1.65	0.89	0.65	SW17	NPSF 1/8"	0.24	0.01-0.02
F50-2	05UV	2.09	1.10	0.86	SW22	NPSF 1/8"	0.24	0.01-0.02

Note: All dimensions are in inches unless otherwise noted.

F30-2 - F50-2 cone valve cup



F110 - F150 cone valve cup

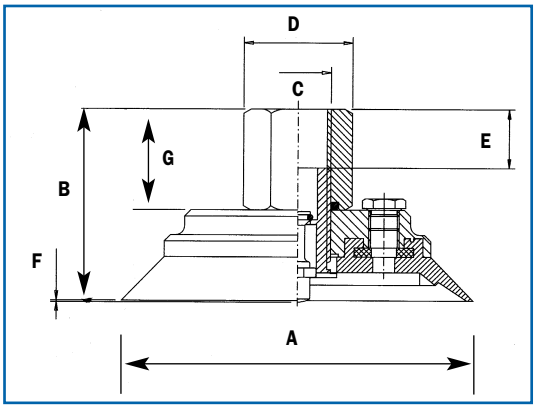
Model	Fitting Part No.	A Outer Dia.	B Height	C	D	E	F Travel	G
F110	11UV	4.41	2.40	G 1/2"	6kN30	0.75	0.01-0.02	1.26
F150	15UV	5.98	2.56	G 1/2"	6kN30	0.75	0.01-0.02	1.26

P35 - P100 cone valve cup

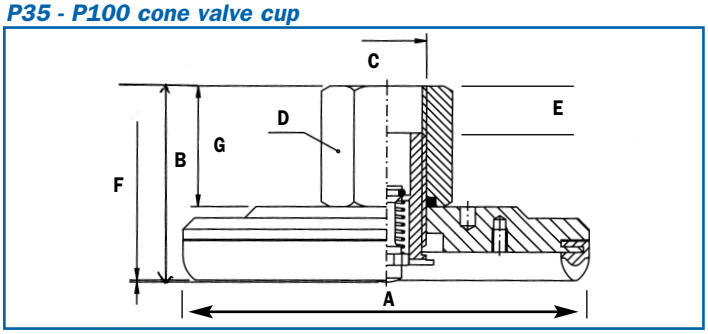
Model	Fitting Part No.	A Outer Dia.	B Height	C	D	E	F Travel	G
P35	03UV	1.67	1.28	NPSF 1/8"	SW14	0.24	0.01-0.02	0.67
P60	03UV	2.66	1.28	NPSF 1/8"	SW14	0.24	0.01-0.02	0.67
P100	10UV	4.23	2.03	G 1/2"	SW12	0.49	0.01-0.02	1.26

Note: All dimensions are in inches unless otherwise noted.

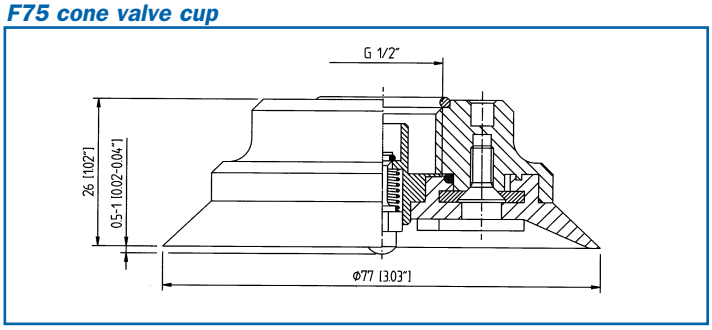
F110 - F150 cone valve cup



P35 - P100 cone valve cup



F75 cone valve cup



CONE VALVE CUP FITTINGS*

Fits Cup Sizes	Part No.	Description	Cup Fitting Weight oz.	Materials	Working Temp.
F30-2	02UV	3-piece Fitting G 1/8"/M5 with Cone Valve 30 male/female	0.088	Aluminum/SS	-40F - +230F
F40-2	04UV	3-piece Fitting NPSF 1/8" with Cone Valve 40 female	0.194	Aluminum/SS	-40F - +230F
F50-2	05UV	3-piece Fitting NPSF 1/8" with Cone Valve 50 female	0.388	Aluminum/SS	-40F - +230F
F75	07UV	Cone Valve with fitting G 1/2" female	1.45	Aluminum/SS	-40F - +230F
F110	11UV	Cone Valve with fitting G 1/2" female	7.0	Aluminum/SS	-40F - +230F
F150	15UV	Cone Valve with fitting G 1/2" female	11.9	Aluminum/SS	-40F - +230F
P35/P60	03UV	Cone Valve with fitting NPSF 1/8" female	0.317	Aluminum/SS	-40F - +230F
P100	10UV	Cone Valve with fitting G 1/2" female	2.24	Aluminum/SS	-40F - +230F

*See pages 116-118 for other suction cup fitting options.

CONE VALVE SUCTION CUP ACCESSORIES

Fits Cup Sizes	Part No.	Description	Weight oz.	Materials	Working Temp.
F30-2	02AE	Angle Adaptor 5xM5 (10-32UNF) female	0.35	Aluminum	-40F - +230F
F40-2	04AF	Angle Adaptor 5xNPSF 1/8" female	0.75	Aluminum	-40F - +230F
F50-2	05AF	Angle Adaptor 5xNPSF 1/8" female	1.16	Aluminum	-40F - +230F
F75/P35/P60	31.50.053U	Angle Adaptor G 1/8" - G 1/8" male	0.71	Steel	-40F - +230F
F40-2-F75/P35/P60	33.50.065	Ball Joint G 1/8" male	0.71	Steel/Therban®	-40F - +230F
F30-2	33.50.068	Level Compensator M5 (10-32UNF) female	0.35	Steel/Brass	-40F - +230F
F30-2-F75/P35/P60	33.50.069	Level Compensator G 1/8" male	2.6	Steel/Brass	-40F - +230F

See pages 114-115 for dimensional information.

Model FC

Flat Concave Suction Cups with Cleats

MATERIAL PROPERTIES

Material	Color	Material Code for Part No.	Working Temperature	Wear Resistance	Oil Resistance	Weather & Ozone Resistance
Nitrile NPV 50°	Black	30	+32 F to +194 F	Excellent	Excellent	Very Good

DIMENSIONAL DATA

Size	Cup Fitting Part Number	Outer Dia. in.	Weight without fitting oz.	Weight with fitting oz.	Volume in3	Cup Fitting Thread Size
FC50	05UB	1.97	–	1.1	0.6	G 3/8"/NPSF 1/8"
FC75	07UF	2.95	–	1.7	1.8	G 3/8"/NPSF 1/8"
FC100	07UB/07UD/07UE/07UU	3.94	2.4	4.9	4.9	NPSF 3/8" or G 1/2"

All suction cup measurements are at static position.

Explanation of Suction Cup Part Number:
The part number is split into three parts. Size. Material. Fitting.
i.e. FC100.30.07UB = FC100 size cup in NPV material with NPSF 3/8" female Al fitting.
See Page 83.

LIFTING POWER

Size	Perpendicular Lifting Power 6 -inHg	Perpendicular Lifting Power 18 -inHg	Perpendicular Lifting Power 27 -inHg	Parallel (Shear) Lifting Power 6 -inHg	Parallel (Shear) Lifting Power 18 -inHg	Parallel (Shear) Lifting Power 27 -inHg	Minimum Curve Radius in.	Maximum Vertical Movement in.
FC50	7.8	19	28	7.8	19	24	3.0	0.22
FC75	17	42	56	18	45	60	5.9	0.28
FC100	28	78	103	27	53	63	3.6	0.47

Vacuum = -inHg, Lifting Power = lbf, Maximum measured values are given. Always use a safety factor of >2.

ORDERING INFORMATION

FC50 - FC75

Size	Material & Part Number Nitrile (NPV) with fitting
FC50	FC50.30.05UB
FC75	FC75.30.07UF

FC100

Size	Material & Part Number Nitrile (NPV)			
	NPSF 3/8" Al fitting	G 1/2" Al fitting	G 1/2" PPS fitting	NPSF 3/8" PPS fitting
FC100	FC100.30.07UB	FC100.30.07UD	FC100.30.07UE	FC100.30.07UU

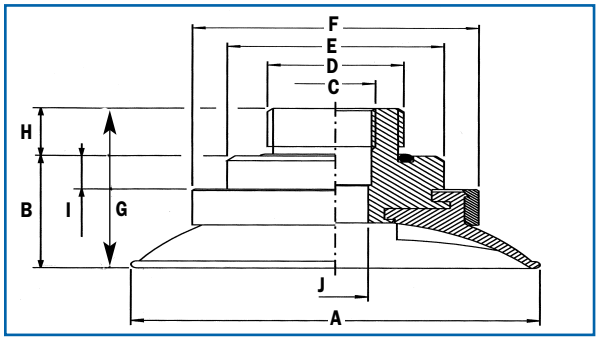
DIMENSIONAL DRAWINGS

FC50 - FC75 with fitting

Model	Fitting Part No.	A Outer Dia.	B Height	C	D	E	F	G	H	I	J
FC50	05UB	1.97	0.93	NPSF 1/8"	G 3/8"	1.04	1.38	1.32	0.39	0.28	SW 8
FC75	07UF	2.95	0.93	NPSF 1/8"	G 3/8"	1.30	1.77	1.32	0.39	–	SW 8

Note: All dimensions are in inches unless otherwise noted.

FC50 - FC75 with fitting



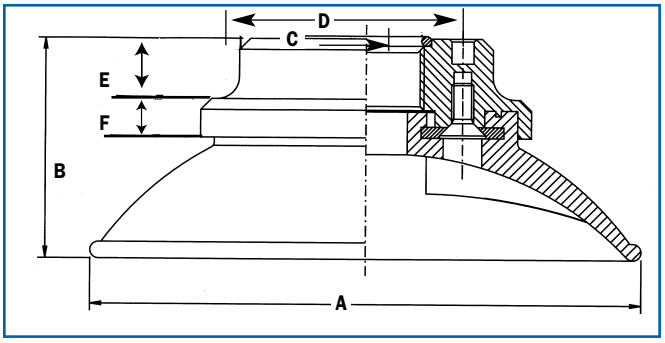
The FC Cup is also available in the Duraflex™ material. See pages 84-85.

FC100 with fitting

Model	Fitting Part No.	A Outer Dia.	B Height	C	D	E	F
FC100 w/3/8" fitting	07UB	3.94	1.57	NPSF 3/8" Al	1.81	0.43	0.28
FC100 w/1/2" fitting	07UD	3.94	1.57	G 1/2" Al	1.81	0.43	0.28
FC100 w/3/8" fitting	07UE	3.94	1.57	NPSF 3/8" PPS	1.81	0.43	0.28
FC100 w/1/2" fitting	07UU	3.94	1.57	G 1/2" PPS	1.81	0.43	0.28

Note: All dimensions are in inches unless otherwise noted.

FC100 with fitting



FC100 CUP FITTINGS

Fits Cup Sizes	Part No.	Description	Cup Fitting Weight oz.	Materials	Working Temp.
FC100	07UB	Fitting NPSF 3/8" female	2.56	Aluminum/SS	-40F - +230F
	07UD	Fitting G 1/2" female	2.43	Aluminum/SS	-40F - +230F
	07UE	Fitting G 1/2" female	1.20	PPS/SS/Al	-4F - +176F
	07UU	Fitting NPSF 3/8" female	1.41	PPS/SS/Al	-4F - +176F

See page 117 for other suction cup fitting options.

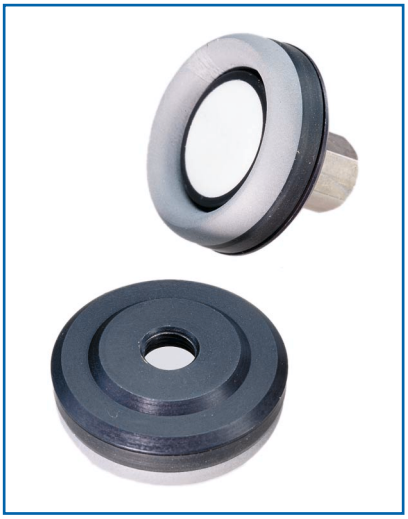
MODEL FC SUCTION CUP ACCESSORIES

Fits Cup Sizes	Part No.	Description	Weight oz.	Materials	Working Temp.
FC50/FC75	31.50.053U	Angle Adaptor G 1/8" - G 1/8" male	0.71	Brass	-40F - +230F
FC100	31.50.054U	Angle Adaptor G 1/2" - G 1/2" male	3.9	Steel	-40F - +230F
FC100	33.00.A02	Ball Joint NPT 3/8" male	4.8	Steel/Therban®	-40F - +230F
FC50/FC75	33.50.065	Ball Joint G 1/8" male	0.71	Steel/Therban®	-40F - +230F
FC100	33.50.066	Ball Joint G 1/2" male	3.9	Steel/Therban®	-40F - +230F
FC50/FC75	33.50.069	Level Compensator G 1/8" male	2.6	Steel/Brass	-40F - +230F
FC100	33.00.A09	Level Compensator NPT 3/8" male	7.5	Steel	-40F - +230F
FC100	33.50.071	Level Compensator NPSM 1/2" male	5.6	Steel	-40F - +230F

See pages 114-115 for dimensional information.

Model P

Suction Cup with Profile Rubber Strip



MATERIAL PROPERTIES

Material	Color	Material Code for Part No.	Working Temperature	Wear Resistance	Oil Resistance	Weather & Ozone Resistance
Ethylene Propylene EPDM	Gray or Black	50	-40 F to +212 F	Very Good	Unsuitable	Excellent

DIMENSIONAL DATA

Size	Cup Fitting Part Number	Outer Dia. in.	Weight with fitting oz.	Volume in3	Cup Fitting Thread Size
P35	03UA	1.67	0.85	0.4	NPSF 1/8"
P60	06UA	2.66	2.3	1.2	NPSF 1/8"
P100	10UA	4.23	8.6	3.4	G 1/2"
P200	20UA	8.46	41	33	G 3/4"
P300	30UA	12.4	82	78	G 3/4"

All suction cup measurements are at static position.

LIFTING POWER

Size	Perpendicular Lifting Power 6 -inHg	Perpendicular Lifting Power 18 -inHg	Perpendicular Lifting Power 27 -inHg	Parallel (Shear) Lifting Power 6 -inHg	Parallel (Shear) Lifting Power 18 -inHg	Parallel (Shear) Lifting Power 27 -inHg	Minimum Curve Radius in.	Maximum Vertical Movement in.
P35	4.5	11	15	–	–	–	–	0.12
P60	13	33	49	–	–	–	–	0.12
P100	40	101	148	–	–	–	–	0.12
P200	160	420	600	–	–	–	–	0.20
P300	360	960	1400	–	–	–	–	0.20

Vacuum = -inHg, Lifting Power = lbf, Maximum measured values are given. Always use a safety factor of >2.

ORDERING INFORMATION

P35 - P300

Size	Material & Part Number Ethylene Propylene EPDM		
	profile only	w/fitting	wi/adj. support
P35	P35.50	P35.50.03UA	P35.50.03US
P60	P60.50	P60.50.06UA	P60.50.06US
P100	P100.50	P100.50.10UA	P100.50.10US
P200	P200.50	P200.50.20UA	–
P300	P300.50	P300.50.30UA	–

Explanation of Suction Cup Part Number:
The part number is split into three parts.
Size. Material. Fitting.
i.e. P35.50.30UA = P35 size cup in EPDM material with NPSF 1/8" female fitting.
See Page 83.

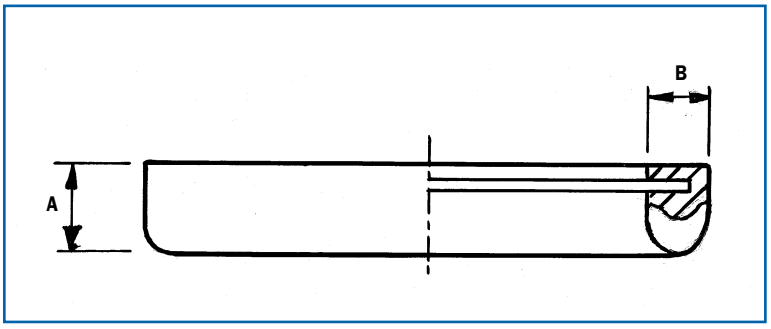
DIMENSIONAL DRAWINGS

P35 - P300 profile

Model	A Height	B Width
P35	0.41	0.30
P60	0.41	0.30
P100	0.41	0.30
P200	1.04	0.59
P300	1.04	0.59

Note: All dimensions are in inches unless otherwise noted.

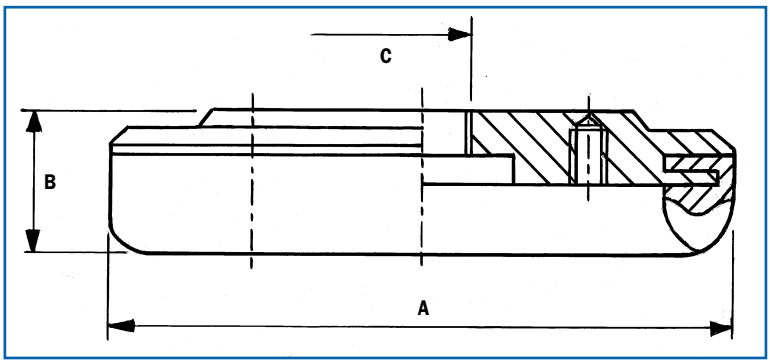
P35 - P300 profile



P35 - P100 with fitting

Model	Fitting Part No.	A Outer Dia.	B Height	C
P35	03UA	1.67	0.61	NPSF 1/8"
P60	06UA	2.66	0.61	NPSF 1/8"
P100	10UA	4.23	0.77	G 1/2"

P35 - P100 with fitting

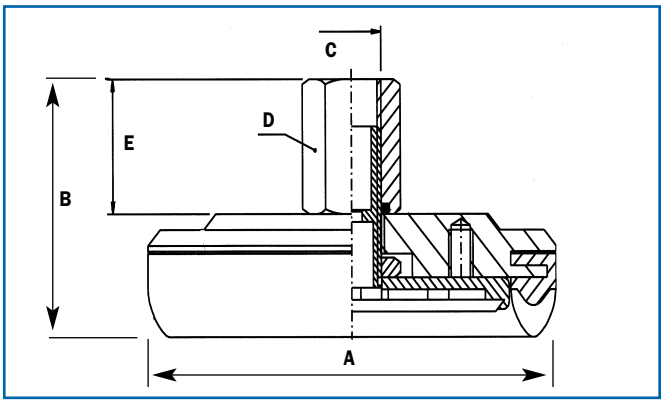


P35 - P100 with adjustable support fitting

Model	Fitting Part No.	A Outer Dia.	B Height	C	D	E
P35	03US	1.67	1.28	NPSF 1/8"	SW 14	0.67
P60	06US	2.66	1.28	NPSF 1/8"	SW 14	0.67
P100	10US	4.23	2.03	G 1/2"	SW 30	1.26

Use the adjustable support when picking up thin material such as film and paper. The support is also suitable for applications requiring accurate positioning.

P35 - P100 with adjustable support fitting

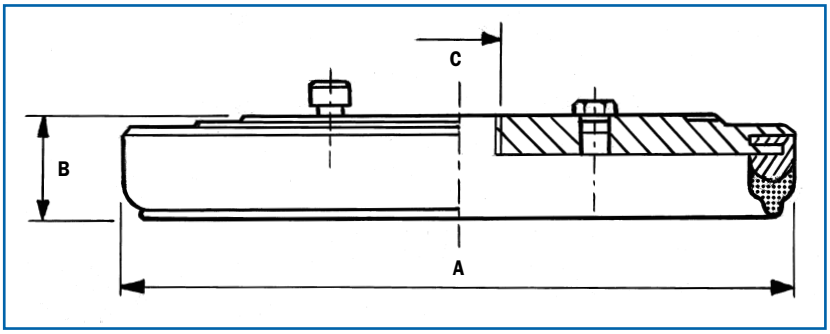


P200 - P300 with fitting

Model	Fitting Part No.	A Outer Dia.	B Height	C
P200	20UA	8.46	1.34	G 3/4"
P300	30UA	12.4	1.34	G 3/4"

Note: All dimensions are in inches unless otherwise noted.

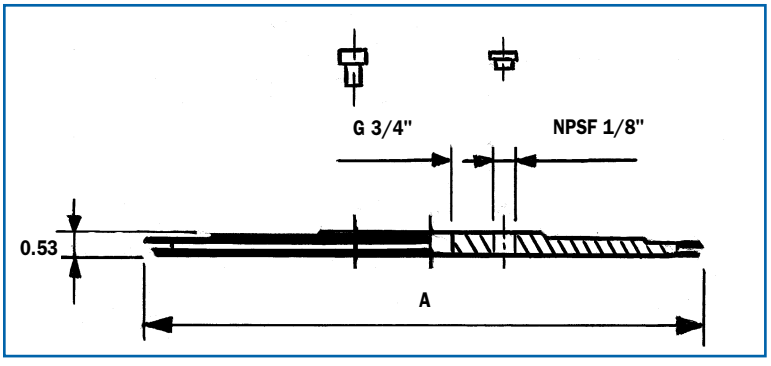
P200 - P300 with fitting

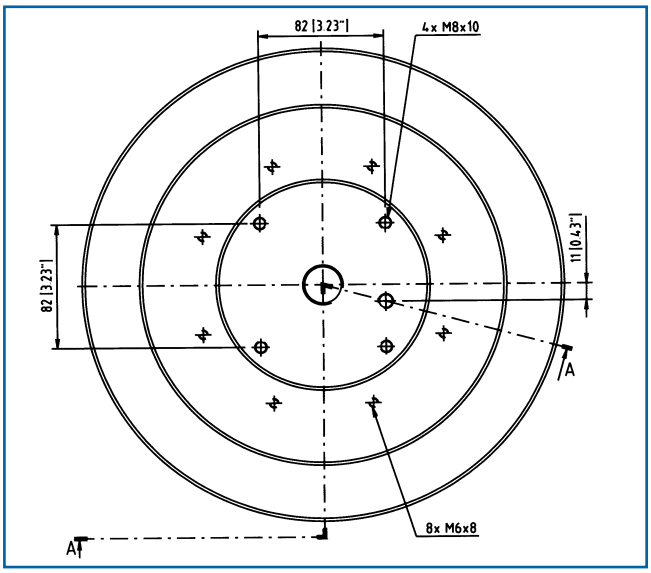


P200 - P300 fitting

Model	A
P200	8.46
P300	12.4

P200 - P300 fitting





MODEL P CUP FITTINGS

Fits Cup Sizes	Part No.	Description	Weight oz.	Materials	Working Temp.
P35	03UA	Fitting NPSF 1/8" female	0.035	Aluminum	-40F - +230F
	03US	Fitting NPSF 1/8" with Adjustable Support	0.388	Al/Brass/PE	-40F - +176F
P60	06UA	Fitting NPSF 1/8" female	0.035	Aluminum	-40F - +230F
	06US	Fitting NPSF 1/8" with Adjustable Support	0.741	Al/Brass/PE	-40F - +176F
P100	10UA	Fitting G 1/2" female	0.035	Aluminum	-40F - +230F
	10US	Fitting G 1/2" with Adjustable Support	3.56	Al/Brass/PE	-40F - +176F
P200	20UA	Fitting G 3/4" female	35.3	Aluminum	-40F - +230F
P300	30UA	Fitting G 3/4" female	74.4	Aluminum	-40F - +230F

MODEL P SUCTION CUP ACCESSORIES

Fits Cup Sizes	Part No.	Description	Weight oz.	Materials	Working Temp.
P35/P60	31.50.053U	Angle Adaptor G 1/8" - G 1/8" male	0.71	Brass	-40F - +230F
P100	31.50.054U	Angle Adaptor G 1/2" - G 1/2" male	3.9	Steel	-40F - +230F
P35/P60	33.50.065	Ball Joint G 1/8" male	0.71	Steel/Therban®	-40F - +230F
P100	33.50.066	Ball Joint G 1/2" male	3.9	Steel/Therban®	-40F - +230F
P35/P60	33.50.069	Level Compensator G 1/8" male	2.6	Brass	-40F - +230F
P100	33.50.071	Level Compensator NPSM 1/2" male	5.6	Steel	-40F - +230F
P200/P300	33.50.067	Ball Joint G 3/4" male	7.1	Steel/Therban®	-40F - +230F

Note: 33.50.067 Ball Joint G 3/4" can only lift 330 lb.

See pages 114-115 for dimensional information.

Model FP
Flat Profile Suction Cup

MATERIAL PROPERTIES

Material	Color	Material Code for Part No.	Working Temperature	Wear Resistance	Oil Resistance	Weather & Ozone Resistance
Polyurethane PUR 65°	Clear yellow/white	45	+32 F to +176 F	Excellent	Excellent	Excellent

DIMENSIONAL DATA

Size	Cup Fitting Part Number	Outer Dia. in.	Weight with fitting oz.	Volume in3	Cup Fitting Thread Size
FP200	20UA	9.37	41	33	G 3/4"
FP300	30UA	13.66	87	78	G 3/4"

All suction cup measurements are at static position.

LIFTING POWER

Size	Perpendicular Lifting Power 6 -inHg	Perpendicular Lifting Power 18 -inHg	Perpendicular Lifting Power 27 -inHg	Parallel (Shear) Lifting Power 6 -inHg	Parallel (Shear) Lifting Power 18 -inHg	Parallel (Shear) Lifting Power 27 -inHg	Minimum Curve Radius in.	Maximum Vertical Movement in.
FP200	160	420	600	–	–	–	–	0.25
FP300	360	960	1400	–	–	–	–	0.25

Vacuum = -inHg, Lifting Power = lbf, Maximum measured values are given. Always use a safety factor of >2.

ORDERING INFORMATION

FP200 - FP300

Size	Material & Part Number Polyurethane PUR	
	profile only	with fitting
FP200	FP200.45	FP200.45.20UA
FP300	FP300.45	FP300.45.30UA

Explanation of Suction Cup Part Number:
The part number is split into three parts.
Size. Material. Fitting.
i.e. FP200.45.20UA = FP200 size cup in polyurethane material with G 3/4" female fitting.
See Page 83.

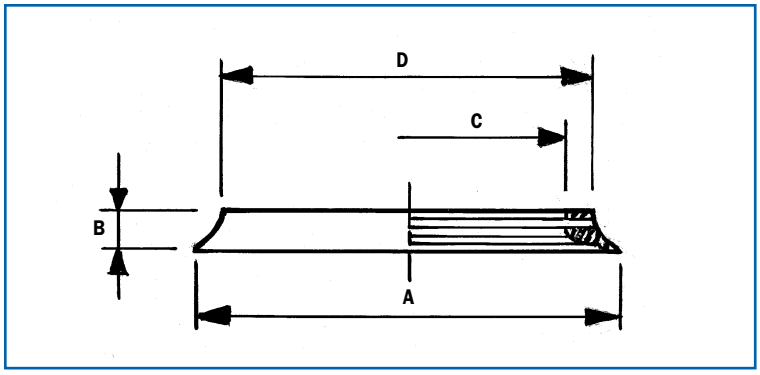
DIMENSIONAL DRAWINGS

FP200 - FP300 profile

Model	A Outer Dia.	B Height	C	D
FP200	8.86	0.79	6.5	7.68
FP300	13.19	0.94	10.24	11.42

Note: All dimensions are in inches unless otherwise noted.

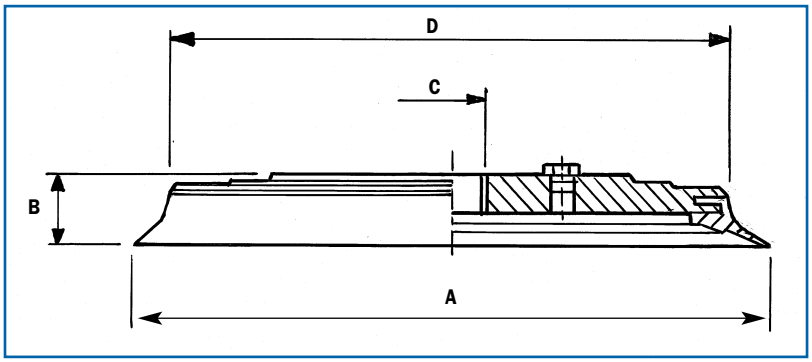
FP200 - FP300 profile



FP200 - FP300 with fitting

Model	Fitting Part No.	A Outer Dia.	B Height	C	D
FP200	20UA	9.37	1.06	G 3/4"	8.46
FP300	30UA	13.66	1.22	G 3/4"	12.40

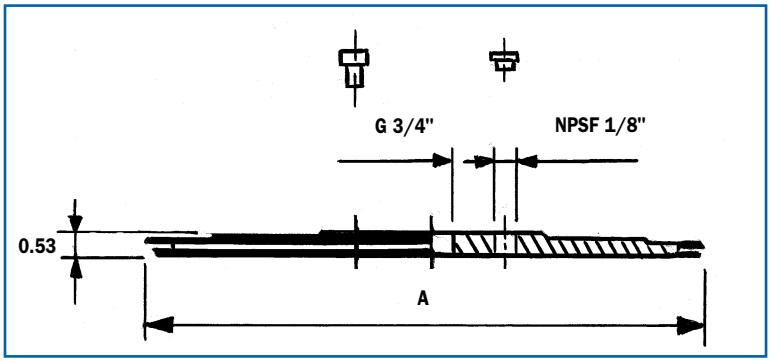
FP200 - FP300 with fitting

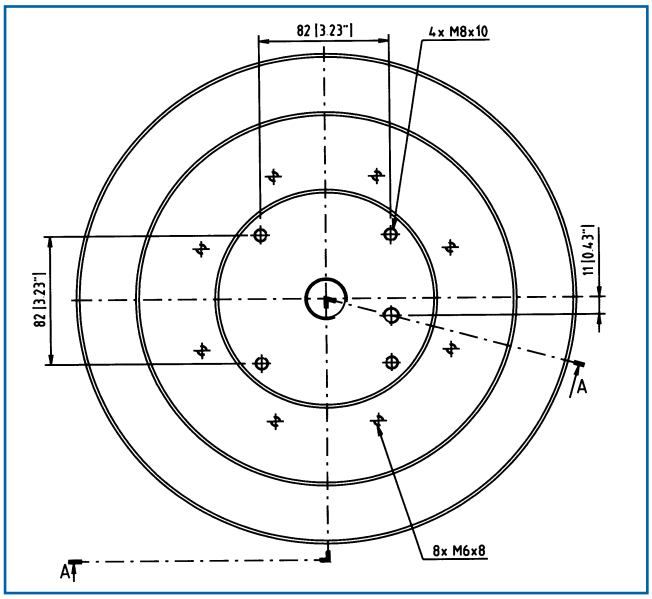


FP200 - FP300 fitting

Model	A
P200	8.46
P300	12.4

FP200 - FP300 fitting





Note: All dimensions are in inches unless otherwise noted.

MODEL FP CUP FITTINGS

Fits Cup Sizes	Part No.	Description	Weight oz.	Materials	Working Temp.
FP200	20UA	Fitting G 3/4" female	35.3	Aluminum	-40F - +230F
FP300	30UA	Fitting G 3/4" female	74.4	Aluminum	-40F - +230F

MODEL FP SUCTION CUP ACCESSORY

Fits Cup Sizes	Part No.	Description	Weight oz.	Materials	Working Temp.
FP200/FP300	33.50.067	Ball Joint G 3/4" male	7.1	Steel/Therban®	-40F - +230F

Note: 33.50.067 Ball Joint G 3/4" can only lift 330 lb.

See page 114 for dimensional information.

Model OP

Oval Suction Cup with Rubber Profile

MATERIAL PROPERTIES

Material	Color	Material Code for Part No.	Working Temperature	Wear Resistance	Oil Resistance	Weather & Ozone Resistance
Ethylene Propylene EPDM	Gray or Black	50	-40 F to +212 F	Very Good	Unsuitable	Excellent

DIMENSIONAL DATA

Size	Cup Fitting Part Number	Length x Width in.	Weight with fitting oz.	Volume in3	Cup Fitting Thread Size
OP 20x100	21UA	4.37x1.22	3.2	0.85	NPSF 1/8"
OP 40x200	42UA	8.31x2.01	12	3.4	G 1/2"

All suction cup measurements are at static position.

LIFTING POWER

Size	Perpendicular Lifting Power 6 -inHg	Perpendicular Lifting Power 18 -inHg	Perpendicular Lifting Power 27 -inHg	Parallel (Shear) Lifting Power 6 -inHg	Parallel (Shear) Lifting Power 18 -inHg	Parallel (Shear) Lifting Power 27 -inHg	Minimum Curve Radius in.	Maximum Vertical Movement in.
OP 20x100	5.6	18	24	–	–	–	–	0.06
OP 40x200	22	72	99	–	–	–	–	0.10

Vacuum = -inHg, Lifting Power = lbf, Maximum measured values are given. Always use a safety factor of >2.

ORDERING INFORMATION

OP 20x100 - OP 40x200

Size	Material & Part Number Ethylene Propylene Rubber EPDM	
	profile only	with fitting
OP 20x100	OP20x100.50	OP20x100.50.21UA
OP 40x200	OP40x200.50	OP40x200.50.42UA

Explanation of Suction Cup Part Number:
The part number is split into three parts.
Size. Material. Fitting.
i.e. OP20x100.50.21UA = OP20x100 size cup in EPDM material with NPSF 1/8" female fitting.
See Page 83.

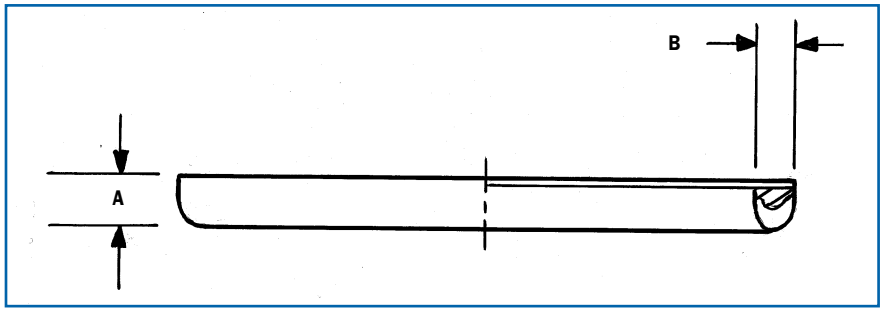
DIMENSIONAL DRAWINGS

OP 20x100 - OP 40x200 profile

Model	A Height	B Width
OP 20x100	0.41	0.30
OP 40x200	0.41	0.30

Note: All dimensions are in inches unless otherwise noted.

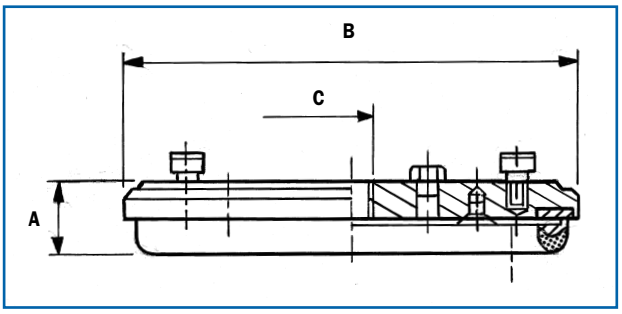
OP 20x100 - OP 40x200 profile



OP 20x100 - OP 40x200 with fitting

Model	Fitting Part No.	A Height	B Length	C
OP 20x100	21UA	0.71	4.37	NPSF 1/8"
OP 40x200	42UA	0.83	8.31	G 1/2"

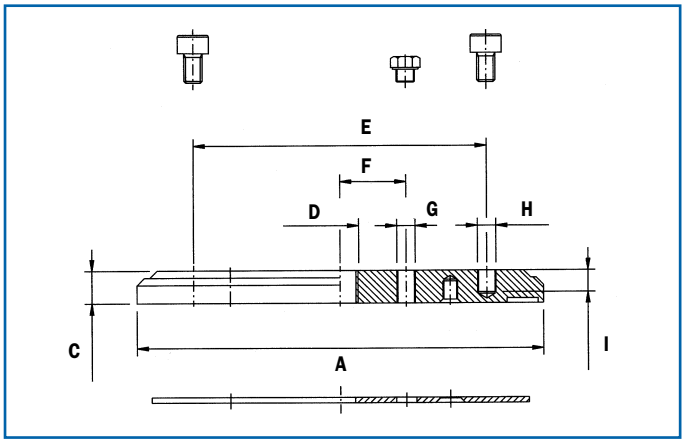
OP 20x100 - OP 40x200 with fitting

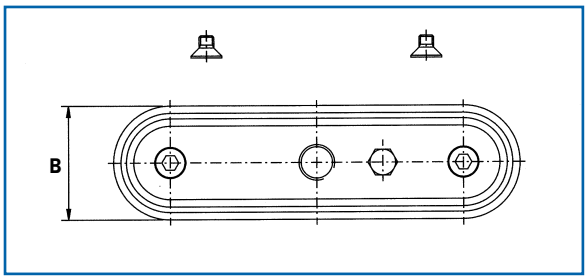


OP 20x100 - OP 40x200 fitting

Model	A	B	C	D	E	F	G	H	I
OP 20x100	4.37	1.22	0.35	NPSF 1/8"	3.15	0.71	M5	2xM5	0.24
OP 40x200	8.31	2.01	0.47	G 1/2"	6.30	0.98	NPSF 1/8"	2xM6	0.31

OP 20x100 - OP 40x200 fitting





Note: All dimensions are in inches unless otherwise noted.

MODEL OP CUP FITTINGS

Fits Cup Sizes	Part No.	Description	Weight oz.	Materials	Working Temp.
OP 20x100	21UA	Fitting NPSF 1/8" female	2.82	Aluminum	-40F - +230F
OP 40x200	42UA	Fitting G 1/2" female	9.17	Aluminum	-40F - +230F

MODEL OP SUCTION CUP ACCESSORIES

Fits Cup Sizes	Part No.	Description	Weight oz.	Materials	Working Temp.
OP 20x100	31.50.053U	Angle Adaptor G 1/8" - G 1/8" male	0.71	Brass	-40F - +230F
OP 40x200	31.50.054U	Angle Adaptor G 1/2" - G 1/2" male	3.9	Steel	-40F - +230F
OP 20x100	33.50.065	Ball Joint G 1/8" male	0.71	Steel/Therban®	-40F - +230F
OP 40x200	33.50.066	Ball Joint G 1/2" male	3.9	Steel/Therban®	-40F - +230F
OP 20x100	33.50.069	Level Compensator G 1/8" male	2.6	Steel/Brass	-40F - +230F
OP 40x200	33.50.071	Level Compensator NPSM 1/2" male	5.6	Steel	-40F - +230F

See pages 114-115 for dimensional information.

Model OC
Oval, Concave Suction Cup

MATERIAL PROPERTIES

Material	Color	Working Temperature	Wear Resistance	Oil Resistance	Weather & Ozone Resistance
Duro-Buna DB	Black	-22 F to +194 F	Very Good	Excellent	Good

DIMENSIONAL DATA

Size	Length x Width in.	Weight with fitting oz.	Volume in3	Cup Fitting Thread Size
OC 60x140	5.4x2.4	5.9	3.2	NPT 3/8"

All suction cup measurements are at static position.

LIFTING POWER

Size	Perpendicular Lifting Power 6 -inHg	Perpendicular Lifting Power 18 -inHg	Perpendicular Lifting Power 27 -inHg	Parallel (Shear) Lifting Power 6 -inHg	Parallel (Shear) Lifting Power 18 -inHg	Parallel (Shear) Lifting Power 27 -inHg	Minimum Curve Radius in.	Maximum Vertical Movement in.
OC 60x140	29	83	117	41.0	83	114	7.9	0.29

Vacuum = -inHg, Lifting Power = lbf, Maximum measured values are given. Always use a safety factor of >2.

ORDERING INFORMATION

OC 60x140

Size	Material & Part Number Duro-Buna DB	
	standard lip	w/flexible lip
OC 60x140	OC60x140.35.61UA	OC60x140.35.61UB

Explanation of Suction Cup Part Number:
The part number is split into three parts. Size. Material. Fitting i.e. OC60x140.35.61UB = OC60x140 size cup in duro-buna material with NPT 3/8" female fitting. *See Page 83.*

There are other 'OC' style cups available in the Duraflex™ material. See pages 84-85.

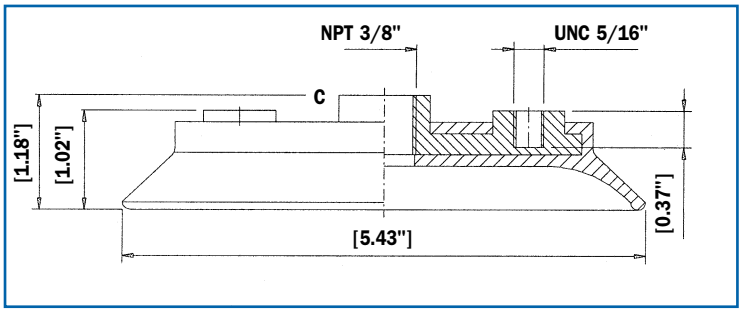
MODEL OC SUCTION CUP ACCESSORIES

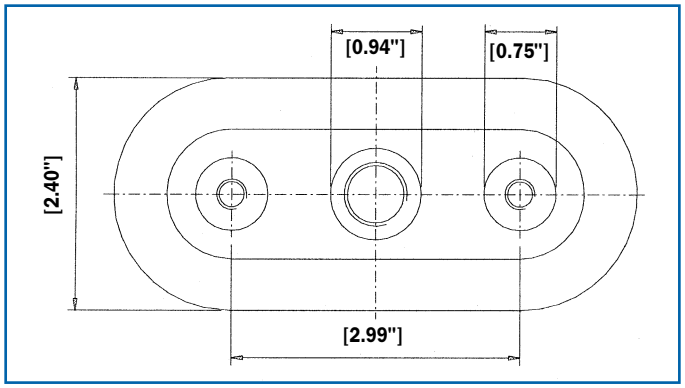
Fits Cup Sizes	Part No.	Description	Weight oz.	Materials	Working Temp.
OC 60x140	33.00.A02	Ball Joint NPT 3/8" male	4.8	Steel/Therban®	-40F - +230F
OC 60x140	33.00.A09	Level Compensator NPT 3/8" male	7.5	Steel	-40F - +230F

See pages 114-115 for dimensional information.

DIMENSIONAL DRAWINGS

OC 60x140





Accessories/Suction Cup Fittings

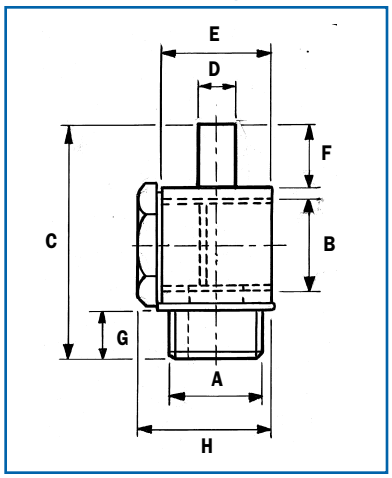
ANGLE ADAPTORS 31.50.053U - 31.50.054U

Part No.	A	B	C	D	E	F	G	H
31.50.053U	G 1/8"	NPSF 1/8"	1.34	5/16-18 UNC	0.55	0.51	0.24	0.69
31.50.054U	G 1/2"	G 1/2"	2.05	5/16-18 UNC	0.98	0.55	0.41	1.18

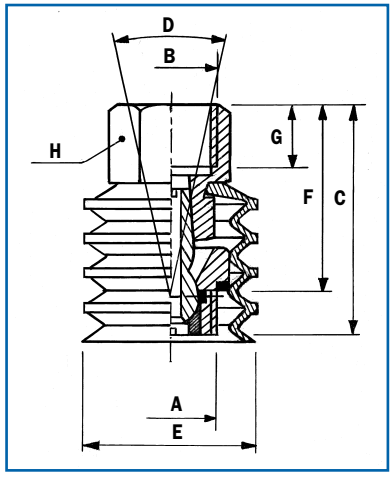
BALL JOINTS 33.00.A02 - 33.50.067

Part No.	A	B	C	D	E	F	G	H
33.00.A02	NPT 3/8"	NPT 3/8"	2.26	24°	1.57	1.76	0.54	1" hex
33.50.065*	G 1/8"	NPSF 1/8"	1.28	24°	0.79	1.06	0.28	SW 12 (2x)
33.50.066	G 1/2"	G 1/2"	2.13	24°	1.57	1.73	0.59	SW 24 (2x)
33.50.067	G 3/4"	G 3/4"	2.48	24°	1.97	1.97	0.63	SW 30 (2x)

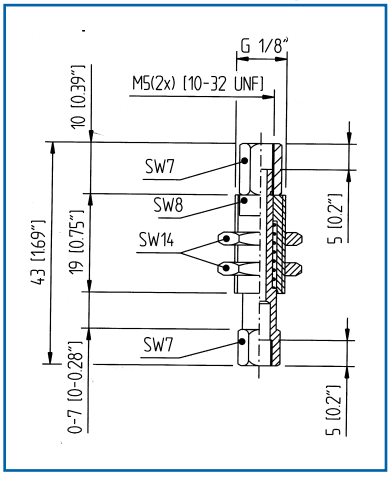
ANGLE ADAPTORS
Part No. 31.50.053U/31.50.054U



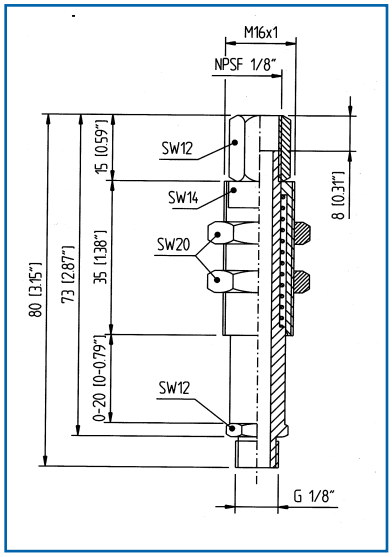
BALL JOINTS
Part No. 33.00.A02 - 33.50.067



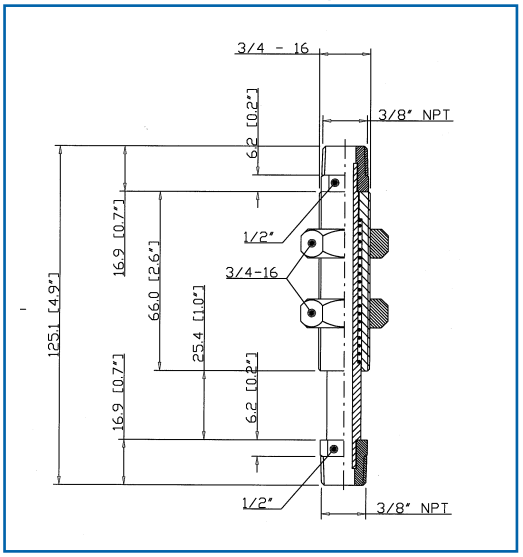
LEVEL COMPENSATOR
Part No. 33.50.068 M5 (10-32UNF)



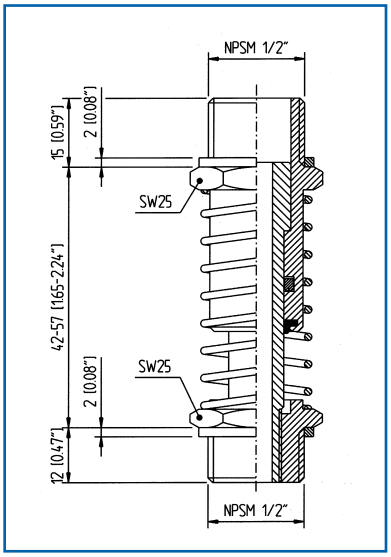
LEVEL COMPENSATOR*
Part No. 33.50.069 G 1/8"



LEVEL COMPENSATOR
Part No. 33.00.A09 NPT 3/8"



LEVEL COMPENSATOR
Part No. 33.50.071 NPSM 1/2"

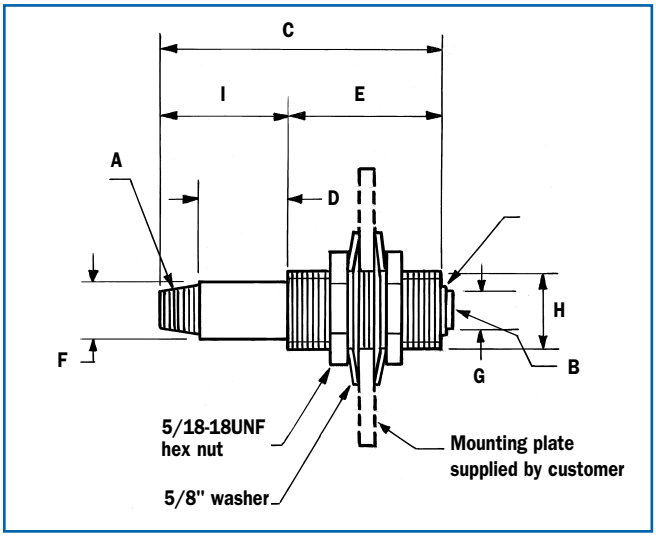


Note: All dimensions are in inches unless otherwise noted. *Adaptor available for NPSF 1/8" female thread. Part no. 33.50.136

LEVEL COMPENSATORS A101IPB/A102EPB

Model	A	B	C	D Travel	E	F	G	H	I
A101IPB	1/8" NPT female	10-32 UNF	2.35	0-.81	1.42	0.47	0.31	0.62	1.22
A102EPB	1/8" NPT male	10-32 UNF	2.64	0-.81	1.42	0.47	0.31	0.62	1.22

A101IPB/A102EPB



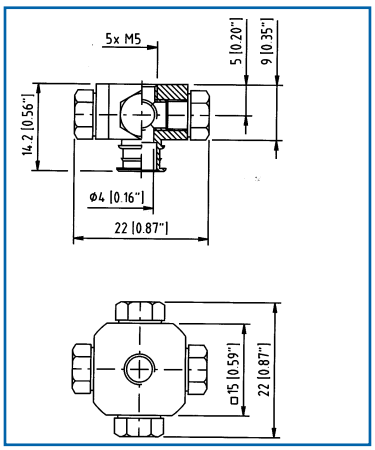
SUCTION CUP ACCESSORIES

Fits Cup Sizes	Part No.	Description	Maximum Load lb.	Materials	Weight oz.	Working Temp.
20-30*	02AE	Angle Adaptor 5xM5 female	–	Aluminum	0.35	-40F - +230F
40**	04AF	Angle Adaptor 5xNPSF 1/8" female	–	Aluminum	0.75	-40F - +230F
50	05AF	Angle Adaptor 5xNPSF 1/8" female	–	Aluminum	1.16	-40F - +230F
75	31.50.053U	Angle Adaptor NPSF 1/8"-G 1/8" male	–	Steel	0.71	-40F - +230F
75-150	31.50.054U	Angle Adaptor NPSF 1/2"-G 1/2" male	–	Steel	3.9	-40F - +230F
75	33.00.A02	Ball Joint NPT 3/8" male	110	Steel/Therban®	4.8	-40F - +230F
40**-75	33.50.065	Ball Joint G 1/8" male	55	Steel/Therban®	0.71	-40F - +230F
75-150	33.50.066	Ball Joint G 1/2" male	110	Steel/Therban®	3.9	-40F - +230F
200-300	33.50.067	Ball Joint G 3/4" male	330	Steel/Therban®	7.1	-40F - +230F
5-30*	33.50.068	Level Compensator M5 (10-32UNF) female	6.6	Steel/Brass	0.35	-40F - +230F
20-75	33.50.069	Level Compensator G 1/8" male	55	Steel/Brass	2.6	-40F - +230F
75	33.00.A09	Level Compensator NPT 3/8" male	110	Steel	7.5	-40F - +230F
75-150	33.50.071	Level Compensator NPS 1/2" male	110	Steel	5.6	-40F - +230F
20-30*	A101IPB	Level Compensator NPT 1/8" female	n/a	Al/Brass/Delrin/Steel	1.3	-40F - +230F
40**-75	A102EPB	Level Compensator NPT 1/8" male	n/a	Al/Brass/Delrin/Steel	1.3	-40F - +230F
J10-J20	A100J	Level Compensator 10-32 UNF	n/a	Al/Brass/Delrin/Steel	4.2	-40F - +230F

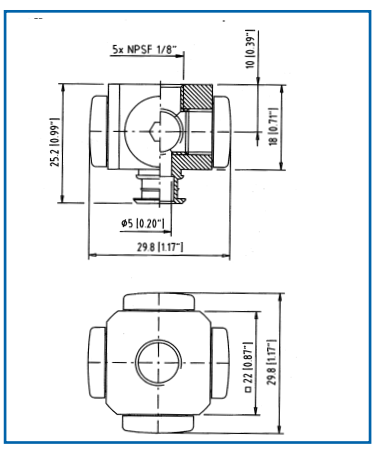
* Excl. B30-2, B30MF and BL30-2 **Incl. B30-2, B30MF and BL30-2 Note: The Ball Joint and Level Compensator should not be used in shear force applications.

See page 114 for dimensional information.

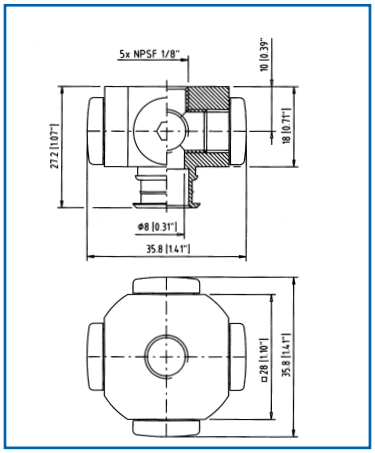
02AE ANGLE ADAPTOR 5xM5



04AF ANGLE ADAPTOR 5xNPSF 1/8"



05AF ANGLE ADAPTOR 5xNPSF 1/8"



SUCTION CUP FITTINGS

Fits Cup Sizes	Part No.	Description	Weight oz.	Materials	Working Temp.
2-3	01AA	M2.5 (3-56UNF) male fitting	0.018	Brass/Nitrile	-40F-+230F
4-8	01AB	M2.5 (3-56UNF) male fitting	0.06	Brass/Nylon	-40F-+230F
10/15	01AC	M5 (10-32UNF) male fitting	0.08	Brass/Nylon	-40F-+230F
20-30*	02AA	1-piece M5 (10-32UNF) female fitting	0.088	Aluminum	-40F-+230F
20-30*	02AB	1-piece G 1/8" male fitting w/filter screen	0.106	Aluminum/SS	-40F-+230F
20-30*	02AC	1-piece NPT 1/8" male fitting w/filter screen	0.106	Aluminum/SS	-40F-+230F
20-30*	02AD	1-piece G 1/8"/M5 (10-32UNF) male/fem. fitting	0.071	Aluminum	-40F-+230F
20-30*	02AE	Angle Adaptor 5xM5 (10-32UNF) female fitting	0.353	Aluminum	-40F-+230F
20-30*	02AF	1-piece G 1/8"/M5 (10-32UNF) male/fem. fitting w/filter screen	0.071	Aluminum/SS	-40F-+230F
20-30*	02DA	1-piece M5 (10-32UNF) female fitting w/ dual flow control valve	0.088	Aluminum/PUR	-40F-+230F
20-30*	02DB	1-piece G 1/8" male fitting w/ dual flow control valve	0.106	Aluminum/PUR	-40F-+230F
20-30*	02DC	1-piece NPT 1/8" male fitting w/ dual flow control valve	0.106	Aluminum/PUR	-40F-+230F
20-30*	02DD	1-piece G 1/8" M5 (10-32UNF) male/fem. fitting w/ dual flow control valve	0.071	Aluminum/PUR	-40F-+230F
20-30*	02DE	Angle Adaptor 5xM5 (10-32UNF) female fitting w/ dual flow control valve	0.353	Aluminum/PUR	-40F-+230F
F30-2 cone valve	02UV	3-piece G 1/8"/M5 (10-32UNF) male/fem. fitting w/ cone valve	0.088	Aluminum/SS	-40F-+230F
20-30*	31.50.196	1-piece G 1/8"/M5 (10-32UNF) male/fem. fitting	0.064	PPS	-40F-+230F
20-30*	31.50.097	3-piece G 1/8"/M5 (10-32UNF) male/fem. fitting w/ filter screen	0.112	Aluminum/SS	-40F-+230F
40**	04AA	1-piece NPSF 1/8" female fitting	0.194	Aluminum	-40F-+230F
40**	04AB	1-piece G 1/4" male fitting w/ filter screen	0.247	Aluminum/SS	-40F-+230F
40**	04AC	1-piece NPT 1/4" male fitting w/ filter screen	0.247	Aluminum/SS	-40F-+230F
40**	04AD	1-piece G 3/8" male fitting w/filter screen	0.370	Aluminum/SS	-40F-+230F
40**	04AE	1-piece NPT 3/8" male fitting w/filter screen	0.370	Aluminum/SS	-40F-+230F
40**	04AF	Angle Adaptor 5xNPSF 1/8" female fitting	0.758	Aluminum	-40F-+230F
40**	04AG	1-piece NPSF 1/8" female fitting w/filter screen	0.194	Aluminum/SS	-40F-+230F
40**	04DA	1-piece NPSF 1/8" female fitting w/ dual flow control valve	0.194	Aluminum/PUR	-40F-+230F
40**	04DB	1-piece G 1/4" male fitting w/ dual flow control valve	0.247	Aluminum/PUR	-40F-+230F
40**	04DC	1-piece NPT 11/4" male fitting w/dual flow control valve	0.247	Aluminum/PUR	-40F-+230F
40**	04DD	1-piece G 3/8" male fitting w/ dual flow control valve	0.370	Aluminum/PUR	-40F-+230F
40**	04DE	1-piece NPT 3/8" male fitting w/ dual flow control valve	0.370	Aluminum/PUR	-40F-+230F
40**	04DF	Angle Adaptor 5xNPSF 1/8" female fitting w/ dual flow control valve	0.758	Aluminum/PUR	-40F-+230F
F40-2 cone valve	04UV	3-piece NPSF 1/8" fitting w/ cone valve	0.194	Aluminum/SS	-40F-+230F
40**	31.50.197	1-piece NPSF 1/8" female fitting	0.080	PPS	-40F-+230F
40**	32.50.001	3-piece NPSF 1/8" female fitting w/filter screen	0.208	Aluminum/SS	-40F-+230F
*Excl. B30-2, B30MF and BL30-2 **Incl. B30-2, B30MF, BL30-2 and FC35P					
50	05AA	1-piece NPSF 1/8" female fitting	0.406	Aluminum	-40F-+230F
50	05AB	1-piece G 1/4" male fitting w/ filter screen	0.423	Aluminum/SS	-40F-+230F
50	05AC	1-piece NPT 1/4" male fitting w/ filter screen	0.423	Aluminum/SS	-40F-+230F
50	05AD	1-piece G 3/8" male fitting w/ filter screen	0.476	Aluminum/SS	-40F-+230F
50	05AE	1-piece NPT 3/8" male fitting w/filter screen	0.476	Aluminum/SS	-40F-+230F
50	05AF	Angle Adaptor 5xNPSF 1/8" female fitting	1.16	Aluminum	-40F-+230F
50	05AG	1-piece NPSF 1/8" female fitting w/filter	0.406	Aluminum/SS	-40F-+230F

SUCTION CUP FITTINGS (cont.)

Fits Cup Sizes	Part No.	Description	Weight oz.	Materials	Working Temp.
50	05DA	1-piece NPSF 1/8″ female fitting w/ dual flow control valve	0.406	Aluminum/PUR	-40F-+230F
50	05DB	1-piece G 1/4″ male fitting w/ dual flow control valve	0.423	Aluminum/PUR	-40F-+230F
50	05DC	1-piece NPT 1/4″ male fitting w/ dual flow control valve	0.423	Aluminum/PUR	-40F-+230F
50	05DD	1-piece G 3/8″ male fitting w/ dual flow control valve	0.476	Aluminum/PUR	-40F-+230F
50	05DE	1-piece NPT 3/8″ male fitting w/ dual flow control valve	0.476	Aluminum/PUR	-40F-+230F
50	05DF	Angle Adaptor 5xNPSF 1/8″ female w/ dual flow control valve	1.16	Aluminum/PUR	-40F-+230F
F50-2 cone valve	05UV	3-piece NPSF 1/8″ female fitting w/ cone valve	0.388	Aluminum/SS	-40F-+230F
50	31.50.198	1-piece NPSF 1/8″ female fitting	0.192	PPS	-40F-+230F
50	32.50.002	3-piece NPSF 1/8″ female fitting w/filter screen	0.448	Aluminum/SS	-40F-+230F
75	07UA	NPSF 1/8″ female fitting w/filter screen	1.99	Aluminum/SS	-40F-+230F
75	07UB	NPSF 3/8″ female fitting w/filter screen	2.56	Aluminum/SS	-40F-+230F
75	07UC	G 3/8″ female fitting w/filter screen	1.41	PPS/SS/Al	-40F-+230F
75	07UD	G 1/2″ female fitting w/filter screen	2.43	Aluminum/SS	-40F-+230F
75	07UE	G 1/2″ female fitting w/filter screen	1.20	PPS/SS/Al	-40F-+230F
75	07UH	NPT 1/4″ female fitting w/M5 (10-32UNF) female addl vac. conn.	2.71	Al/SS/Brass	-40F-+230F
75	07UI	NPSF 1/8″ female fitting w/M5 (10-32UNF) female addl vac. conn.	2.05	Al/SS/Brass	-40F-+230F
75	07UU	NPSF 3/8″ female fitting w/filter screen	1.41	PPS/SS/Al	-40F-+230F
F75 cone valve	07UV	G 1/2″ female fitting w/cone valve	1.45	Aluminum/SS	-40F-+230F
F75 cone valve	07XV	NPSF 1/8″ female fitting w/ M5 (10-32UNF) female blow-off port w/cone valve	2.69	Al/SS/Brass	-40F-+230F
F75 cone valve	07VD	Clamp Ring G 3/8″ female fitting w/cone valve	2.66	Aluminum/SS	-40F-+230F
F75 cone valve	07VE	Clamp Ring NPSF 3/8″ female fitting w/cone valve	2.66	Aluminum/SS	-40F-+230F
F75 cone valve	07VF	Clamp Ring G 1/2″ female fitting w/cone valve	2.49	Aluminum/SS	-40F-+230F
75/FC100(P)	07NA	Clamp Ring NPSF 1/8″ female fitting w/filter screen	2.50	Aluminum/SS	-40F-+230F
75/FC100(P)	07ND	Clamp Ring G 3/8″ female fitting w/filter screen	2.43	Aluminum/SS	-40F-+230F
75/FC100(P)	07NE	Clamp Ring NPSF 3/8″ female fitting w/filter screen	2.46	Aluminum/SS	-40F-+230F
75/FC100(P)	07NF	Clamp Ring G 1/2″ female fitting w/filter screen	2.29	Aluminum/SS	-40F-+230F
110	11UA	G 1/2″ female fitting w/1/8″ female addl. vac. conn.	4.81	Aluminum/SS	-40F-+230F
F110 cone valve	11UV	G 1/2″ female fitting w/ cone valve w/1/8″ female addl. vac. conn.	7.00	Aluminum/SS	-40F-+230F
F110 cone valve	11VC	Clamp Ring G 1/2″ female fitting w/cone valve w/1/8" female addl. vac. conn.	10.3	Aluminum/SS	-40F-+230F
110/FC150P	11NA	Clamp Ring G 3/8″ female fitting w/1/8″ female addl. vac. conn.	8.54	Aluminum/SS	-40F-+230F
110/FC150P	11NB	Clamp Ring NPSF 3/8″ female fitting w/1/8″ female addl. vac. conn.	8.62	Aluminum/SS	-40F-+230F
110/FC150P	11NC	Clamp Ring G 1/2″ female fitting w/filter screen w/1/8" female addl. vac. conn.	8.24	Aluminum/SS	-40F-+230F
150	15UA	G 1/2″ female fitting w/1/8″ female addl. vac. conn.	9.75	Aluminum/SS	-40F-+230F
150	15NA	Clamp Ring G 1/2″ female fitting w/1/8″ female addl. vac. conn.	12.5	Aluminum/SS	-40F-+230F
150	15NB	Clamp Ring G 3/4″ female fitting w/1/8″ female addl. vac. conn.	12.1	Aluminum/SS	-40F-+230F
F150 cone valve	15UV	G 1/2″ female fitting w/ cone valve 1/8″ female addl. vac. conn.	11.9	Aluminum/SS	-40F-+230F
F150 cone valve	15VA	Clamp Ring G 1/2″ female fitting w/cone valve w/1/8" female addl. vac. conn.	12.3	Aluminum/SS	-40F-+230F

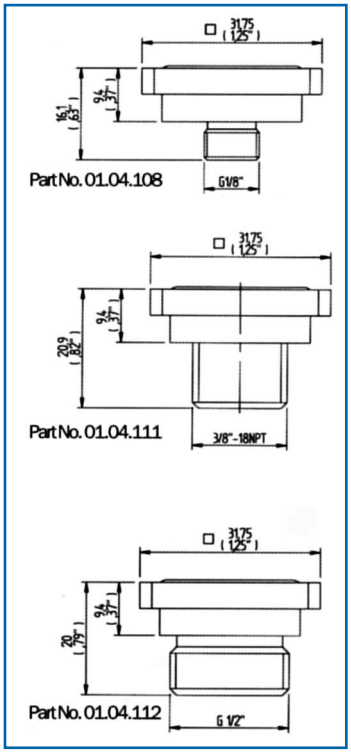
SUCTION CUP FITTINGS (cont.)

Fits Cup Sizes	Part No.	Description	Weight oz.	Materials	Working Temp.
P35	03UA	NPSF 1/8" female fitting	0.035	Aluminum	-40F-+230F
P60	06UA	NPSF 1/8" female fitting	0.035	Aluminum	-40F-+230F
P100	10UA	G 1/2" female fitting	0.035	Aluminum	-40F-+230F
P200/FP200	20UA	G 3/4" female fitting w/1/8" female addl. vac. conn.	35.3	Aluminum	-40F-+230F
P300/FP300	30UA	G 3/4" female fitting w/1/8" female addl. vac. conn.	74.4	Aluminum	-40F-+230F
P35/60 cone valve	03UV	NPSF 1/8" female fitting w/cone valve	0.317	Aluminum/SS	-40F-+230F
P100 cone valve	10UV	G 1/2" female fitting w/cone valve	2.24	Aluminum/SS	-40F-+230F
P35 adj. Support	03US	NPSF 1/8" female fitting w/adjustable support	0.388	Aluminum/Brass/PE	-40F-+176F
P60 adj. Support	06US	NPSF 1/8" female fitting w/adjustable support	0.741	Aluminum/Brass/PE	-40F-+176F
P100 adj. Support	10US	G 1/2" female fitting w/adjustable support	3.56	Aluminum/Brass/PE	-40F-+176F
OP20x100	21UA	NPSF 1/8" female fitting w/M5 (10-32UNF) female addl. vac. conn.	2.82	Aluminum	-40F-+230F
OP40x200	42UA	G 1/2" female fitting w/1/8" female addl. vac. conn.	9.17	Aluminum	-40F-+230F

T-SLOT ADAPTERS

Fits Cup Sizes	Part No.	Description	Weight oz.	Materials	Working Temp.
40**-75	01.04.108	G 1/8" male T-Slot Adapter	2.2	Aluminum/Nitrile	-40F-+176F
75-FC150	01.04.111	NPT 3/8" male T-Slot Adapter	2.2	Aluminum/Nitrile	-40F-+176F
75-150	01.04.112	G 1/2" male T-Slot Adapter	2.2	Aluminum/Nitrile	-40F-+176F
**Incl. B30-2, B30MF, BL30-2 and FC35P					

T-SLOT ADAPTERS



INDIVIDUAL PARTS FOR 3-PIECE 20-50 SIZE SUCTION CUP FITTINGS

For Fittng	Part Number	Description	Materials	Working Temp.
31.50.97	31.50.140	Locking Spacer 20-30	Aluminum	-40F-+230F
	31.50.141	Connection Plate 20-30	Aluminum	-40F-+230F
	31.50.163	Filter Screen 11x11mm	SS	-40F-+230F
02UV	31.50.141	Connection Plate 20-30	Aluminum	-40F-+230F
	31.50.055	Cone Valve 30	Aluminum/SS	-40F-+230F
32.50.001	31.50.142	Locking Spacer 30-2/40	Aluminum	-40F-+230F
	31.50.143	Connection Plate 30-2/40	Aluminum	-40F-+230F
	31.50.164	Filter Screen 15x15mm	SS	-40F-+230F
04UV	31.50.143	Connection Plate 30-2/40	Aluminum	-40F-+230F
	31.50.056	Cone Valve 30-2/40	Aluminum/SS	-40F-+230F
32.50.002	31.50.144	Locking Spacer 50	Aluminum	-40F-+230F
	31.50.145	Connection Plate 50	Aluminum	-40F-+230F
	31.50.165	Filter Screen 21x21mm	SS	-40F-+230F
05UV	31.50.145	Connection Plate 50	Aluminum	-40F-+230F
	31.50.057	Cone Valve 50	Aluminum/SS	-40F-+230F

INDIVIDUAL PARTS FOR 75 SIZE SUCTION CUP FITTINGS

For Fittng	Part Number	Description	Materials	Working Temp.
07UA	31.50.043	Connection Plate NPSF 1/8" female	Aluminum	-40F-+230F
	31.50.215	Filter Screen 25mm	SS	-40F-+230F
	31.13.752	Screw 4x	Aluminum	-40F-+230F

INDIVIDUAL PARTS FOR 75 SIZE SUCTION CUP FITTINGS (cont.)

For Fittng	Part Number	Description	Materials	Working Temp.
07UB	31.50.218U	Connection Plate NPSF 3/8" female	Aluminum	-40F-+230F
	31.50.215	Filter Screen 25mm	SS	-40F-+230F
	31.13.752	Screw (4x)	Aluminum	-40F-+230F
07UC	31.50.221	Connection Plate G 3/8" female	PPS	-4F-+176F
	31.50.215	Filter Screen 25mm	SS	-40F-+230F
	31.13.901	Screw (4x)	Aluminum	-40F-+230F
07UD	31.50.211	Connection Plate G 1/2" female	Aluminum	-40F-+230F
	31.50.215	Filter Screen 25mm	SS	-40F-+230F
	31.13.752	Screw (4x)	Aluminum	-40F-+230F
07UE	31.50.222	Connection Plate G 1/2" female	PPS	-4F-+176F
	31.50.215	Filter Screen 25mm	SS	-40F-+230F
	31.13.901	Screw (4x)	Aluminum	-40F-+230F
07UH	31.50.0431/4	Connection Plate NPT 1/4" female w/ M5 (10-32UNF) female addl. vac. conn.	Aluminum/Brass	-40F-+230F
	31.50.163	Filter Screen 11x11mm	SS	-40F-+230F
	31.50.215	Filter Screen 25mm	SS	-40F-+230F
	31.07.033	Plug 10-32	Aluminum	-40F-+230F
	31.13.752	Screw (4x)	Aluminum	-40F-+230F
07UI	31.50.043AL10/32	Connection Plate NPSF 1/8" female w/ M5 (10-32UNF) female addl. vac. conn.	Aluminum/Brass	-40F-+230F
	31.50.163	Filter Screen 11x11mm	SS	-40F-+230F
	31.50.215	Filter Screen 25mm	SS	-40F-+230F
	31.07.033	Plug 10-32	Aluminum	-40F-+230F
	31.13.752	Screw (4x)	Aluminum	-40F-+230F
07UU	31.50.221U	Connection Plate NPSF 3/8" female	PPS	-4F-+176F
	31.50.215	Filter Screen 25mm	SS	-40F-+230F
	31.13.901	Screw (4x)	Aluminum	-40F-+230F
07UV	31.50.222	Connection Plate G 1/2" female	PPS	-40F-+230F
	32.50.038	Cone Valve 1/2	SS	-40F-+230F
	31.13.752	Screw (4x)	Aluminum	-40F-+230F
07XV	31.50.043AL10/32	Connection Plate NPSF 1/8" female w/ M5 (10-32UNF) female addl. vac. conn.	Aluminum/Brass	-40F-+230F
	33.50.033	Cone Valve 35/60/75	SS	-40F-+230F
	31.07.033	Plug 10-32	Aluminum	-40F-+230F
	31.13.752	Screw (4x)	Aluminum	-40F-+230F

INDIVIDUAL PARTS FOR 75/FC100 SUCTION CUP FITTINGS

For Fittng	Part Number	Description	Materials	Working Temp.
07NA	01.03.009	Connection Plate NPSF 1/8" female	Aluminum	-40F-+230F
	01.02.943	Clamp Ring 75	Aluminum	-40F-+230F
	31.50.215	Filter Screen 25mm	SS	-40F-+230F
	01.02.995	Screw (2x)	Aluminum	-40F-+230F
07ND	01.03.011	Connection Plate G 3/8" female	Aluminum	-40F-+230F
	01.02.943	Clamp Ring 75	Aluminum	-40F-+230F
	31.50.215	Filter Screen 25mm	SS	-40F-+230F
	01.02.995	Screw (2x)	Aluminum	-40F-+230F
07NE	01.03.012	Connection Plate NPSF 3/8" female	Aluminum	-40F-+230F
	01.02.943	Clamp Ring 75	Aluminum	-40F-+230F
	31.50.215	Filter Screen 25mm	SS	-40F-+230F
	01.02.995	Screw (2x)	Aluminum	-40F-+230F
07NF	01.03.013	Connection Plate G 1/2" female	Aluminum	-40F-+230F
	01.02.943	Clamp Ring 75	Aluminum	-40F-+230F
	31.50.215	Filter Screen 25mm	SS	-40F-+230F
	01.02.995	Screw (2x)	Aluminum	-40F-+230F
07VD	01.03.011	Connection Plate G 3/8" female	Aluminum	-40F-+230F
	01.02.943	Clamp Ring 75	Aluminum	-40F-+230F
	01.00.729	Cone Valve	SS	-40F-+230F
	01.02.995	Screw (2x)	Aluminum	-40F-+230F
07VE	01.03.012	Connection Plate NPSF 3/8" female	Aluminum	-40F-+230F
	01.02.943	Clamp Ring 75	Aluminum	-40F-+230F
	01.00.729	Cone Valve	SS	-40F-+230F
	01.02.995	Screw (2x)	Aluminum	-40F-+230F
07VF	01.03.013	Connection Plate G 1/2" female	Aluminum	-40F-+230F
	01.02.943	Clamp Ring 75	Aluminum	-40F-+230F
	01.00.729	Cone Valve	SS	-40F-+230F
	01.02.995	Screw (2x)	Aluminum	-40F-+230F

INDIVIDUAL PARTS FOR 110 SUCTION CUP FITTINGS

For Fittng	Part Number	Description	Materials	Working Temp.
11UA	31.50.044	Connection Plate G 1/2" female w/ 1/8" female addl. vac. conn.	Aluminum	-40F-+230F
	31.50.167	Filter Screen 30mm	SS	-40F-+230F
	31.50.164	Filter Screen for extra connection 15x15mm	SS	-40F-+230F
	31.07.034	Plug 1/8"	Aluminum	-40F-+230F
	31.13.752	Screw (7x)	Aluminum	-40F-+230F
11UV	31.50.044	Connection Plate G 1/2" female w/ 1/8" female addl. vac. conn.	Aluminum	-40F-+230F
	33.50.034	Cone Valve	Aluminum	-40F-+230F
	31.50.164	Filter Screen for extra connection 15x15mm	SS	-40F-+230F
	31.07.034	Plug 1/8"	Aluminum	-40F-+230F
	31.13.752	Screw (7x)	Aluminum	-40F-+230F
11VC	01.03.019	Connection Plate G 1/2" female w/ 1/8" female addl. vac. conn./Valve Cup	Aluminum	-40F-+230F
	01.02.944	Clamp Ring 110	Aluminum	-40F-+230F
	33.50.034	Cone Valve	Aluminum	-40F-+230F
	31.07.034	Plug 1/8"	Aluminum	-40F-+230F
	01.02.995	Screw (2x)	Aluminum	-40F-+230F

INDIVIDUAL PARTS FOR 110/FC150 SUCTION CUP FITTINGS

For Fittng	Part Number	Description	Materials	Working Temp.
11NA	01.03.016	Connection Plate G 3/8" female w/ 1/8" female addl. vac. conn.	Aluminum	-40F-+230F
	01.02.944	Clamp Ring 110	Aluminum	-40F-+230F
	31.50.167	Filter Screen 30mm	SS	-40F-+230F
	31.07.034	Plug 1/8"	Aluminum	-40F-+230F
	01.02.995	Screw (2x)	Aluminum	-40F-+230F
11NB	01.03.014	Connection Plate NPSF 3/8" female w/ 1/8" female addl. vac. conn.	Aluminum	-40F-+230F
	01.02.944	Clamp Ring 110	Aluminum	-40F-+230F
	31.50.167	Filter Screen 30mm	SS	-40F-+230F
	31.07.034	Plug 1/8"	Aluminum	-40F-+230F
	01.02.995	Screw (2x)	Aluminum	-40F-+230F
11NC	01.03.018	Connection Plate G 1/2" female w/ 1/8" female addl. vac. conn.	Aluminum	-40F-+230F
	01.02.944	Clamp Ring 110	Aluminum	-40F-+230F
	31.50.167	Filter Screen 30mm	SS	-40F-+230F
	31.07.034	Plug 1/8"	Aluminum	-40F-+230F
	01.02.995	Screw (2x)	Aluminum	-40F-+230F

INDIVIDUAL PARTS FOR 150 SUCTION CUP FITTINGS

For Fittng	Part Number	Description	Materials	Working Temp.
15UA	31.50.045	Connection Plate G 1/2" female w/ 1/8" female addl. vac. conn.	Aluminum	-40F-+230F
	31.50.167	Filter Screen 30mm	SS	-40F-+230F
	31.50.165	Filter Screen for extra connection 21x21mm	SS	-40F-+230F
	31.07.034	Plug 1/8"	Aluminum	-40F-+230F
	31.13.752	Screw (7x)	Aluminum	-40F-+230F
15NA	01.03.020	Connection Plate G 1/2" female w/ 1/8" female addl. vac. conn.	Aluminum	-40F-+230F
	01.02.943	Clamp Ring 150	Aluminum	-40F-+230F
	31.50.167	Filter Screen 30mm	SS	-40F-+230F
	31.07.034	Plug 1/8"	Aluminum	-40F-+230F
	01.02.995	Screw (2x)	Aluminum	-40F-+230F
15NB	01.03.022	Connection Plate G 3/4" female w/ 1/8" female addl. vac. conn.	Aluminum	-40F-+230F
	01.02.943	Clamp Ring 150	Aluminum	-40F-+230F
	31.50.167	Filter Screen 30mm	SS	-40F-+230F
	31.07.034	Plug 1/8"	Aluminum	-40F-+230F
	01.02.995	Screw (2x)	Aluminum	-40F-+230F
15UV	31.50.045	Connection Plate G 1/2" female w/ 1/8" female addl. vac. conn.	Aluminum	-40F-+230F
	33.50.034	Cone Valve	Aluminum	-40F-+230F
	31.50.165	Filter Screen for extra connection 21x21mm	SS	-40F-+230F
	31.07.034	Plug 1/8"	Aluminum	-40F-+230F
	31.13.752	Screw (7x)	Aluminum	-40F-+230F
15VA	01.03.020	Connection Plate G 1/2" female w/ 1/8" female addl. vac. conn.	Aluminum	-40F-+230F
	01.02.943	Clamp Ring 150	Aluminum	-40F-+230F
	33.50.034	Cone Valve	Aluminum	-40F-+230F
	31.07.034	Plug 1/8"	Aluminum	-40F-+230F
	01.02.995	Screw (2x)	Aluminum	-40F-+230F

Thread Systems

ISO Thread:

- Cylindrical Metric thread: designated with the letter M. Example: M5.
- Cylindrical Inch thread (also called Unified Thread): designated with the letter UNF. Example: 10-32UNF.

Dry Seal Thread (American system of pipe threads):

The dry seal system consists of cylindrical pipe-threads. The threads have a 60° profile angle and are sealed without packing or seal rings (please note that when these are used in other combination of thread systems, that "sealing" is not applicable). The dimensions are given in inches and PIAB's catalog uses the letters NPT and NPSF:

- Conical thread is designated NPT. Example: NPT 1/8"
- Cylindrical thread is noted as the letters NPSF: Example: NPSF 1/8"

BSP Thread (British system of pipe threads):

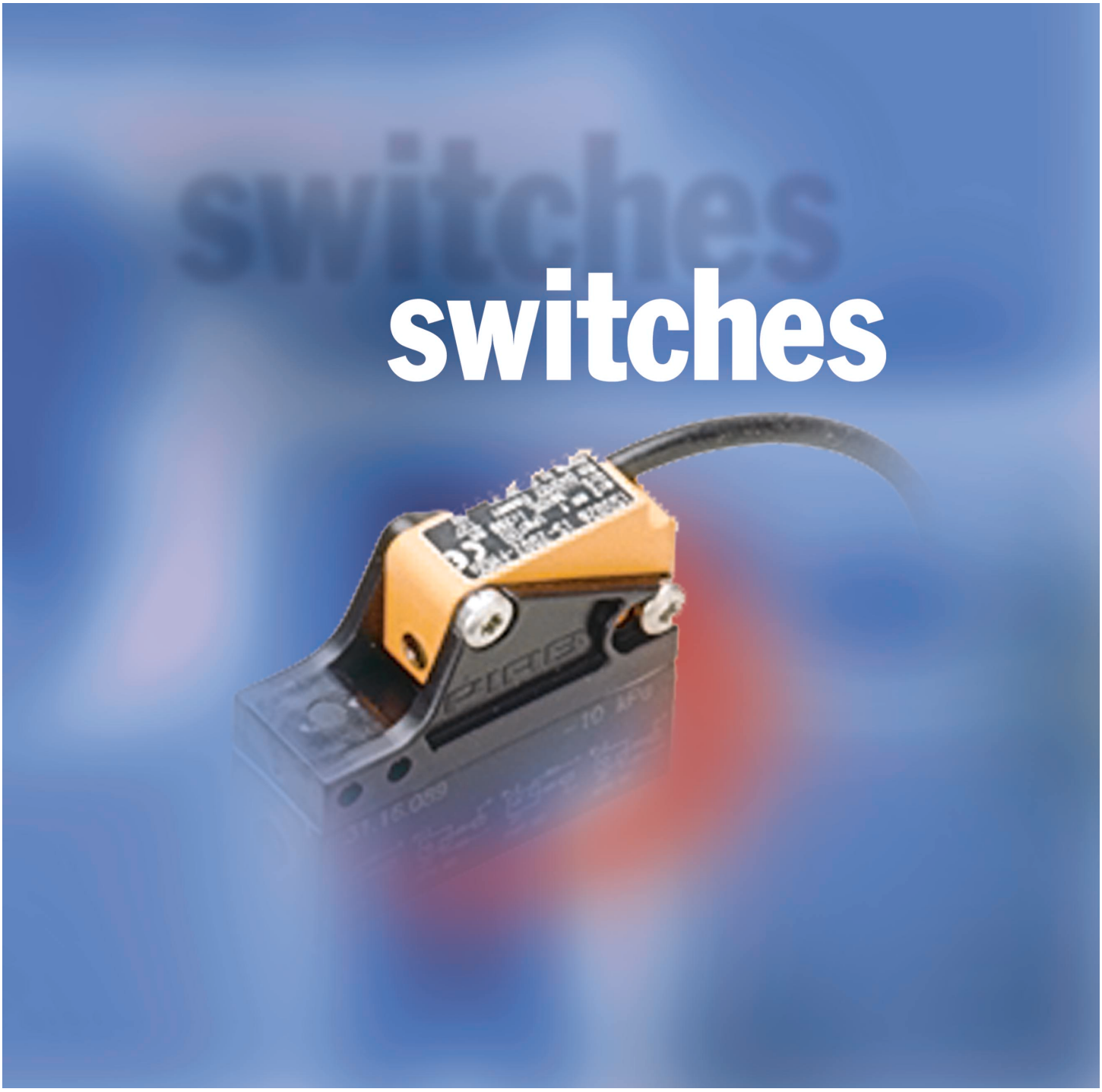
- The threads have a 55° profile angle and are dimensioned in inches.
- Cylindrical thread is designated with the letter G. Example: G 1/8".

COMPATIBILITY OF DIFFERENT THREAD SYSTEMS

	M5 male	M5 female	G1/8″ male	G1/8″ female	G1/4″ male	G1/4″ female	G3/8″ male	G3/8″ female	G1/2″ male	G1/2″ female	G3/4″ male	G3/4″ female	G1″ male	G1″ female	G2″ male	G2″ female
10-32UNF female or male	+	+++														
NPSF1/8″ female			+++													
NPT 1/8″ female or male			—	+												
NPSF 1/4″ female					+											
NPT 1/4″ female or male					—	—										
NPSF 3/8″ female							—									
NPT 3/8″ female or male							—	—								
NPSF 1/2″ female									+							
NPT 1/2″ female or male									—	+++						
NPSF 3/4″ female											+					
NPT 3/4″ female or male											—	+++				
NPT 1″ female or male													—	—		
NPT 2″ female or male															—	—

+++ Fits + Fits with short thread — Does not fit

To order your own copy of this wall size suction cup poster, please call 1-800-321-7422 or use the enclosed postcard.



PIAB

Innovators in Vacuum Technology

Energy Saving Device, ES

The pneumatic Energy Saving devices, minimize the consumption of compressed air to a compressed air driven Vacuum Pump.

ES-kit for classic pumps - Part No. 01.03.110

- The ES-kit includes an amplifier valve and a pneumatic adjustable vacuum switch together with connectors and hose, to be mounted on the vacuum pump.
- The ES-kit minimizes the consumption of compressed air to a compressed air driven Vacuum Pump.
- Nominal flow 17.5 scfm.
- The operation of ES is similar to that of a thermostat in a heating system.
- Recommended for Vacuum Pumps in sealed or micro leaking systems where a specific vacuum level is to be maintained.
- **ES works only with Vacuum Pumps equipped with non-return valves.** A non-return valve of nitrile for pump model Classic is supplied.

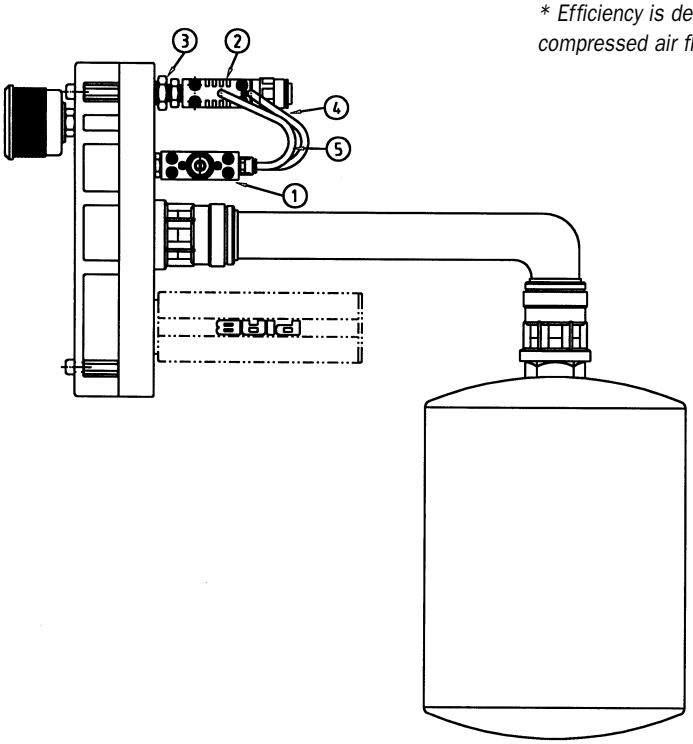
	ES-kit-Classic Pumps
Medium	Compressed air, filtration 40 µm, non-lubricated
Design	Unit for minimizing consumption of compressed air
Type of Control System	Pneumatic
Pressure Range, psi	58-87
Nominal Flow, scfm	17.5
Vacuum Level Off (-inHg)	Adjustable 4.5-28
Hysteresis, inHg	Max 4.5
Working Temperature	-14°F to 140°F
Material	POM, AL, SS, NBR, PA6, CuZn, ABS, PMMA
Weight, oz	16.5
Fits PIAB Vacuum Pump Size	5-120
Compressed Air Connection, in	NPT 1/4"
Vacuum Pump Connection	NPSF 1/8"
Connection Vacuum Signal	Hose Connector 4/2

Connection and Function

ES-kit-Classic Pumps

1. Vacuum Switch Pneumatic NC
2. Amplifier Valve 1/8"
3. Bushing 1/4" to 1/8"
4. Hose of Nylon D=4/2
5. Hose of Nylon D=4/2

See dimensional drawings 01.03.110 ES-kit



Energy Saving with PIAB

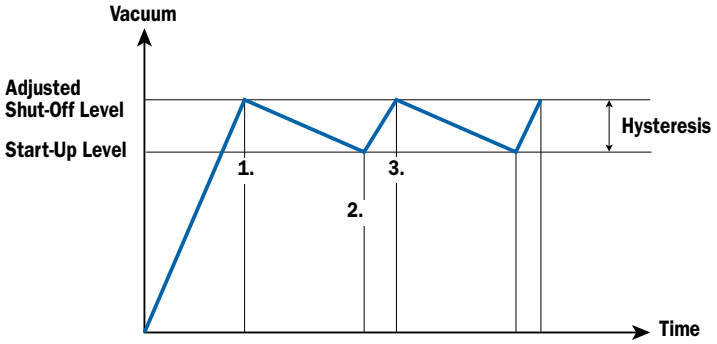
PIAB offers the widest range of compressed air-driven vacuum pumps available on the market. This, combined with the fact that the PIAB pump is the most efficient* on the market, ensures that PIAB can always offer the best solution.

One way of saving additional energy is to use the PIAB Energy Saving (ES) system. The ES system is a pneumatic control system that shuts off the vacuum pump as soon as the required vacuum has been reached, thus minimizing the compressed air consumption of the vacuum pump. When the vacuum drops below the start-up level, the pump automatically restarts. The energy saving system is most useful in airtight systems.

** Efficiency is defined as the ratio of extracted air flow to consumed compressed air flow at different vacuum levels.*

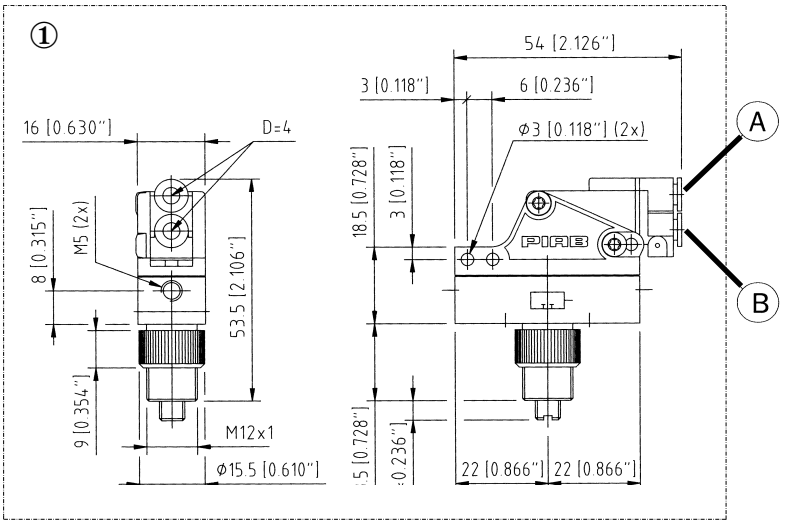
Function

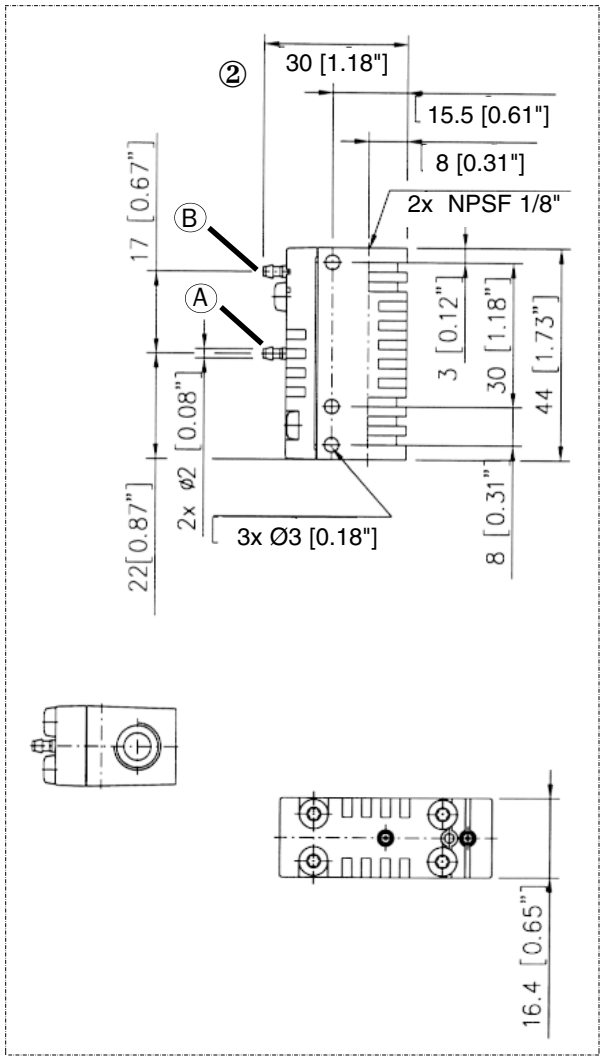
A vacuum control valve shuts off the flow of compressed air to the pump when the pre-set vacuum level is reached (1). The vacuum level is set by a knob or a screw. Because of minor leakage in a vacuum system the vacuum level drops and after a while the start up level of the valve is reached (2). Then the pump will start and work until the shut off level is reached again (3), etc.

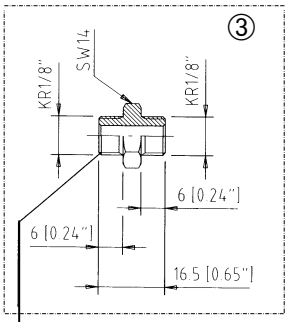


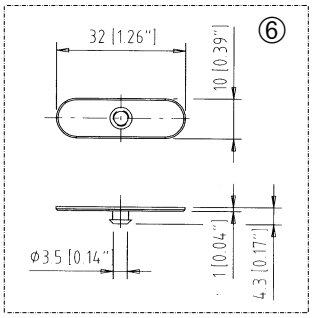
DIMENSIONAL DRAWING

01.03.110 ES-kit-Classic Pumps



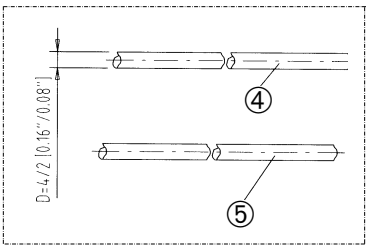






Loctite

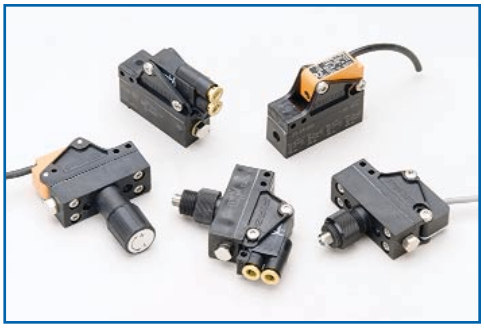
The pump must be equipped with a non-return valve



1. Vacuum Switch Pneumatic NC
2. Amplifier Valve 1/8"
3. Bushing 1/4" to 1/8"
4. Hose of Nylon D=4/2
5. Hose of Nylon D=4/2
6. Non-return Valve OF, nitrile

VACUUM SWITCH, ADJUSTABLE

The adjustable vacuum switches are actuated at a set vacuum level and set by a knob or a screw.



TYPE

Inductive Universal

- Actuated at a set vacuum level (-inHg) and set by a knob.
- Converts a vacuum signal to an electric signal.
- Vacuum actuated membrane linked to a proximity inductive universal switch.
- The output functions NO PNP, NC PNP, NO NPN, and NC NPN are available in the vacuum switch.
- The switch must be connected in series with the load.

Inductive

- Actuated at a set vacuum level (-inHg) and set by a screw.
- Converts a vacuum signal to an electric signal.
- Vacuum actuated membrane linked to a proximity inductive switch.
- Available in four variations with output functions: NO PNP, NC PNP, NO NPN or NC NPN.

Electro-Mechanical

- Actuated at a set vacuum level (-inHg) and set by a knob or a screw.
- Converts a vacuum signal to an electric signal.
- Vacuum actuated membrane linked to an electro-mechanical switch.
- Can be installed as NO or NC.

Pneumatic

- Actuated at a set vacuum level (-inHg) and set by a knob or a screw.
- Converts a vacuum signal to a pneumatic signal.
- Vacuum actuated membrane linked to a pneumatic switch.
- Available in two variations, as NO or NC.

CHARACTERISTICS

	Inductive Universal	Inductive	Electro-mechanical	Pneumatic NO	Pneumatic NC
Design	Adjustable vacuum control switch, with a vacuum actuated membrane linked to a switch as stated				
Output Function	see "Ordering Information"				
Pressure Range, psi	–				22-116
Signal Range, (-inHg)	1.5-28		3-28	1.5-28	4.5-28
Hysteresis, -inHg	0.6	2.4	3.0	1.0	3.6
Working Temperature	-13°F to 176°F	-13°F to 158°F	-4°F to 176°F	-14°F to 140°F	
Material	Grivory, AL, SS, NBR, PA 6				
	PBTP			CuZn	
Weight, oz	2.1	2.0	2.1	1.2	
Cable, ft	2 x 6.5	3 x 6.5	3 x 1.6	–	
Supply Voltage	5-36 VDC	9-36 VDC	max 250 VAC	–	
Voltage Drop	max 4.6 V	max 1.6 V	–	–	
LED	yellow	red	–	–	
Protection Against Mis-Connections	–	yes	–	–	
Safety Classification	IP67	IP 67	–	–	
Output Current, max	200 mA	200 mA	5A	–	
Connection Vacuum	M5 (10-32 UNF)				

ORDERING INFORMATION

Vacuum Switches, Adjustable Type	Output Function	Part Number	
		Knob	Screw
Inductive Universal	NO/NC/PNP/NPN	31.16.064	–
Inductive	NO PNP	–	31.16.057
Inductive	NC PNP	–	31.16.058
Inductive	NO NPN	–	31.16.059
Inductive	NC NPN	–	31.16.060
Electro-Mechanical	NO/NC	31.16.068	31.16.061
Pneumatic	NO	31.16.069	31.16.062
Pneumatic	NC	31.16.070	31.16.063

ACCESSORIES

	Connection Set for Vacuum Switch
Part Number	01.00.488
Contents	Barrel nipple G 1/8" M5 long, Hose connector 4/2 M5
Material	Brass, IXEF, nitrile, nylon
Fits	All pre-set and adjustable vacuum switches

Supplement 1

NO PNP = Normally Open, Positive logic. As the switch is activated, the gate at the feed current (+) closes and contact is established.
NC PNP = Normally Closed, Positive logic. As the switch is activated, the gate at the feed current (+) opens and contact is interrupted.
NO NPN = Normally Open, Negative logic. As the switch is activated, the gate at ground (-) closes and contact is established.
NC NPN = Normally Closed, Negative logic. As the switch is activated, the gate at ground (-) opens and contact is interrupted.

Note

NO, Normally Open, in electrical circuits corresponds with an open circuit breaker, which means that if the gate is open no current can pass through.
NO, Normally Open, in pneumatic circuits corresponds with an open valve, which means that if the valve is open compressed air passes through.

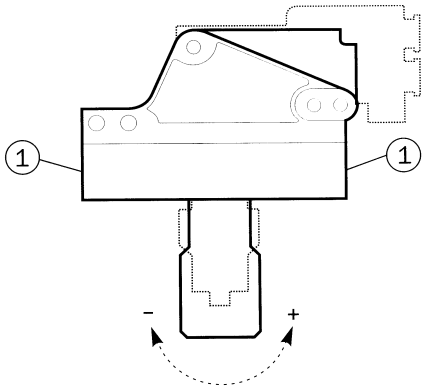
Supplement 2

The adjustable Vacuum Switch, inductive universal must be connected in series with the load!

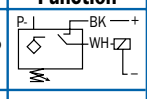
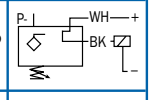
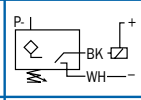
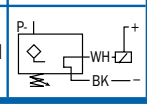
Connection

① Vacuum Connection

Use one of the ports (optional) or both (in-line).

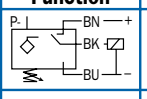
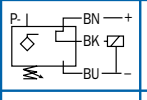
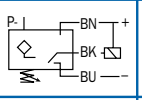
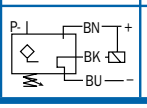


Inductive Universal

Model	Function	Part No.
NO PNP		31.16.064
NC PNP		
NO NPN		
NC NPN		

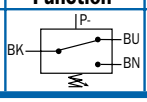
BK=black / WH=white

Inductive

Model	Function	Part No.
NO PNP		31.16.057
NC PNP		31.16.058
NO NPN		31.16.059
NC NPN		31.16.060

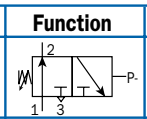
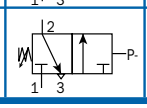
BN=brown / BK=black / BU=blue

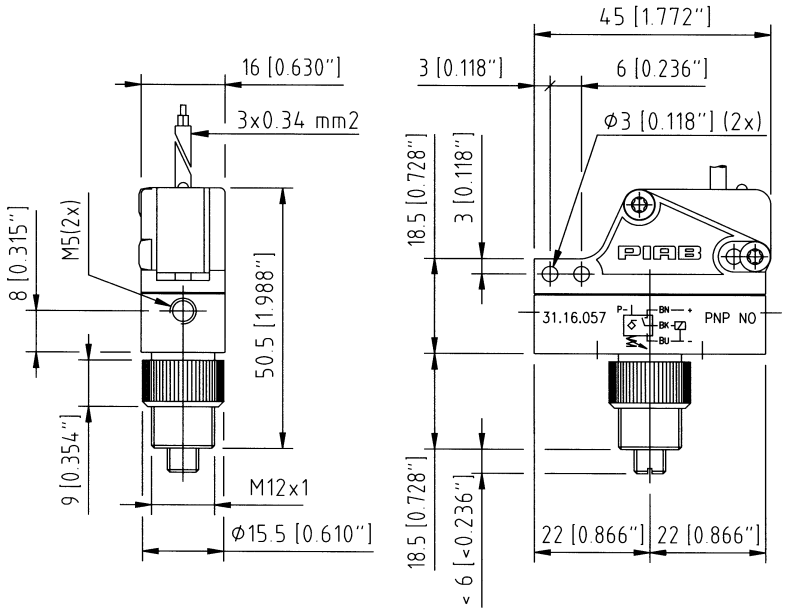
Electro-mechanical

Model	Function	Part No.
NO/NC		31.16.061 31.16.068

BN=brown / BK=black / BU=blue

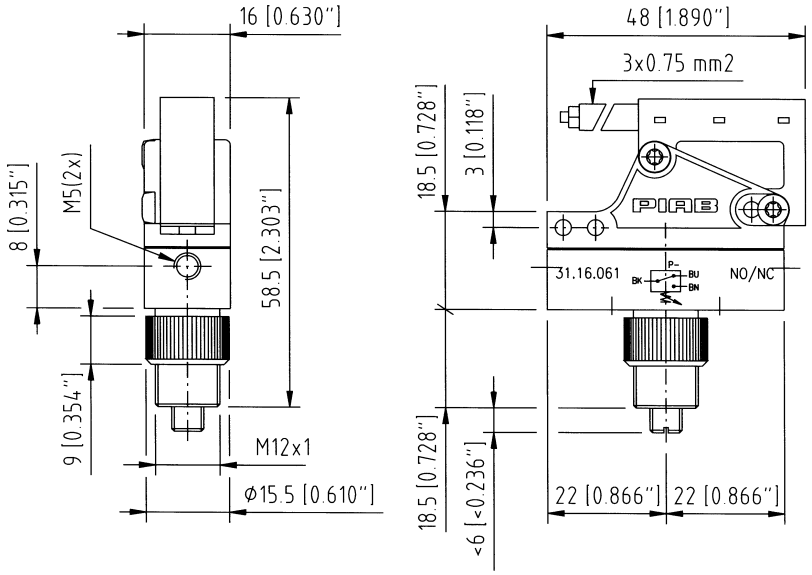
Pneumatic

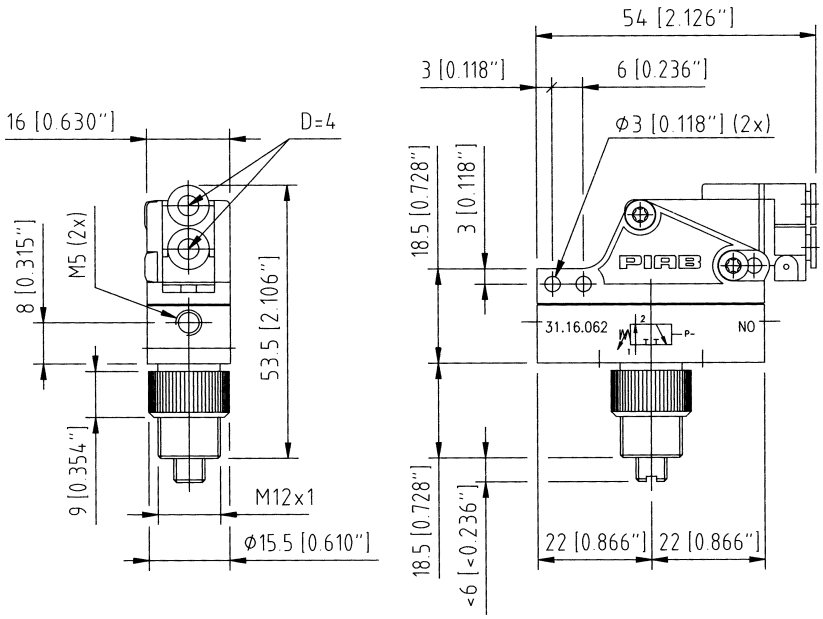
Model	Function	Part No.
NO		31.16.062 31.16.069
NC		31.16.063 31.16.070



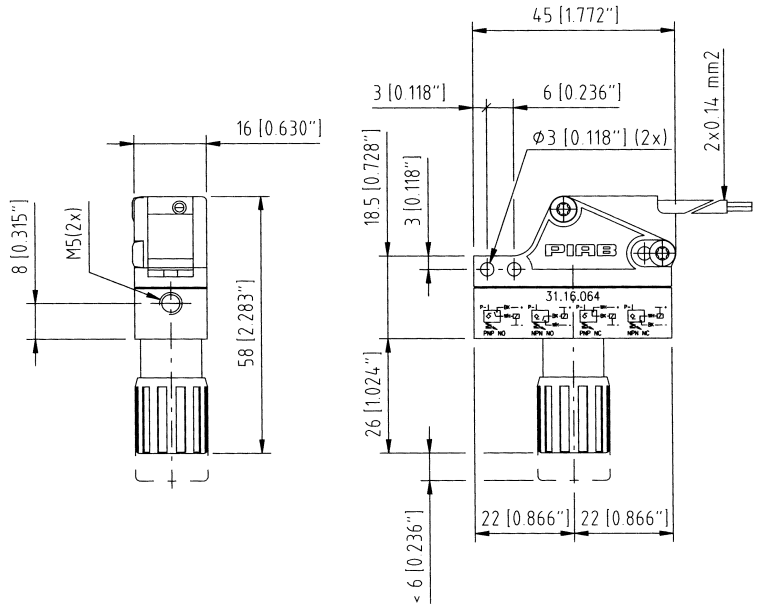
31.16.057 Inductive NO PNP, with screw
31.16.058 Inductive NC PNP, with screw
31.16.059 Inductive NO NPN, with screw
31.16.060 Inductive NC NPN, with screw

31.16.061 Electro mechanical, with screw



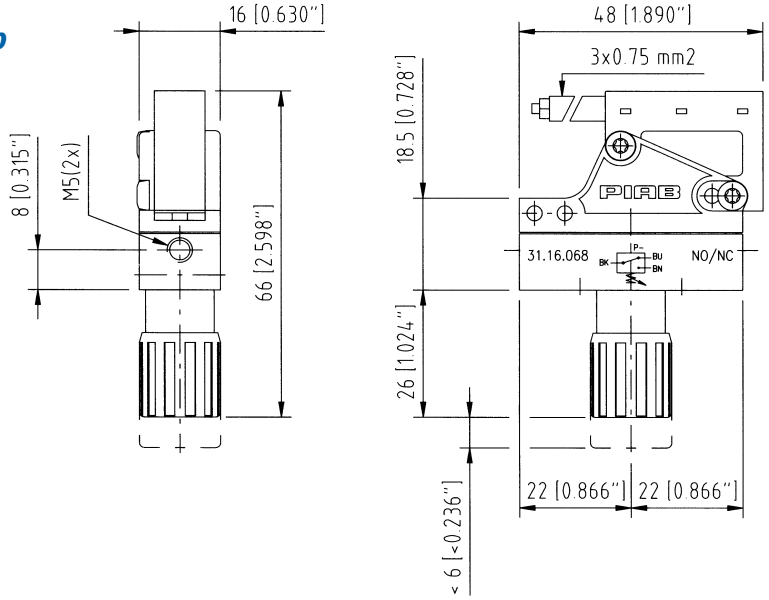


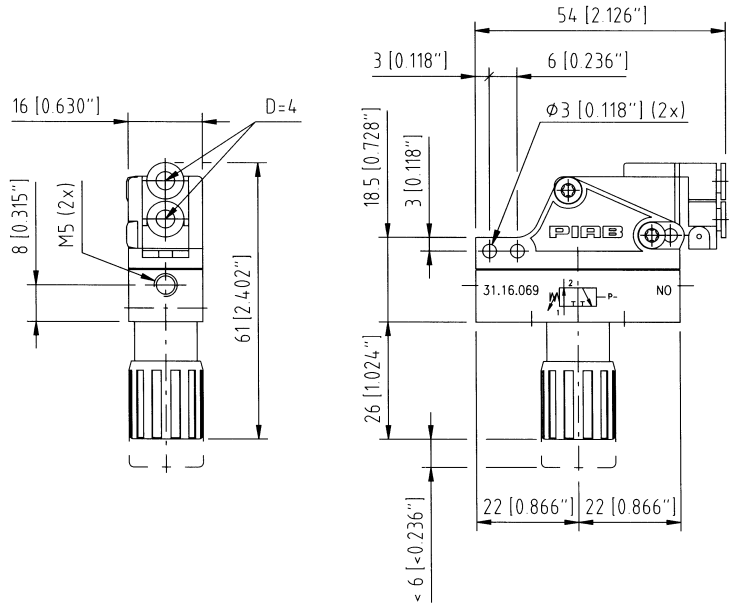
31.16.062 Pneumatic NO, with screw
31.16.063 Pneumatic NC, with screw



31.16.064 Inductive universal, with knob

31.16.068 Electro mechanical, with knob





31.16.069 Pneumatic NO, with knob
31.16.070 Pneumatic NC, with knob

VACUUM SWITCH, PRE-SET

The pre-set Vacuum Switches are actuated at a pre-set vacuum level, non-adjustable.

TYPE

Inductive Universal

- Actuated at a pre-set vacuum level (-inHg), non-adjustable.
- Converts a vacuum signal to an electric signal.
- Vacuum actuated membrane linked to a proximity inductive universal switch.
- The output functions NO PNP, NC PNP, NO NPN, and NC NPN are available in the vacuum switch.
- The switch must be connected in series with the load.

Electro-Mechanical

- Actuated at a pre-set vacuum level (-inHg), non-adjustable.
- Converts a vacuum signal to an electric signal.
- Vacuum actuated membrane linked to an electro-mechanical switch.
- Can be installed as NO or NC.

Pneumatic

- Actuated at a pre-set vacuum level (-inHg), non-adjustable.
- Converts a vacuum signal to a pneumatic signal.
- Vacuum actuated membrane linked to a pneumatic switch.
- Available in two variations, as NO or NC.

CHARACTERISTICS

	Inductive Universal	Electro-mechanical	Pneumatic NO	Pneumatic NC
Design	Pre-set vacuum control switch			
Output Function	see "Ordering Information"			
Pressure Range, psi	–	–	22-116	
Hysteresis, -inHg	max 0.6	max 4.0	max 1.0	max 4.5
Working Temperature	-13°F to 176°F	-4°F to 176°F	-14°F to 140°F	
Material	Grivory, AL, SS 2333, SS 2346, NBR, PA 6			
	PBTP		CuZn	
Weight, oz	2.0	2.0	1.2	
Cable, ft	2 x 6.5	3 x 1.6	–	–
Supply Voltage	5-36 VDC	max 250 VAC	–	–
Voltage Drop	max 4.6 V	–	–	–
LED	yellow	–	–	–
Safety Classification	IP 67	IP 67	–	–
Output Current, max	200 mA	5A	–	–
Accuracy, -inHg	3.0 ± 0.3 9.0 ± 0.9 21.0 ± 1.5	– 7.4 ± 1.5 19.0 ± 3.0	3.0 ± 0.6 7.4 ±1.2 19.0 ± 2.4	– 9.0 ± 1.5 21.0 ± 3.0
Connection Vacuum	M5 (10-32 UNF)			

ORDERING INFORMATION

Pre-set Vacuum Switches, Adjustable Type	Output Function	Vacuum level (-inHg) and part number				
		3.0	7.5	9.0	19.0	21.0
Inductive Universal	NO/NC/PNP/NPN	31.16.089	–	31.16.090		31.16.091
Electro-Mechanical	NO/NC	–	31.16.095	–	31.16.096	–
Pneumatic	NO	31.16.083	31.16.084	–	31.16.085	–
Pneumatic	NC	–	–	31.16.087	–	31.16.088

ACCESSORIES

	Connection Set for Vacuum Switch
Part Number	01.00.488
Contents	Barrel nipple G 1/8" M5 long, Hose connector 4/2 M5
Material	Brass, IXEF, nitrile, nylon
Fits	All pre-set and adjustable vacuum switches

Supplement 1

NO PNP = Normally Open, Positive logic. As the switch is activated, the gate at the feed current (+) closes and contact is established.
NC PNP = Normally Closed, Positive logic. As the switch is activated, the gate at the feed current (+) opens and contact is interrupted.
NO NPN = Normally Open, Negative logic. As the switch is activated, the gate at ground (-) closes and contact is established.
NC NPN = Normally Closed, Negative logic. As the switch is activated, the gate at ground (-) opens and contact is interrupted.

Note

NO, Normally Open, in electrical circuits corresponds with an open circuit breaker, which means that if the gate is open no current can pass through.
NO, Normally Open, in pneumatic circuits corresponds with an open valve, which means that if the valve is open compressed air passes through.

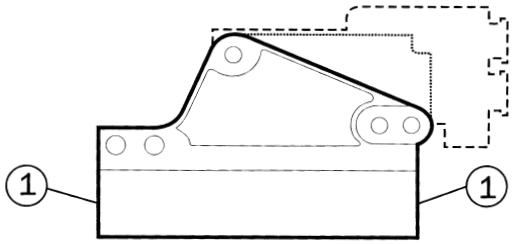
Supplement 2

The adjustable Vacuum Switch, inductive universal must be connected in series with the load!
If the vacuum level does not suit your application then choose an adjustable vacuum switch, instead.

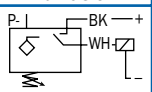
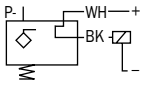
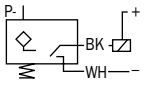
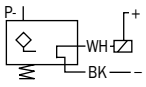
Connection

① Vacuum Connection

Use one of the ports (optional) or both (in-line).

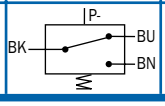


Inductive Universal

Model	Function	Part No.
NO PNP		31.16.089 31.16.090 31.16.091
NC PNP		
NO NPN		
NC NPN		

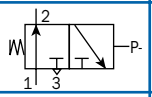
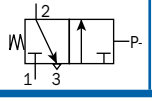
BK=black / WH=white

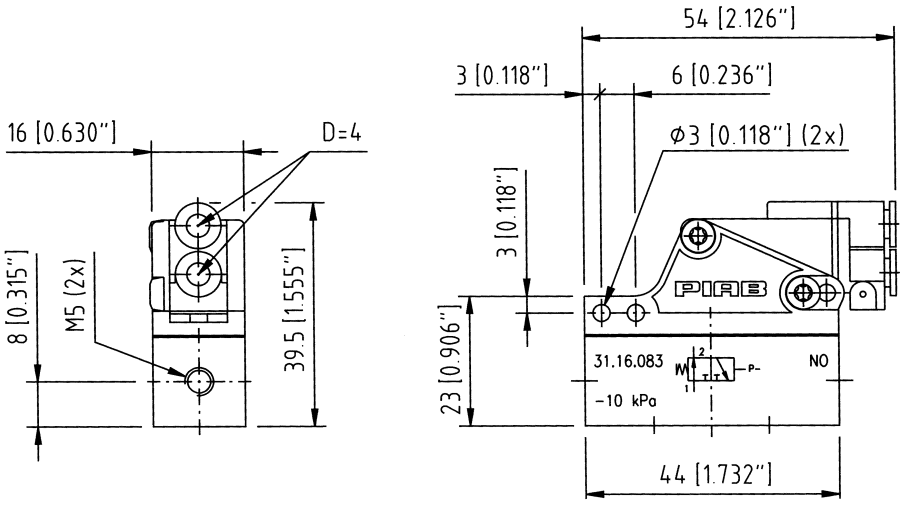
Electro-mechanical

Model	Function	Part No.
NO/NC		31.16.095 31.16.096

BN=brown / BK=black / BU=blue

Pneumatic

Model	Function	Part No.
NO		31.16.083 31.16.084 31.16.085
NC		31.16.087 31.16.088



31.16.083 ***Pneumatic NO, 3.0 -inHg***

31.16.084 ***Pneumatic NO, 7.4 -inHg***

31.16.085 ***Pneumatic NO, 19.0 -inHg***

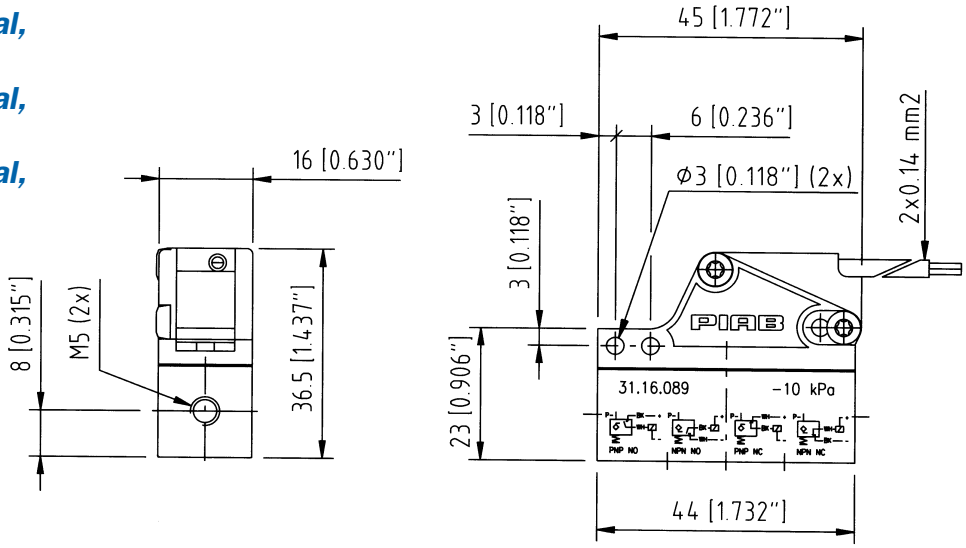
31.16.087 ***Pneumatic NC, 9.0 -inHg***

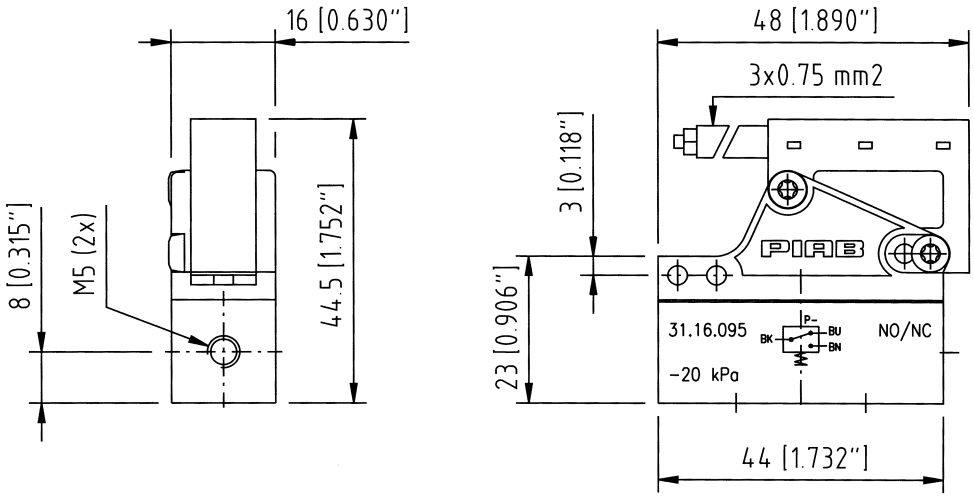
31.16.088 ***Pneumatic NC, 21.0 -inHg***

31.16.089 ***Inductive universal, 3.0 -inHg***

31.16.090 ***Inductive universal, 9.0 -inHg***

31.16.091 ***Inductive universal, 21.0 -inHg***





31.16.095 ***Electro mechanical, 7.4 -inHg***

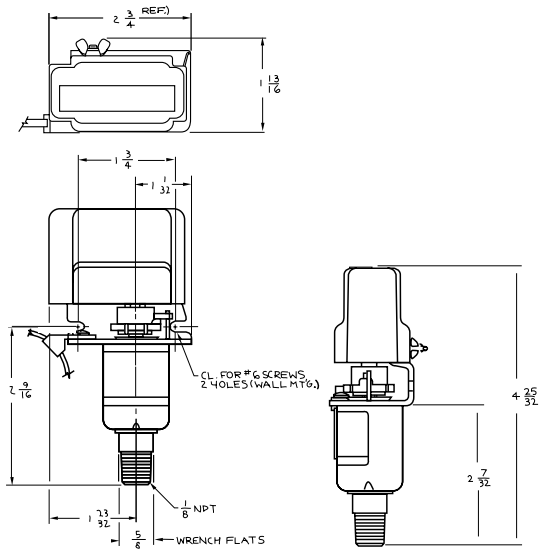
31.16.096 ***Electro mechanical, 19.0 -inHg***

VACUUM SWITCH, EVS

EVS 54 with Calibrated Adjustment Dial

- Range: 0 to 30 -inHg.
- SPDT switch, wired normally open or normally closed
- Calibrated adjustment dial (dial divisions 2 -inHg.)
- Electrical Rating: 15 amps 125/250 VAC resistive
- Buna N diaphragm sensor
- Enclosure: Lexan Dust Cover
- Pressure Connection: 1/8" NPTM, aluminum
- Proof Pressure: 50 PSIG
- Deadband: 1.5 to 3.5 -inHg.
- Mounting: Holes for surface mounting
- UL 508 recognized; CSA certified C22.2 no. 14. (optional)
- CE marked (conforms with Low Voltage Directive)

EVS 54 Part No. 31.16.040



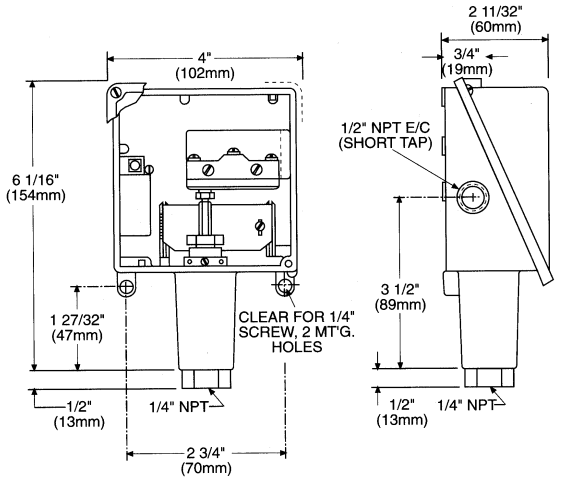
EVS 100 NEMA 4X Vacuum Switch

- Range: 0 to 30 -inHg.
- SPDT Switch, wired normally open or normally closed.
- Internal setpoint reference scale.
- Electrical Rating: 15 amps 125/250 VAC resistive.
- Phosphor bronze bellows sensor.
- Enclosure: NEMA 4X; IP65, die cast aluminum with epoxy powder coated.
- Pressure Connection: 1/4" NPTF, nickel plated brass
- Proof Pressure: 30 -inHg.
- Deadband: 1 to 2 -inHg.
- Mounting: surface mount with two screws or mount by pressure connection.
- UL 508 Listed; CSA Certified, C22.2 No. 14
- CE marked (conforms with Low Voltage Directive)
- Optional indicator light.

OPTIONAL MICROSWITCHES

Part No.	Description
6259-217	5 amp 125/250 VAC resistive switch. Close band differential for EVS 54 (range .375 - .875 -inHg.) & EVS 100 (range .25 - .50 -inHg.)
6259-529	10 amp 125/250 VAC resistive DPDT switch. Wider deadband for EVS 100 only. Deadband range is 2.0 - 4.0 -inHg.
6259-550	15 amp 480 VAC resistive switch. Adjustable deadband for EVS 100 only. Deadband range is 2.5 - 10.0 -inHg. (mod. #1519)

EVS 100 Part No. 31.16.041



filters

PIAB

Innovators in Vacuum Technology

VACUUM PUMP FILTERS

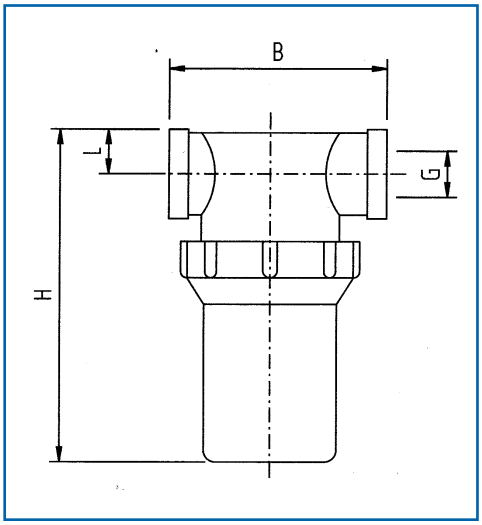
- 10 micron element size
- Extended pump life
- Compact design
- Engineered for safety
- Easy to install
- Reduces downtime
- Reliable to 29 -inHg
- Plastic or metal bowls
- Economical
- 150 psi design pressure – plastic filters
- 5 psi design pressure – metal filters

PLASTIC FILTERS

PIAB plastic filters provide easy monitoring, economy and safety. These shatterproof filters can withstand high pressures and are designed for use in applications where glass cannot be tolerated. A new porous plastic element prolongs element life under most environmental conditions. Stainless steel elements also available.

PIAB vacuum pump filters are designed to prolong pump life by preventing dust and other particles from inhibiting pump performance. PIAB filters range in size from 1/8" to 2" NPT and are available with either easy-to-monitor transparent plastic or metal bowls.

Part Number	Internal Volume in^3	Max. Flow scfm	Filter Area in^2
PPSF.125-X10	2.1	3.2	4.9
PPSF.25-X10	2.4	4.2	4.9
PPSF.375-X10	2.7	5.3	4.9
PPSF.5-X35	11.9	31.8	16
PPSF.75-X35	12.5	31.8	16
PPSF1.0-X50	30.2	89	29.5
PPSF1.5-X75	41.2	180.1	35



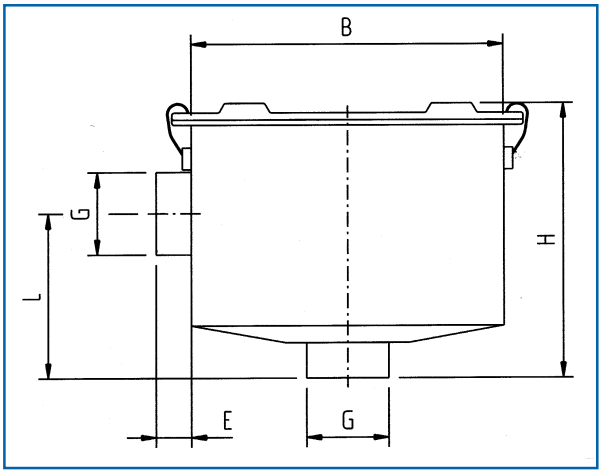
MATERIALS: Head - Nylon, Bowl - Nylon, Gasket - Buna-N, Element - Polyethylene

Part Number	H in	L in	B in	G	Weight oz	Filter Element Part Number (3-packs)	Filter Element Part Number Stainless Steel	Filter Bowl Part Number
PPSF.125-X10	2.36	0.39	2.99	NPT 1/8"	1.7	PPX10RE3	14888	10494
PPSF.25-X10	2.36	0.39	2.99	NPT 1/4"	1.98	PPX10RE3	14888	10494
PPSF.375-X10	2.68	0.55	2.99	NPT 3/8"	2.47	PPX10RE3	14888	10494
PPSF.5-X35	5.12	0.63	3.54	NPT 1/2"	6.61	PPX35RE3	14887	10503
PPSF.75-X35	5.41	0.73	3.54	NPT 3/4"	6.42	PPX35RE3	14887	10503
PPSF1.0-X50	6.48	0.91	4.92	NPT 1"	15.0	PPX50RE3	14889	10521
PPSF1.5-X75	8.23	1.22	5.12	NPT 1 1/2"	18.8	PPX75RE3	14890	10521

Note: Pressure Range -14.69-0 psi, Working Temperature -4°F-212°F

METAL FILTERS

PIAB metal filters offer high performance and durability. Their rugged construction and large bowl capacity make these filters ideal for harsh environments where large quantities of dust are collected. Steel mesh elements also available.



Part Number	H in	L in	B in	E in	G	Weight lb	Filter Element Part No.
PSF.375	3.80	2.05	3.78	0.86	NPT 3/8"	1.0	PSF.375RE
PSF.5B	3.80	2.05	3.78	0.86	NPT 1/2"	1.0	PSF.375RE
PSF.75B	3.83	2.08	3.78	0.75	NPT 3/4"	1.0	PSF.375RE
PSF1.0	4.37	2.63	5.00	0.75	NPT 1"	2.2	PSF.5RE
PSF1.5	6.50	4.50	6.81	0.75	NPT 1 1/2"	4.6	PSF.1.5RE
PSF2.0	10.25	5.50	7.63	1.25	NPT 2"	10.8	PSF2.0RE

Note: Pressure Range -14.69-0 psi, Working Temperature -22°F-194°F. The PSF1.5 and PSF2.0 are available with a steel mesh element. Add 'XM' after the Art No. for the complete filter or just the filter element.

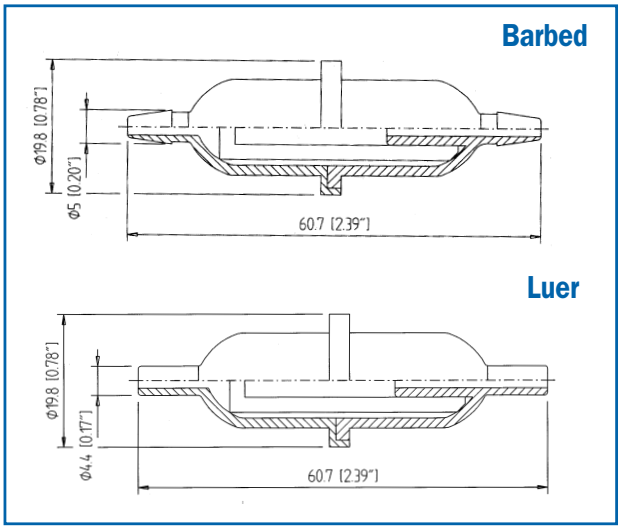
MATERIALS: Housing - Steel, Gasket Buna-N, Element - Polyester

Part Number	Internal Volume in^3	Max. Flow scfm	Filter Area in^2
PSF.375	23.5	14	54.7
PSF.5B	23.5	21	54.7
PSF.75B	23.5	21	54.7
PSF1.0	58.9	25	86.4
PSF1.5	192.3	80	288
PSF2.0	377	150	648

IN-LINE FILTERS

PIAB offers IN-LINE Filters from POREX™ Technologies. These miniature filters can be used on compressed-air lines or vacuum lines to protect vacuum pumps, vacuum switches and valves from contamination. Their translucent, inert polypropylene housing allows for visual inspection. Filter is constructed of chemically inert porous polyethylene and has a recommended working pressure up to 65 psig.

Part Number	Type
X-7438	10 micron, barbed
X-6621	10 micron, luer
X-7439	25 micron, barbed
X-6618	25 micron, luer



Part Number	Internal Volume in^3	Max. Flow scfm	Filter Area in^2
X-7438	0.24	1.1	1.71
X-6621	0.24	1.1	1.71
X-7439	0.24	1.1	1.71
X-6618	0.24	1.1	1.71

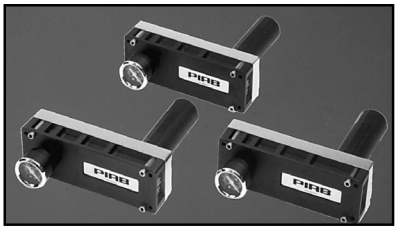
Note: Pressure Range -14.69-65 psi, Material PP, PE, Working Temperature 32°F-176°F, weight 0.14 oz.

MINI SUCTION CUPS

PIAB's new line of Mini Suction Cups allows easy installation in applications where space is limited or where small parts are being handled. Mini cups are available in diameter sizes of 2-8 mm with some styles allowing for level compensation and lifting movements to separate thin items. All styles are available in a conductive silicone rubber designed to handle products that are sensitive to static electricity. These cups are suited for handling electronic components and small fragile products.

PIAB

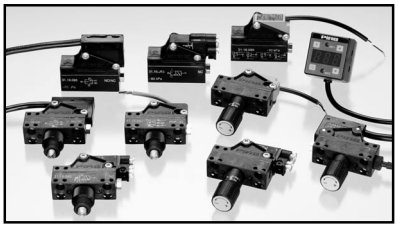
New HIGH FLOW PUMPS



PIAB introduces an improved series of compressed air driven vacuum pumps that provides 30%-70% more vacuum flow than previous models. The L Series pumps are quiet, compact, efficient, easily installed and virtually maintenance-free. The three L Series pumps will handle high leakage rates in applications such as opening and handling cartons or cases while still providing enough vacuum pressure to get the job done. The L Series features a durable aluminum connection plate and a lightweight PPS composite body that provides for easy assembly and disassembly with only four bolts to remove.

PIAB

COMPACT VACUUM SWITCHES

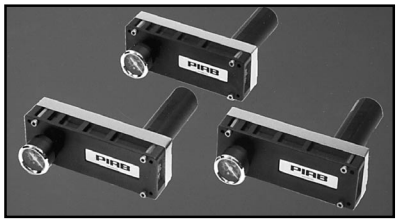


PIAB announces a line of compact vacuum switches designed for high performance. There are three different types of vacuum switches: electric, pneumatic and electronic. All of the new switches feature an improved operating range of 1.5 -inHg to 28.5 -inHg. It is possible to place the switches in stacks with their narrow 0.63" width. The switches are dust-proof and have a very low weight. The switches can be operated either NO or NC. The electronic switches have a long lifetime and can be connected directly to a PLC unit or they can directly regulate a valve.

PIAB

New LOW PRESSURE PUMPS

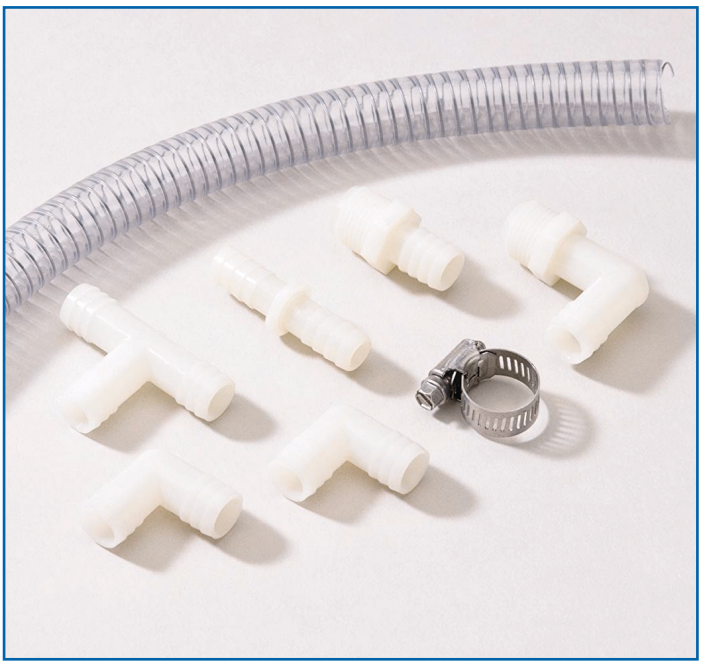
PIAB introduces an improved series of compressed air driven vacuum pumps that is designed to handle low or fluctuating compressed air pressures. The Low



Pressure M Series pumps are quiet, compact, efficient, easily installed and virtually maintenance-free. The three M Series pumps provide up to 27-inHg of vacuum at only a 49-psi inlet pressure. The M Series features a durable aluminum connection plate and a lightweight PPS composite body that provides for easy assembly and disassembly with only four bolts to remove.

PIAB

PIAB
Innovators in Vacuum Technology



PVC HELIX REINFORCED

Heavy duty clear PVC suction and discharge hose

Features

- Economical
- Lightweight and flexible
- Smooth core resists buildup, ensures fast flow rate and is easily flushed
- Excellent abrasion and kink resistance
- Standard packaging is a 100 foot coil

Uses

- Vacuum packaging
- Robotics
- Pneumatic material handling systems
- Printing presses/Graphic arts
- Packaging machinery

Body: Clear PVC
Helix: White rigid PVC
Cover: Smooth, clear PVC
Temperature Range: +20°F to +150°F

HOSE CLAMPS (SS)

Part Number	Description
4JM	Fits 7/32 - 5/8
8J	Fits 7/16 - 1
16J	Fits 11/16 - 1 1/2
24J	Fits 1 1/16 - 2
32J	Fits 1 9/16 - 2 1/2

VACUUM HOSE/FITTINGS

STEEL WIRE REINFORCED

Food grade PVC suction hose-wire helix embedded in transparent food grade PVC

Features

- Clear compounded using ingredients shown on the FDA approved list
- Outstanding flexibility
- Highly abrasion resistant cover is smooth and nonmarking
- Excellent kink and crush resistance
- Full vacuum rating on all sizes
- Transparent for easy flow monitoring
- Smooth core resists buildup, ensures fast flow rate and is easily flushed
- Standard packaging is a 100 foot coil (50 foot for PVH1.25 - PVH2.0)

Uses

- Ideal for applications in which there are tight bend requirements
- Vacuum packaging
- Food processing applications requiring full vacuum
- Vacuum forming machinery
- Injection molding coolant lines
- Automation machinery requiring vacuum
- Hard parts material handling
- Kink sensitive pressure applications

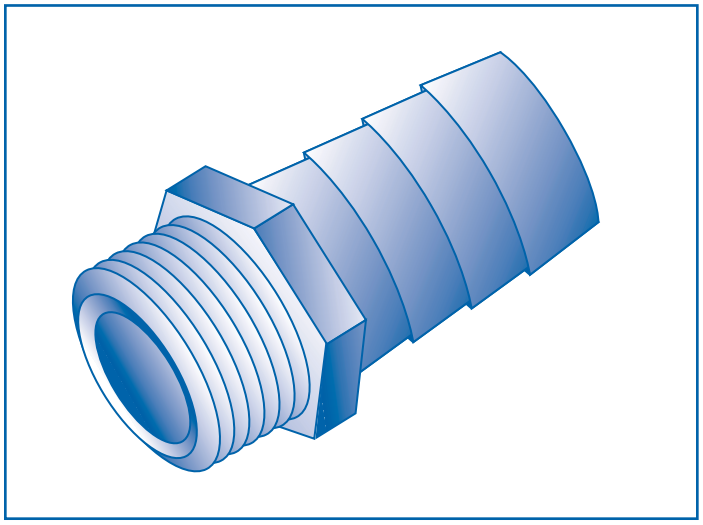
Body: Clear food grade PVC
Helix: Steel wire
Cover: Smooth, clear food grade PVC
Temperature Range: +25°F to +175°F

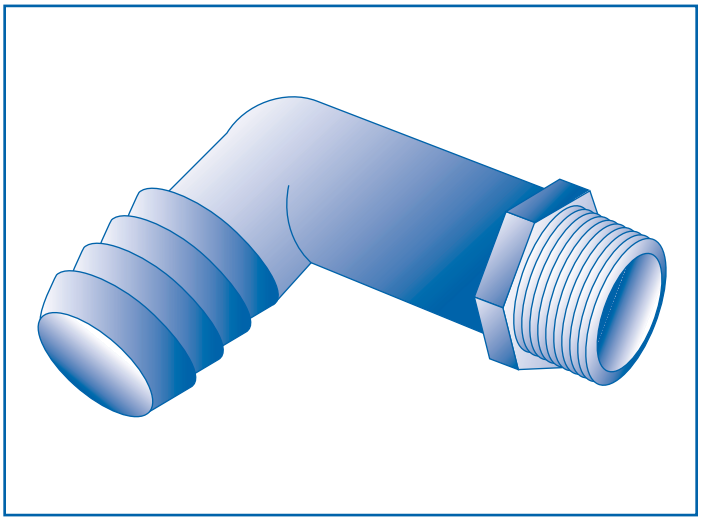
STEEL WIRE

Part Number	I.D. In.	O.D. In.	Working psi @ 70°F	Minimum Bend Radius	Weight LBS/CFT
PVH.25	1/4	0.453	200	1"	6.0
PVH.375	3/8	0.630	175	1 1/2"	10.7
PVH.50	1/2	0.748	140	2"	12.4
PVH.625	5/8	0.906	100	2 1/2"	17.8
PVH.75	3/4	1.023	100	3"	21.8
PVH1.0	1	1.319	85	4"	31.9
PVH1.25	1 1/4	1.614	85	5"	45.0
PVH1.5	1 1/2	1.890	85	6"	58.8
PVH2.0	2	2.440	70	8"	91.3

PVC HELIX

Part Number	I.D. In.	O.D. In.	Working psi @ 70°F	Minimum Bend Radius	Weight LBS/CFT
PVH.75-720	3/4	0.938	105	3"	20
PVH1.0-720	1	1.250	100	3"	27
PVH1.25-720	1 1/4	1.500	95	4"	30
PVH1.5-720	1 1/2	1.813	85	4"	40
PVH2.0-720	2	2.375	80	5"	60





MALE TAPER PIPE BY HOSE BARB

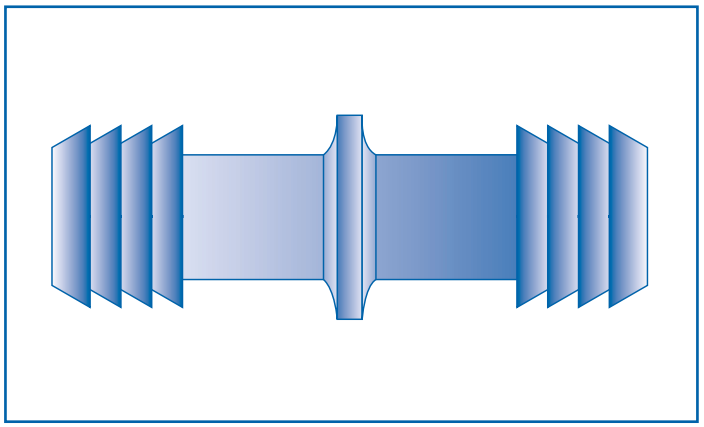
Part Number	M.P.T.	X	Barb
A1814	1/8	X	1/4
A1838	1/8	X	3/8
A14	1/4	X	1/4
A1438	1/4	X	3/8
A1412	1/4	X	1/2
A3814	3/8	X	1/4
A38	3/8	X	3/8
A3812	3/8	X	1/2
A3858	3/8	X	5/8
A1214	1/2	X	1/4
A1238	1/2	X	3/8
A12	1/2	X	1/2
A1258	1/2	X	5/8
A1234	1/2	X	3/4
A12100	1/2	X	1
A3414	3/4	X	1/4
A3438	3/4	X	3/8
A3412	3/4	X	1/2
A3458	3/4	X	5/8
A34	3/4	X	3/4
A34100	3/4	X	1
A10034	1	X	3/4
A100	1	X	1
A100114	1	X	1 1/4
A11434	1 1/4	X	3/4
A114100	1 1/4	X	1
A114	1 1/4	X	1 1/4
A114112	1 1/4	X	1 1/2
A112114	1 1/2	X	1 1/4
A112	1 1/2	X	1 1/2
A200	2	X	2

ELBOW–MALE TAPER PIPE BY HOSE BARB

Part Number	M.P.T.	X	Barb
EL1814	1/8	X	1/4
EL1838	1/8	X	3/8
EL14	1/4	X	1/4
EL1438	1/4	X	3/8
EL1412	1/4	X	1/2
EL1458	1/4	X	5/8
EL3814	3/8	X	1/4
EL38	3/8	X	3/8
EL3812	3/8	X	1/2
EL3858	3/8	X	5/8
EL1214	1/2	X	1/4
EL1238	1/2	X	3/8
EL12	1/2	X	1/2
EL1258	1/2	X	5/8
EL1234	1/2	X	3/4
EL12100	1/2	X	1
EL3438	3/4	X	3/8
EL3412	3/4	X	1/2
EL3458	3/4	X	5/8
EL34	3/4	X	3/4
EL34100	3/4	X	1
EL10012	1	X	1/2
EL10034	1	X	3/4
EL100	1	X	1
EL11434	1 1/4	X	3/4
EL114100	1 1/4	X	1
EL114	1 1/4	X	1 1/4
EL114112	1 1/4	X	1 1/2
EL112	1 1/2	X	1 1/2
EL200	2	X	2

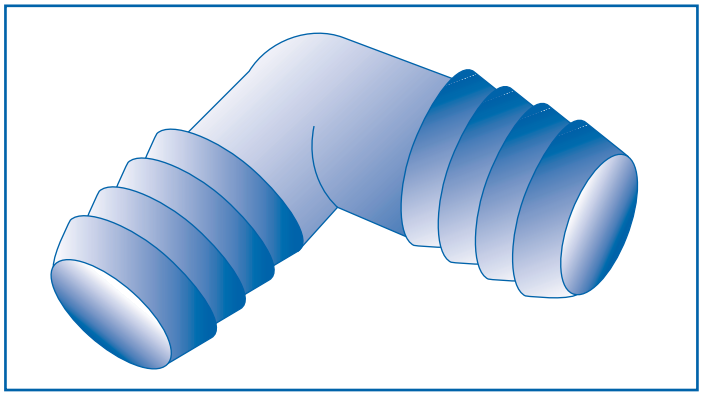
HOSE MENDER BARB TO BARB

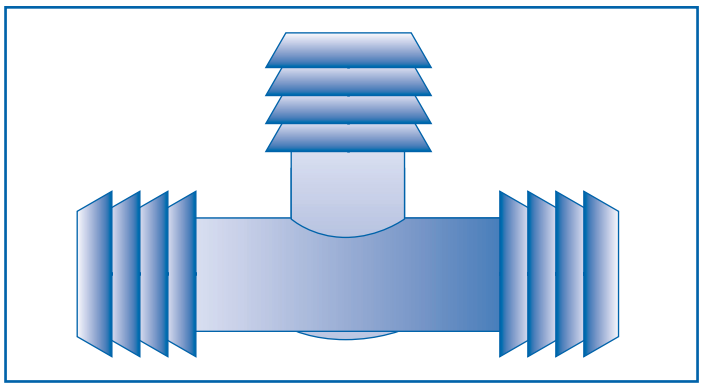
Part Number	Barb	X	Barb
HM18	1/8	X	1/8
SHM14	1/4	X	1/4
HM3814	3/8	X	1/4
SHM38	3/8	X	3/8
HM1214	1/2	X	1/4
SHM1238	1/2	X	3/8
SHM12	1/2	X	1/2
SHM1258	1/2	X	5/8
HM5838	5/8	X	3/8
SHM58	5/8	X	5/8
SHM34	3/4	X	3/4
SHM100	1	X	1
SHM114	1 1/4	X	1 1/4
SHM112	1 1/2	X	1 1/2
SHM200	2	X	2



ELBOW–HOSE BARB BY HOSE BARB

Part Number	Barb	X	Barb
EL14HB	1/4	X	1/4
EL38HB	3/8	X	3/8
EL12HB	1/2	X	1/2
EL58HB	5/8	X	5/8
EL34HB	3/4	X	3/4
EL100HB	1	X	1
EL114HB	1 1/4	X	1 1/4
EL112HB	1 1/2	X	1 1/2
EL200HB	2	X	2



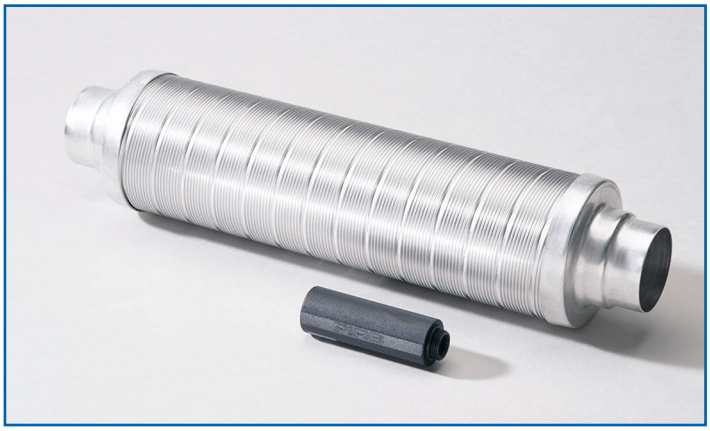


TEE–BARB BY BARB BY BARB

Part Number	Barb 1	X	Barb 2 & 3
T18	1/8	X	1/8
T14	1/4	X	1/4
T1438	1/4	X	3/8
T38	3/8	X	3/8
T3812	3/8	X	1/2
T3858	3/8	X	5/8
T1238	1/2	X	3/8
T12	1/2	X	1/2

TEE–BARB BY BARB BY BARB

Part Number	Barb 1	X	Barb 2 & 3
T58	5/8	X	5/8
T3412	3/4	X	1/2
T34	3/4	X	3/4
T100	1	X	1
T114	1 1/4	X	1 1/4
T112	1 1/2	X	1 1/2
T200	2	X	2



SILENCERS

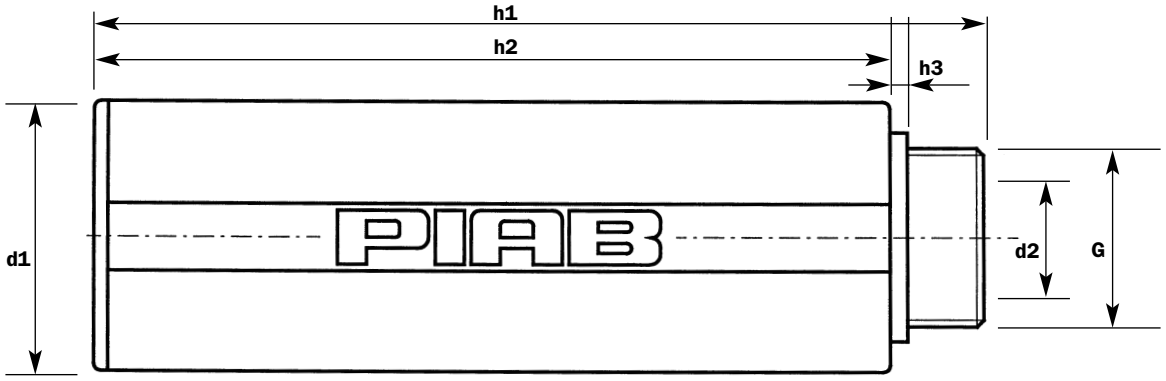
- External free flow silencer
- Reduces the noise level from the pump by more than 10 dB(A)
- Silencer 75 is used together with Central Exhaust for PIAB Vacuum Pumps, model Maxi.

TECHNICAL DATA & ARTICLE NUMBERS

Type	Material	Working Temperature	Noise Reduction dB(A)	Weight Ounces	Part Number
Silencer 3/8"	PA, HDPE	-13°F to 212°F	-10	0.5	32.16.009
Silencer 1/2"	PA, HDPE	-13°F to 212°F	-10	2.1	32.16.001
Silencer 3/4"	PA, HDPE	-13°F to 212°F	-10	2.2	32.16.002
Silencer 1 1/2"	PA, HDPE	-13°F to 212°F	-10	14.5	01.03.224
Silencer 75	AL	-13°F to 212°F	-10	17.6	31.16.609

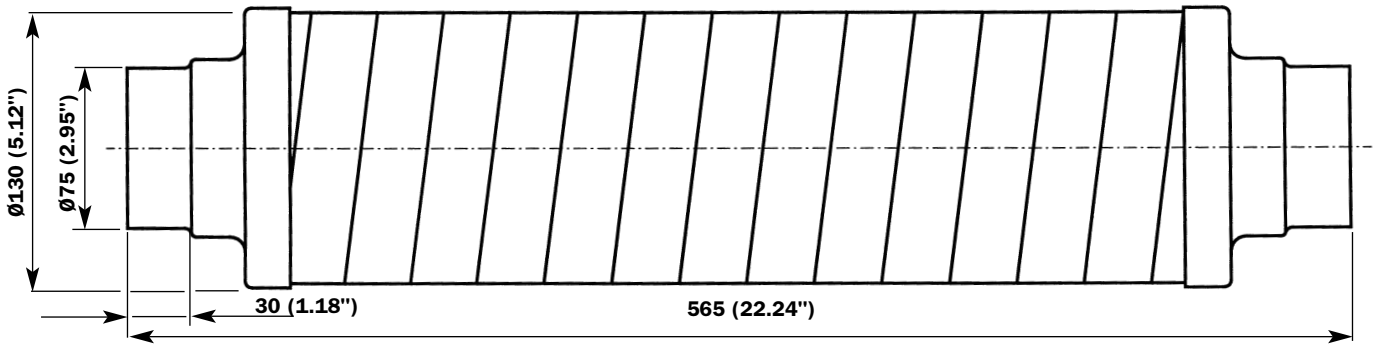
DIMENSIONAL DRAWINGS

Silencer



Size G	d1		d2		h1		h2		h3	
	mm	[in]	mm	[in]	mm	[in]	mm	[in]	mm	[in]
3/8"	24	[0.94]	11	[0.43]	71.5	[2.81]	62	[2.44]	2	[0.08]
1/2"	40	[1.57]	15	[0.59]	129.5	[5.10]	116	[4.57]	2.5	[0.10]
3/4"	40	[1.57]	17	[0.67]	129.5	[5.10]	116	[4.57]	2.5	[0.10]
G 1½	85	[3.35]	40	[1.57]	205	[8.07]	181	[7.13]	9	[0.35]

Silencer 75



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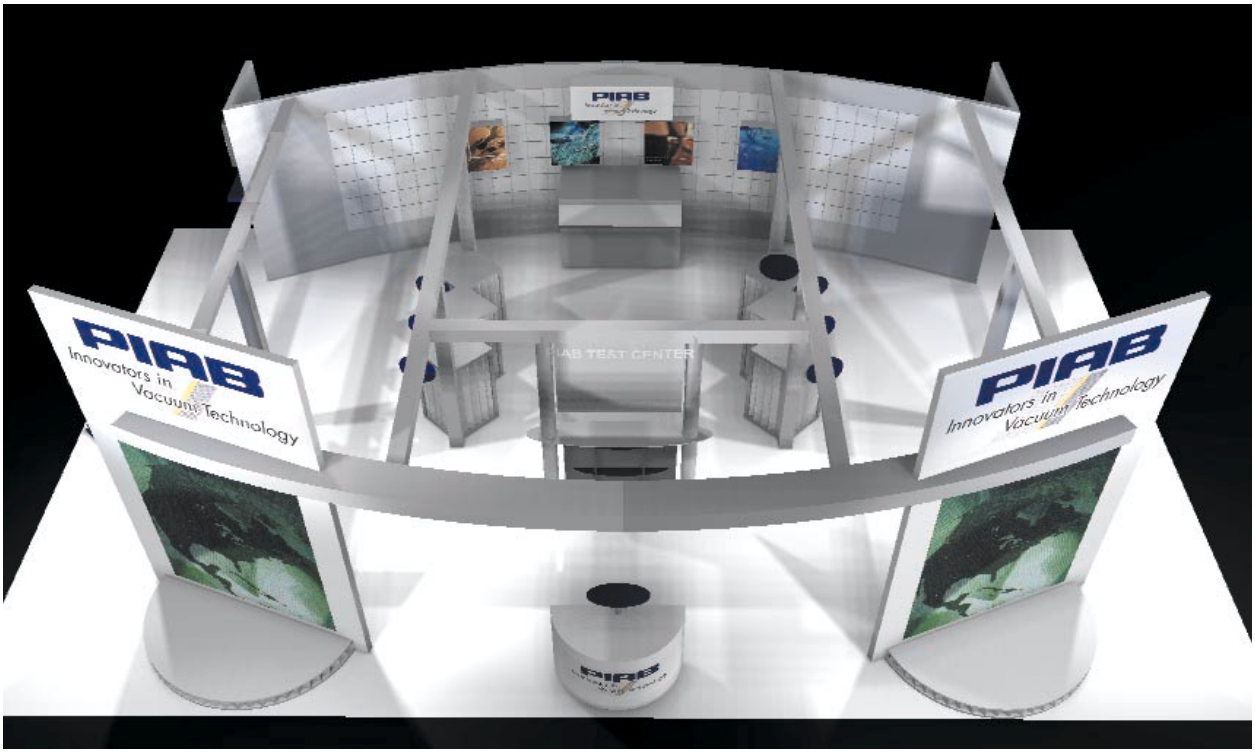

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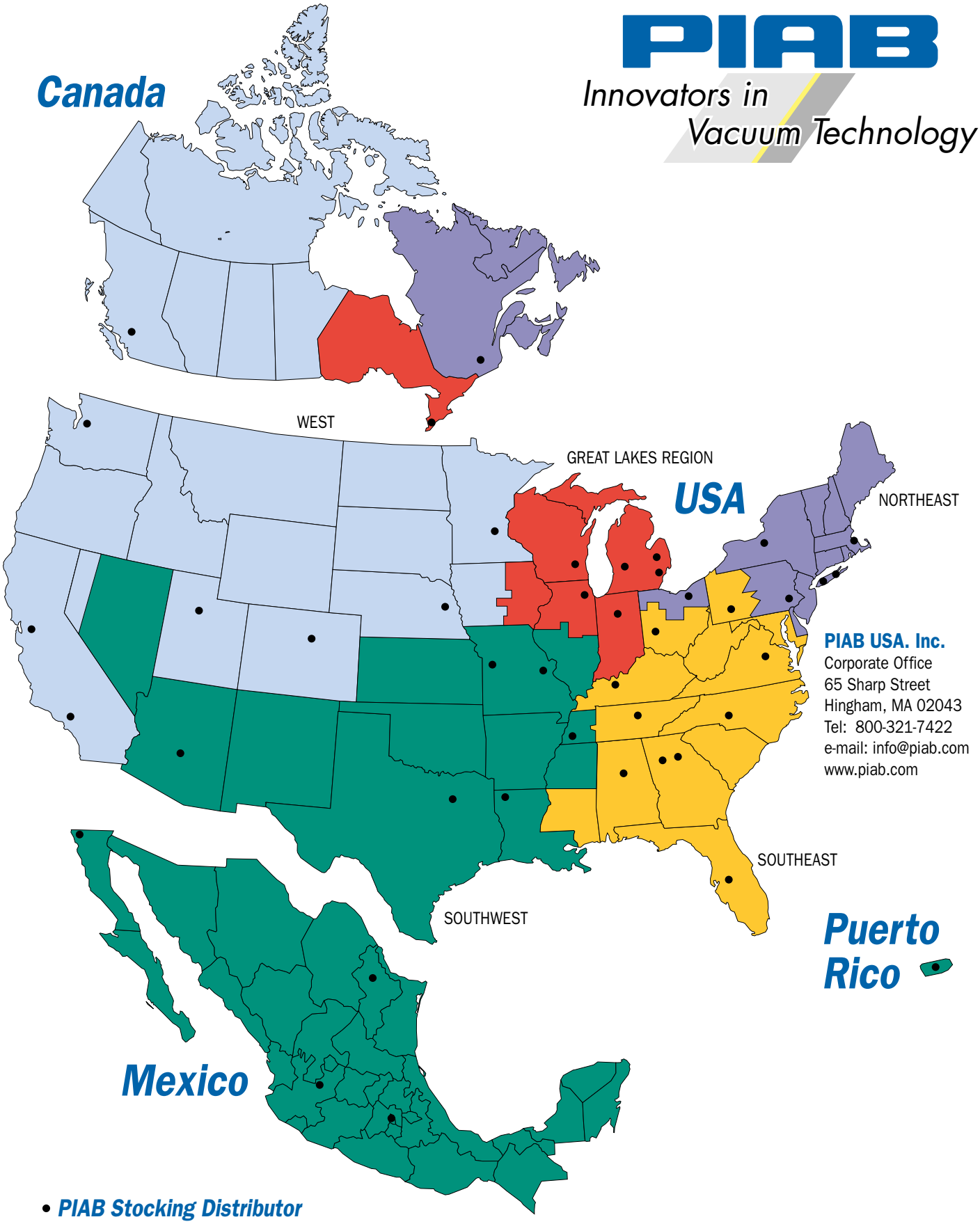

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Corporate Office
65 Sharp Street
Hingham, MA 02043
Tel: 800-321-7422
e-mail: info@piab.com
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Fax 65-483 1193
E-mail: piab@pacific.net.sg

AUSTRALIA
PIAB Asia Pacific Pte Ltd.
P.O. Box 3
AU-CHELTENHAM, Vic. 3192
Tel 61-3 9584 9410
Fax 61-3 9584 6231
E-mail: piab@blaze.net.au

FRANCE
PIAB S.A.
Parc d'Entreprises Esplanade
Saint Thibault-des-Vignes
FR-77462 LAGNY SUR MARNE CEDEX
Tel 33-1 64 30 82 67
Fax 33-1 64 30 82 85
E-mail: piab@argyro.net
Web site: www.piab.fr

GERMANY
PIAB Vakuum GmbH
Pfingstweide 41
D-61169 FRIEDBERG
Tel 49-6031 71840
Fax 49-6031 718419
E-mail: info@piab.de
Web site: www.piab.de

GREAT BRITAIN
PIAB G.B., Ltd.
GB-BRENTFORD, Middlesex TW8 9AJ
Tel 44-181 568 0165
Fax 44-181 847 3437
E-mail: piab.gb@btinternet.com

ITALY
PIAB ITALIA Srl
Via Schiaparelli, 10
IT-10148 TORINO
Tel 39-011 226 36 66
Fax 39-011 226 21 11
E-mail: piab@piab.it
Web site: www.piab.it

JAPAN
PIAB Japan Ltd.
26-28 Hayase-2,
TODA CITY
SAITAMA PREF.
Tel 81-48 421 1998
Fax 81-48 422 1803
E-mail: piab-j-m@ra2.so-net.or.jp
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SOUTH AMERICA (Colombia)
PIAB Latin America
Carrera 18 No. 86A-14
COLOMBIA
Tel 57-1 296 0242
Fax 57-1 296 0243
E-mail: piablam@piab.com
Web site: www.piab.es/lam

SOUTH AFRICA
PIAB (Pty) Ltd.
P.O. Box 651570
BENMORE 2010
Tel 27-11 442 4040
Fax 27-11 442 4074
E-mail: piabembl@gem.co.za

SPAIN
Vacío PIAB, S.L.
Calle Badal 16, Local 3
ES-08014 BARCELONA
Tel 34-3 331 22 11
Fax 34-3 331 21 85
E-mail: piabspa@piab.es
Web site: www.piab.es

SWEDEN
PIAB AB
Box 4501
SE-183 04 TÄBY
Tel 46-8 630 25 00
Fax 46-8 630 26 90
E-mail: info@mail.piab.se
Web site: www.piab.se

SWITZERLAND
PIAB Vakuum AG
Industrie Neuhof 9
Postfach 400
CH-3422 KIRCHBERG
Tel 41-34 448 24 24
Fax 41-34 448 24 20
E-mail: piab@bluewin.ch
Web site: www.piab.ch

NORTH AMERICA
PIAB USA, Inc.
65 Sharp Street
Hingham, MA 02043
1-800-321-7422
E-mail: info@piab.com
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