piab

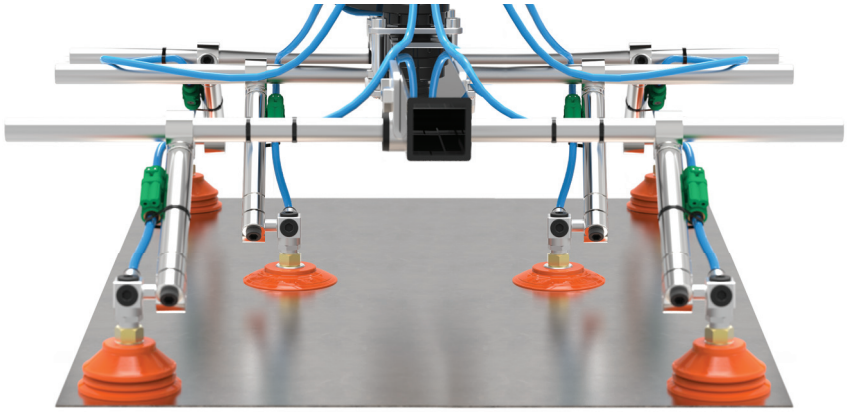
Automotive Industry

Realise productivity gains with innovative vacuum components for the automotive industry

Your global supplier

What does Piab do for the Automotive industry?

Piab's vacuum components for highly automated production lines in the automotive industry are found in the press shop, body shop and final assembly. Piab also has special products for manual handling devices and for automotive sub-supplier industries, such as tailored-welded blanks, glass, tires and plastic interior/exterior parts.

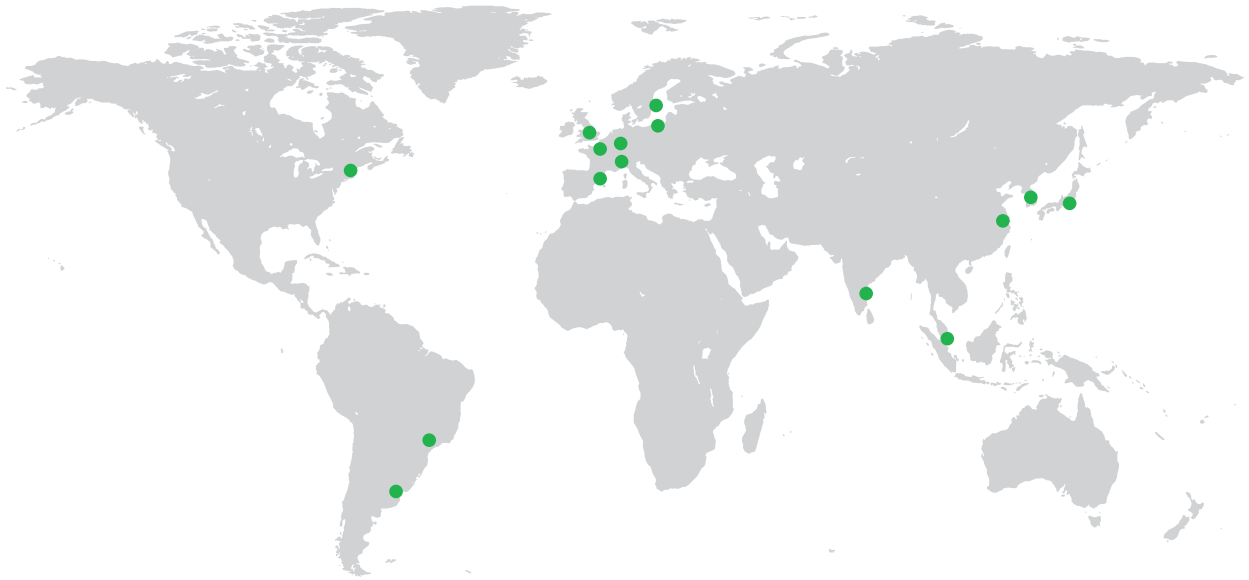


Over 25 years' experience of selling vacuum components to automotive with excellent track-record

- Efficient vacuum generators for centralised and decentralised vacuum.
- Durable and mark free suction cups for metal sheets, glass, plastics and composites made of high-end materials.
- End-of-arm tools and mounting elements to facilitate positioning of suction cups.
- Vacuum system accessories such as level compensators, vacuum sensors, vacuum check valves and energy optimisers.
- Large Area Foam Grippers.

Strong productivity benefits with Piab components for automotive

- Huge selection of products designed in accordance with automotive industry standards that are configurable to meet each and every need.
- High reliability and superior performance leading to better uptime, faster cycles times and longer intervals between maintenance/service.
- Energy savings up to 50%.
- Several specially designed functions to handle E-Stop situations and eliminate risk for damage and wasted energy consumption.
- Condition monitoring and diagnostics functions to maximise system reliability and minimise down-time.
- Advanced communication and remote parameter setting with IO-link technology gives improved operating efficiency. IO-link is fieldbus neutral making it easy to integrate.



A Global Automotive sales team

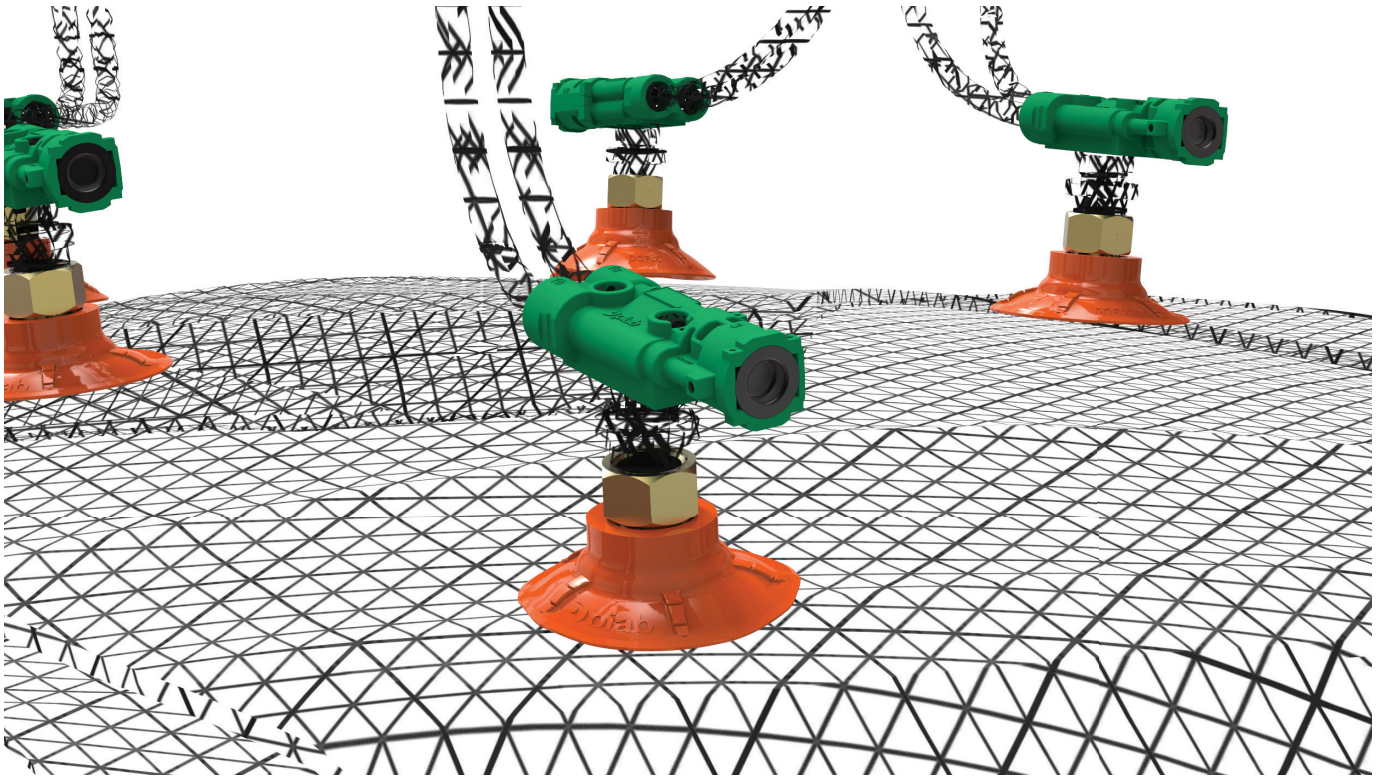
- Offers regional and global support/coordination.
- Fast deliveries worldwide thanks to a logistic set-up with regional warehouses.
- Great customer support with product and application expertise.
- Full support to OEMs, line builders and integrators for the best vacuum solution.
- On-site training for operators and engineers.
- Help with documentation and plant/project handbooks.
- Vacuum audits of manufacturing units with focus on energy, speed and uptime improvements.

piab

- Deep “Know-how” in following areas:
  - Tailored blanks
  - Press shop
  - Body shop
  - Final assembly (Glass, and manual handling lifting)

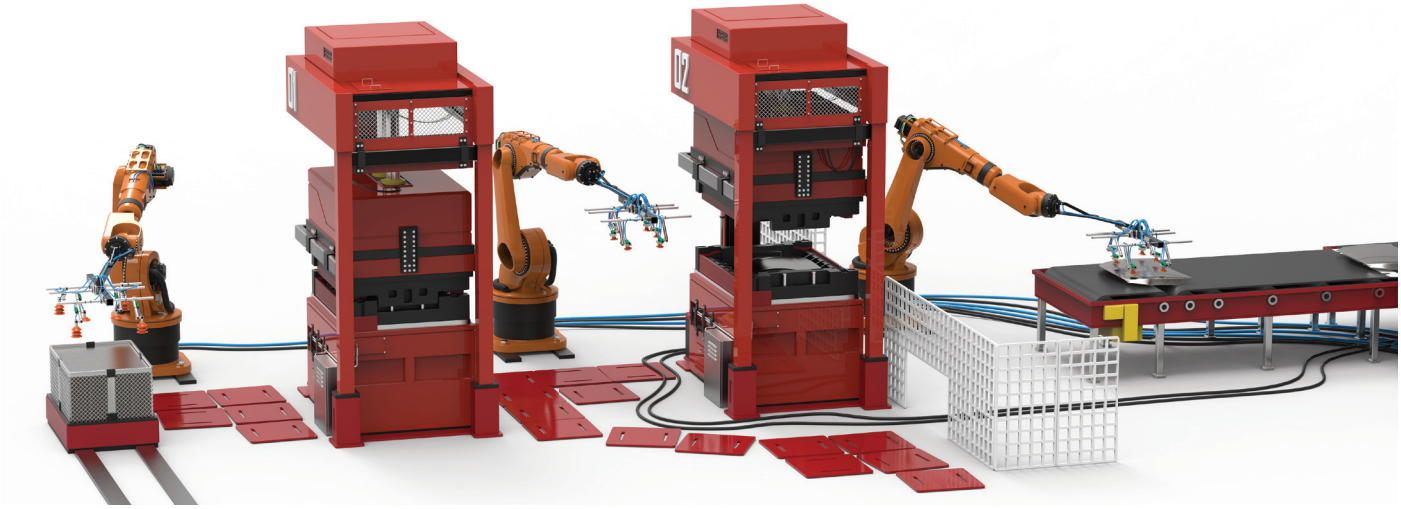
R&D department dedicated to support automotive customers

- Constant flow of new innovative products for automotive applications.
- Customised solutions.
- Best-in-class support on 3D-CAD downloads, compliance certificates and MTBF data.
- Suction cups are available with 3D CAD (step file, etc.) both in normal and vacuum activated states.
- Silicone-free and PWIS-free certificates available.



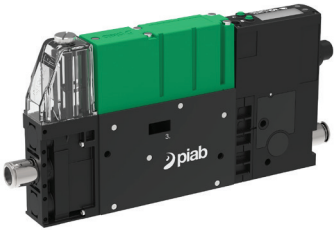
Press shop

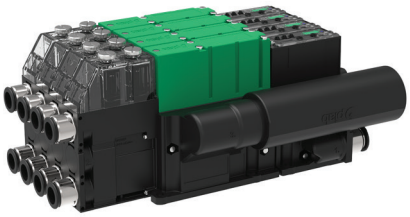
In stamping (pressing), sheet metal blanks of steel or aluminum are moved through a series of presses and formed into car parts such as a door panel or a hood/bonnet. Piab's components are used to de-stack, transport and at the end, automatically rack the parts as fast and as reliably as possible by the means of vacuum. Piab's suction cups, suction cup holders and COAX® based vacuum generators (centralised and decentralised) with unique features and functions intended for stamping will help exceed your requirements for vacuum components.



Piab's components…

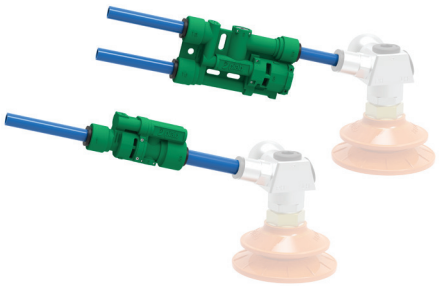
- Highest reliability for maximum uptime.
- Durable and long lasting.
- Ability to adapt and conform to complex geometries found in the later press stages.
- Lightweight.
- Cups and ejectors contribute to more Strokes Per Minute (SPM).
- Products are easy to use and easy to control.
- Condition monitoring and diagnostics functions.
- Resistant to tough environment (oil, dirt, heavy vibrations).
- Integrated safety functions in case of E-Stop.
- Energy savings with COAX® technology and other integrated functions.





piCOMPACT®23

Centralised “all-in-one ejector” with integrated controls. Available with functions suitable in stamping such as bi-stable on/off valve for safety, ABO (amplified blow-off), high capacity nozzles for faster cycle time, vacuum filter for reliability, energy saving functions, IO-Link communication and much more. Read more on page 20.



piINLINE®plus with AQR & EBR

New patented lightweight decentralised inline ejector with integrated automatic release function (AQR) and exhaust block release function (EBR). Read more on page 17.

piSTAMP with EBR

Decentralised lightweight ejector with generic design and Exhaust Block Release function (EBR). Read more on page 19.

DURAFLEX® Friction cups, DCF series

Handling of convex and concave oily surfaces with maximum shear force grip. Read more on page 41.

DURAFLEX® Friction cups, BFFT Series

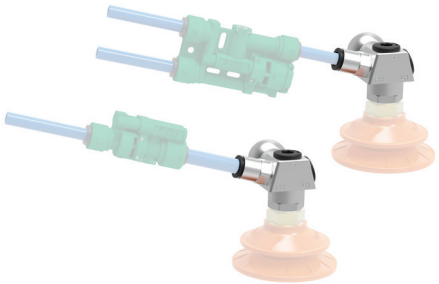
Handling ultra-thin metal sheets without risk for dents. Suitable for thickness ≥0.6mm. Read more on page 39.

DURAFLEX® Friction cups, BXF series

Specially designed for de-stacking and auto-racking applications where large level compensation is needed. Eliminates the need for spring plungers/metal level compensators. **Coming soon.**

DURAFLEX® Friction cups, OCF and OBF series

Small oval friction cups to handle and grip on narrow and curved surfaces on parts at the end of the press line. Read more on page 45 and 47.

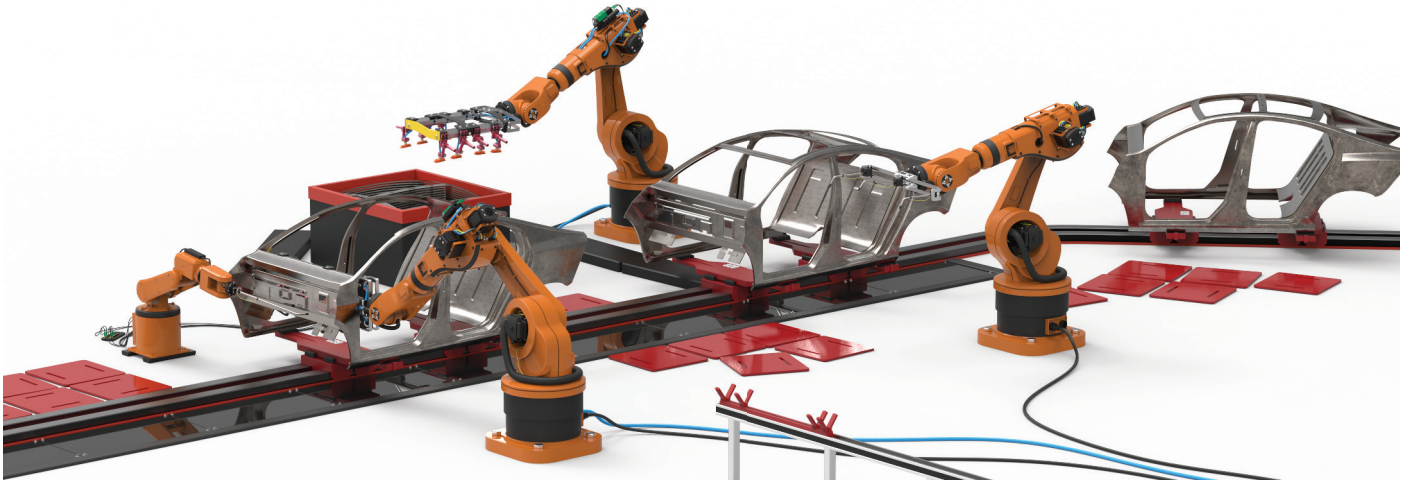


Suction cup holders

New weight-optimised and durable suction cups holders. Made of machined aluminum and available with ball joint and lock pin interfaces for industry standard end-of-arm tools.

Body shop

In the fully automated body shop process, the stamped parts are welded and assembled into a body-in-white car ready for the paint shop. Piab's vacuum components are used on advanced robot gripper systems for handling parts between assembly stations and in vacuum holding fixtures during operations such as welding and hemming of parts together. For quality control and loading stations in the production process, Piab components are used on ergonomic manual handling devices as well. Piab's tailored made components for the body shop have several unique features helping improve productivity and safety.

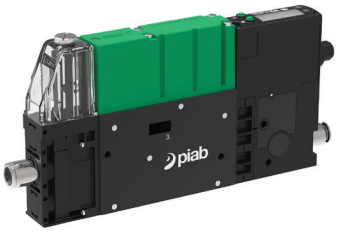


Piab's components…

- Vacuum safety functions to handle system and power failures as well as E-Stops without risk for damage of parts or harm to personnel.
- Decentralised vacuum solutions with safety functions for highest degree of fail-safe operation.
- Energy saving function with COAX® technology and other integrated functions.
- Highest reliability for maximum uptime.
- Durable in the harsh welding environment where ozone and welding sparks are present.
- Products that are easy to use and easy to control.
- Modular tooling components for quick setup and unlimited positioning of cups.
- Condition monitoring and diagnostics functions.

Decentralised ejectors

These decentralised ejectors come with integrated vacuum check valve, release and/or energy saving functions. **PMAT Vacuum Check Valve (24h).** Recommended if mechanical safety system is excluded. (Pg. 70) **piSECURE with Vacuum Check Valve.** Recommended if mechanical safety system is excluded. (Pg. 24) **VGS™3040.** Recommended if a mechanical safety system is included. (Pg. 25)



piCOMPACT®23

Centralised “all-in-one ejector” with integrated controls. Available with functions suitable in the body shop such as bi-stable on/off valve for safety, vacuum filter for reliability, energy saving functions, IO-link communication, Pre Vacuum Hovering (PVH) and Self Adhesion Control (SAC) for manual handling devices and much more. Read more on page 20.

P5010 ES AQR

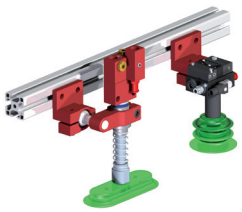
Pneumatic controlled centralised compact ejector with check valve, release and energy saving functions. Read more on page 29.

Vacuum Switch VS4128

Durable Vacuum Switch with M12 connector. Possible to serial wire to save I/Os, suitable for decentralised systems. Read more on page 86.

DURAFLEX® Friction cups

Huge program of cups for handing metal sheets with complex geometries. Read more on pages 37–48.



PMAT (Piab Modular Automation Tooling)

Allows design of vacuum gripper and fixture tools in body shop with minimal design time. Made of hard coated aluminum and easy to assemble onsite, without welding or use of special tools. Full adjustability, flexibility and rigidity. Read more on page 73.

Final Assembly

In the final assembly, the painted car will be made ready on the assembly line. Windshields, tires, plastic exterior parts (bumpers, lights etc), interior parts (dashboards, seats, textiles, etc.) are assembled and the engine and power transmission is merged with the rest. At the end of the assembly line, car liquids, such as brake oil and A/C coolants are filled up. Piab's vacuum products are widely used in most of the final assembly applications, on ergonomic-manual handling assist arms and robots used for windshield assembly or for other pick-and-place. Large, deep vacuum Piab ejector pumps are also found in stations for liquid filling.

Piab's components…

- Vacuum safety functions to handle system and power failures as well as E-Stops without risk.
- To reduce damage of parts or harm to personnel, suitable for manual handling assist arms.
- Decentralised vacuum solutions with safety functions for highest degree of fail-safe operation.
- Tailored made patented functions such as Self Adhesion Control (SAC) and Pre Vacuum Hovering (PVH) to optimise design of ergonomic assist arms and make them user-friendly, efficient and safe for operators.
- Special suction cups for excellent grip on textured plastic surfaces. Good choice for interior parts and back-side of composite parts.
- Mark free suction cups for windshield handling.
- Energy saving function with COAX® technology.
- Foam grippers to pick and kit layers of smaller parts.
- Reliable and maintenance-free deep vacuum ejector pumps for liquid filling applications.

DURAFLEX® single durometer

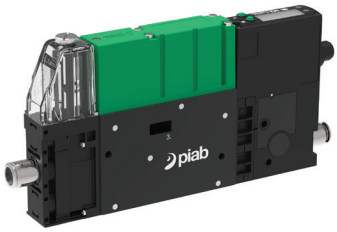
Mark-free grip for windshield handling. Read more on page 49.

DURAFLEX® dual durometer

Excellent grip on textured and rough surfaces. Read more on page 56.

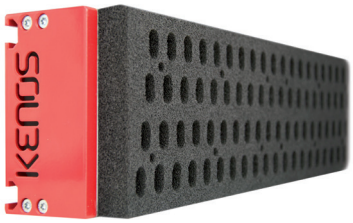
Vacuum check valve & piSECURE

Secures vacuum in cups for hours in case of power failure. Read more on pages 24 and 70 respectively.



piCOMPACT®23 with SAC & PVH

Features SAC (Self Adhesion Control) and PVH (Pre Vacuum Hovering). Patented functions for ergonomic vacuum assist arms used for assembly. The function will make it easier, safer and more efficient for operators. Read more on page 20.



Kenos foam grippers

Flexible solutions for handling several products with different shapes, dimensions and compactness. Read more on page 63.

P6040

Large capacity ejector pumps suitable for liquid filling applications. Maintenance-free operation. Read more on page 32.

piab

Vacuum technology at automotive sub-suppliers

Piab components are important for successful manufacturing of car parts made by sub suppliers for the automotive industry. Here are some examples where Piab components are present and contribute to efficient production.

Tailor welded blanks

The process prior to stamping the metal sheets in order to optimise the car weight as well as for crash-safety. Blanks (metal sheets) of different thickness are laser welded together before entering the press shop. Piab DURAFLEX® cups have proven to last long and stay flexible in the laser welding environment.

Interior parts

Design and appearance requirements on car interiors often results in materials with textured surfaces that are more difficult to grip without damage. Piab has developed a line of polyurethane cups with flexible lips and stable bodies that will give an excellent grip on these materials.

Windshields

In the production of windshields, mark free handling, abrasion resistance and sometimes high temperature resistance are the important requirements. Piab's program of silicone free DURAFLEX® cups has proven particularly suitable in the glass industry. piSECURE is an ejector product line developed for the highest degree of safety when handling and lifting glass.

Tires

Vacuum is used to handle rubber slabs during the molding process of car tires. Piab has developed a program of small DURAFLEX® cups with excellent grip and longer life when handling rubber slabs as compared to conventional suction cups. For the molding process, Piab's large (deep vacuum) ejector pumps are used to secure the quality of the tires. They contribute with reliability, easy installation, easy operation and low cost of service compared to rotary vane pumps.

General Motors utilises 80% more efficient decentralised vacuum system

Background

General Motors (GM) needed a vacuum system that would function in harsh environments and provide a high level of performance and safety. The major automotive manufacturer saw a number of advantages in choosing a decentralised vacuum system over a centralised one.

Solution

With a decentralised system, performance can be enhanced as it offers a great amount of flexibility. As additional product styles are included in a line at GM, a valve and the necessary cups to accommodate the new product are easily added. Strong, continuous vacuum flow is another goal to consider when choosing a system. With vacuum being produced at each suction cup, a decentralised system will still retain a strong hold if some of the cups are damaged or line losses occur.

Result

GM has recognised that the decentralised vacuum system from Piab is about 80% more efficient than a centralised vacuum setup. This means that huge potential savings in air can be realised when using that system. GM has also recognised gains through improved setup and simple maintenance, as the setup for the decentralised system is very simplistic.

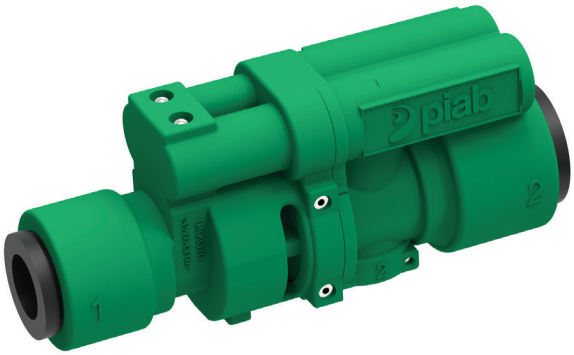
Product overview

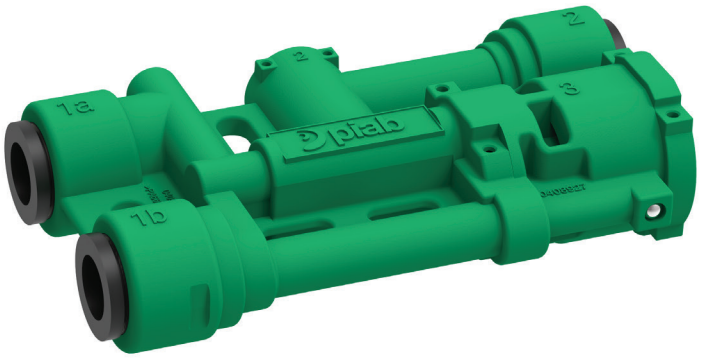
	Tailored blank	Press shop	Body shop	Final assembly	Other
Generators/ejectors					
piINLINE®plus	••	•••	••	••	–
piSTAMP	••	•••	••	••	–
piCOMPACT®23	•••	•••	•••	•••	–
piSECURE	••	••	•••	•••	–
VGS™3040	••	••	•••	•••	–
P5010	•	•	•••	•	•
P6040	–	–	–	•••	–
Suction cups					
Friction cups	•••	•••	•••	••	–
DURAFLEX® single durometer	•••	•	••	•••	•••
DURAFLEX® dual durometer	••	•	•••	•••	•••
XLF 150	•••	•	••	•••	–
Kenos Vacuum Gripping Systems	•	•	•	••	•••
PMAT					
PMAT configurable products	••	••	•••	•••	–
Accessories					
Mounting elements (ME)	•••	••	••	•••	–
Level Compensators	•••	•••	•••	•••	–
Blow-off check valves	•••	•••	•••	•••	–
AQR	•••	•••	•••	•••	–
piSAVE release	•••	•••	•••	•••	–
Optimisers					
piSAVE sense 02/03	•••	••	••	•••	–
Vacustat	•••	•••	•••	•••	–
piSAVE optimize	•••	•••	•••	•••	–
Vacuum switch VS4128	••	••	•••	•••	–
T-connector M12 male	••	••	•••	•••	–

••• Recommended, •• Functional but not recommended, • Not recommended.

Generators/ejectors

piINLINE®plus





The ultra-lightweight vacuum ejectors feature a unique and integrated automatic release mechanism, and come in compact, minimised packages. Tailor-made for automotive press-shop automation, piINLINE®plus generators utilise the COAX® technology, ensuring low air consumption (typically 25 percent lower than competing technology), excellent suction capacity, and fast evacuation. Generators can be configured with either one or two MICRO COAX® cartridges; two cartridges for larger suction cups in high speed applications, or one cartridge for smaller suction cups or for reduced air consumption when high speed is not essential.

The integrated release function is available in two optional designs – the easily controllable Atmospheric Quick Release (AQR), which requires no extra compressed air hose, and the very fast performing Exhaust Block Release (EBR).

Vacuum flow

COAX® cartridge	Feed pressure	Air consumption	Vacuum flow (Nl/s) at different vacuum levels (-kPa)									Max vacuum
	MPa	Nl/s	0	10	20	30	40	50	60	70	80	-kPa
MICRO Ti05-2	0.5	0.64	0.62	0.56	0.48	0.38	0.26	0.14	0.06	0.02	0.004	81

Evacuation times

COAX® cartridge	Feed pressure	Air consumption	Evacuation time (s/l) to reach different vacuum levels (-kPa)								Max vacuum
	MPa	Nl/s	10	20	30	40	50	60	70	80	-kPa
MICRO Ti05-2	0.5	0.64	0.17	0.36	0.6	0.9	1.4	2.4	4.9	13.3	81

Ordering information

For a complete list of available pumps and combinations with further information visit **piab.com**. On our webpage you will also be able to find dimensional drawings, CAD-drawings and much more. Register and get full access to all resources available.

piINLINE®plus – Customer Code

piINLINE®plus Code
PIL

Code	Model
A	AQR
B	EBR

Code	Nozzle
T	Ti05-2 Extra high vacuum flow

Code	Nozzle rows
1	Single
2	Double

Code	Air connection:
6	ø6 push-in connector(s)
14	ø1/4" push-in connector(s)
8	ø8 push-in connector(s)

Code	EBR-Pilot air connection
6	ø6 push-in connector(s)
14	ø1/4" push-in connector(s)
8	ø8 push-in connector(s)
X	No pilot air connection

PIL . A . T . 2 . 8X . 10 . X . XXX

Code	Vacuum connection
6	ø6 push-in connector(s)
14	ø1/4" push-in connector(s)
8	ø8 (5/18 (5/16)) push-in connector(s)
10	ø1/4" push-in connector(s)
38	ø3/8” push-in connector(s)

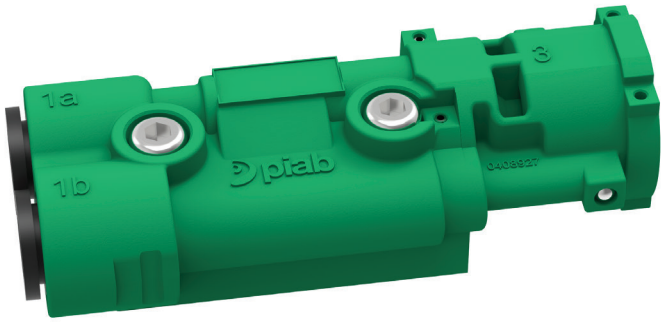
Code	Sensing port connection
X	No
6	Yes 6mm
14	Yes 1/4” mm

Code	Suction cup holder
X	No holder
I	Ball-Joint
C	Lock-pin

Code	Holder mounting direction
X	No holder
LH	Left handed
RH	Right handed
U	Up

Code	Holder thread
X	No holder
G38F	G3/8” female
G38M	G3/8” male
NT38M	3/8” NPT male

piSTAMP



piSTAMP offers easy retrofitting in the automotive press shop tooling. The ultra-lightweight vacuum generator features a unique and integrated release mechanism, and comes in a compact, minimised package. A fully decentralised design with compressed air ports at the side and vacuum port underneath, piSTAMP will fit perfectly in generic suction cup holders found in standard press shop tooling systems. piSTAMP utilises COAX® technology, typically 25 percent lower than competing technology, excellent suction capacity, and fast evacuation. The generator is normally supplied with two MICRO COAX® cartridges, supporting large suction cups in high speed applications. A one cartridge option is available for additional air consumption saving when used with smaller cups or at slower cycle speeds.

The integrated release function, the very fast acting Exhaust Block Release (EBR), is based on a durable polyurethane membrane which is not sensitive to dust. This ensures highly reliable production systems with improved uptime.

Vacuum flow

COAX® cartridge	Feed pressure	Air consumption	Vacuum flow (Nl/s) at different vacuum levels (-kPa)									Max vacuum
	MPa	Nl/s	0	10	20	30	40	50	60	70	80	-kPa
MICRO Ti05-2	0.5	0.64	0.62	0.56	0.48	0.38	0.26	0.14	0.06	0.02	0.004	81

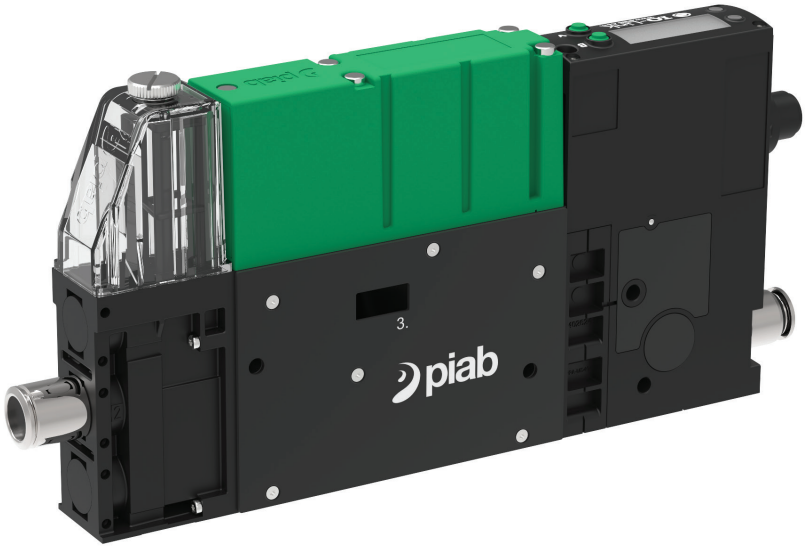
Evacuation times

COAX® cartridge	Feed pressure	Air consumption	Evacuation time (s/l) to reach different vacuum levels (-kPa)								Max vacuum
	MPa	Nl/s	10	20	30	40	50	60	70	80	-kPa
MICRO Ti05-2	0.5	0.64	0.17	0.36	0.6	0.9	1.4	2.4	4.9	13.3	81

Ordering information

Name	Art. no.
piSTAMP 8-8 mm	0207770
piSTAMP 6-6 mm	0207771
piSTAMP 1/4"-1/4"	0207772

piCOMPACT®23



piCOMPACT® is an ejector family with integrated controls, so called compact or" all-in-one" ejector unit. It is a stackable platform with the possibility to mount several units in the same manifold and have common pneumatic and electrical connections. The focus during development has been on the most significant "key criteria" for these types of pumps, reliability and speed, as well as introducing some brand new attractive features/functions. That in combination with our state-of-the-art vacuum engine, COAX®, the product is outstanding. By working at low feed pressure and maximising the utilisation rate of the compressed air, the COAX® ejectors reduce energy consumption for manufacturers while increasing productivity and reliability. Its vacuum response to 50–60 -kPa is typically 30–50% faster compared to single stage technology.

Unbeaten performance, high reliability and new special features on piCOMPACT®23 will exceed the tough requirements of the automotive industry. The amplified blow-off (ABO) gives an efficient and super-strong, yet air-saving blow-off even in vacuum systems for very large car parts. The bi-stable (latching) on/off valve in combination with a check valve secures safety and air-savings in case of an emergency-stop. Integrated diagnostics, such as leakage warnings, and automatic functions to minimise energy consumption as well as high level communication (IO-link) are available options appreciated by automotive customers.

Vacuum flow

COAX® Cartridge	Feed pressure	Air consumption	Vacuum flow (Nl/s) at different vacuum levels (-kPa)									Max vacuum
	MPa	Nl/s	0	10	20	30	40	50	60	70	80	-kPa
SX12	0.504/0.5*	0.72	1.22	1.03	0.78	0.52	0.27	0.21	0.15	0.09	0.03	85
SX42	0.47/0.43*	2.21	3.46	3.02	2.41	1.7	1.02	0.61	0.47	0.28	0.1	90

* Pump/nozzle.

Evacuation times

COAX® Cartridge	Feed pressure	Air consumption	Evacuation time (s/l) to reach different vacuum levels (-kPa)								Max vacuum
	MPa	Nl/s	10	20	30	40	50	60	70	80	-kPa
SX12	0.504/0.5*	0.72	0.082	0.201	0.374	0.674	1.216	1.914	2.978	6.187	85
SX42	0.47/0.43*	2.21	0.038	0.074	0.123	0.204	0.356	0.577	0.879	1.718	90

* Pump/nozzle.

Pneumatic technical information

Description	Unit	COAX®			
		SX12 ×1	SX12 ×2	SX42 ×1	SX42 ×2
Optimum feed pressure, pump	MPa	0.504	0.515	0.47	0.54
Optimum feed pressure, nozzle	MPa	0.5	0.5	0.43	0.43
Max. vacuum at optimum pressure	-kPa	85	85	90	90
Air consumption at optimum pressure	Nl/s	0.72	1.44	2.21	4.42
Max. vacuum flow at optimum pressure	Nl/s	1.22	2.44	3.46	6.92
Flow, blow off at 0.6 MPa	Nl/s	0–5.5			

General electric characteristics

Description	
Supply voltage	24 ±10% V
Current consumption	100/63 mA (Valve pull/hold at $24V_{sys}$)

Technical data, IO-Link

Description	Unit	
Min. cycle time	ms	2.5
Transfer type	Baud rate	230k (COM3)
IO-Link revision		1.1

Valve module

Description	
Function on/off	Normally closed (NC*) or normally open (NO)
Function blow-off	Normally closed (NC)
Air consumption blow-off/release	0–5.5 Nl/s at 6 bar
Manual override	Yes, non-locking push style

* NC failsafe version is available (power off - NO). In running mode the valve behaves like a NC valve but if power is cut the valve goes into NO-mode leaving compressed air for continuous vacuum.

Other data

Description	
Temperature range	-10–50°C
Materials	PA, NBR, SS, POM, TPE, PVC, Brass, Al

For full specifications visit **piab.com**. On our webpage you will also be able to find dimensional drawings, CAD-drawings and much more. Register and get full access to all resources available.

piCOMPACT®23 – customer code

piCOMPACT®
Code
PC

Functionality	
Code	Vacuum characteristics
F	High vacuum performance

Functionality	
Code	Nozzle model
12	SX12 (73–146 Nl/min)
42	SX42 (207–415 Nl/min)
Code	**Nozzle rows**
1	Single
2	Double

Working enviroment	
Code	Chemical resistance
S	Standard

Functionality	
Code	Control functions
A	Electrical ES, vac and blow-off
B	Electrical ES, vac and automatic timer based blow-off (ATBO)
F	Electrical ES, vac, intelligent blow-off (IBO)
C	Vac and blow-off
D	Vac, automatic timer based blow-off (ATBO)
G	Vac and intelligent blow off (IBO)
E	Vacuum on/off (vac)
H	IO-Link pre-configured

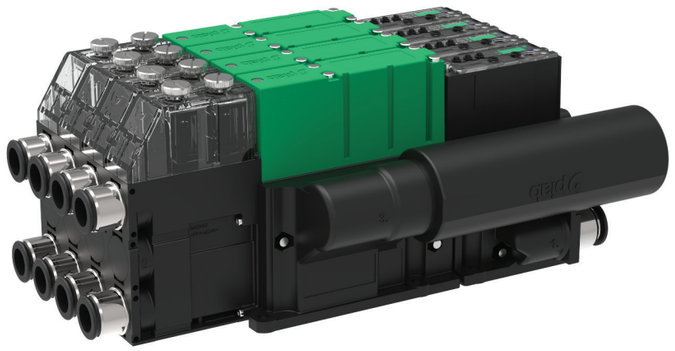
Additional vacuum functions	
Code	
	No extra vacuum control
Z	Self adhesion control (SAC)

Vacuum connect module	
Code	Vacuum filter
S	Vacuum filter 50 µm
F	2× Vacuum filter 50 µm
X	No vacuum filter
Z	No vacuum filter including sensing port
Code	**Vacuum ports(s) / channel**
1	1 vacuum port
2	2 vacuum ports
3	3 vacuum ports
Code	**Vacuum connection(s)**
8	Ø8(5/16) push-in connector(s)
P1	Ø10 push-in connector(s)
P2	Ø3/8" push-in connector(s)
P3	Ø12 push-in connector(s)
P4	Ø1/2" push-in connector(s)
H1	12mm / 1/2" I.D. barb connector

Single unit or manifold mount	
Code	Number of channels
1	1 channel
2	2 channels
3	3 channels
4	4 channels
Code	**Split control from vacuum**
X	No split
B	Split Ø6
C	Split Ø1/4"
D	Split Ø8
E	Split Ø10
F	Split Ø3/8"

Internal check valves	
Code	
B	Without non-return valve
A	With non-return valve
C	Amplified blow-off, without vacuum non-return valve (ABO)
D	Amplified blow-off, with vacuum non-return valve (ABO)
E	Pre-vacuum hovering, without vacuum non-return valve (PVH)
F	Pre-vacuum hovering, with vacuum non-return valve (PVH)
Code	**Vacuum sensing**
A	Display, analog and digital output
B	Display, 2× digital outputs
C	Display, leakage warning and digital output
D	IO-Link display
X	No vacuum sensing

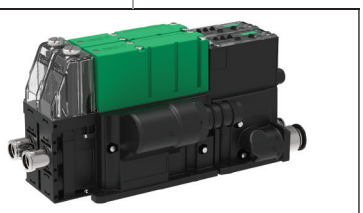
IO-Link Energy saving type	
Code	
1	ES pre-set on 75 -kPa
2	ES Automatic level determination (ALD)
3	ES pre-set on 75 -kPa with ALD backup
0	No ES
Code	**IO-Link Blow-off type**
1	Automatic timer based blow-off (ATBO)
2	Intelligent blow off (IBO)
0	External control
Code	**IO-Link Additional functions**
1	Self adhesion control (SAC)
0	No IO-Link additional functions



PC . F . 422 . S . AAA . F18 . 4X . 2P1 . EN . CCAB

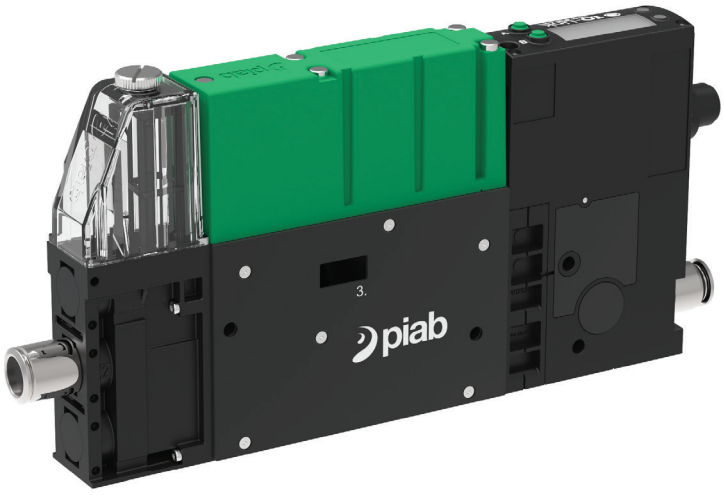
PC . F . 122 . S . H111AD . S1P1 . 1X . 8 . EJ . CCCC

Air supply	
Code	Air connections
6	Ø6 push-in connector
14	Ø1/4" push-in connector
8	Ø8(5/16") push-in connector
P1	Ø10 push-in connector
P2	Ø3/8" push-in connector
P3	Ø12 push-in connector(s)
P4	Ø1/2" push-in connector(s)
2P1	2× Ø10 push-in connector(s)
2P2	2× Ø3/8" push-in connector(s)
2P3	2× Ø12 push-in connector(s)
2P4	2× Ø1/2" push-in connector(s)



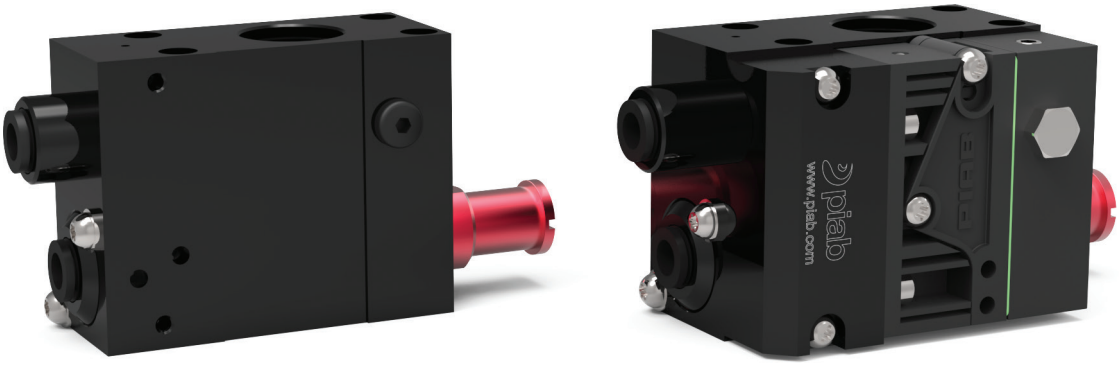
Mounting	
Code	Ejector options
EC	Ejectors stacked with central exhaust
EN	Ejectors stacked with central silencer
EJ	Ejector(s) for individual mounts, integrated silencer
EK	Ejector(s) for individual mounts, top mounted silencer
EL	Ejector(s) for individual mounts, central exhaust
EM	Ejector(s) for individual mounts, central silencer

Electrical properties	
Code	Valve configuration
CC	NC vacuum + NC blow off
FC	NC vacuum (power off - NO) + NC blow off
OC	NO vacuum + NC blow off
C	NC vacuum
O	NO vacuum
AC	Bi-stable vacuum valve + NC blow off
Code	**Electrical input/output**
A	PNP/PNP or NPN/NPN
B	Mixed mode
C	IO-Link, PNP/PNP
Code	**Electrical interface**
B	M12 8p connector(s)
C	M12 4p connector(s)



PC . F . 122 . S . H111AD . S1P1 . 1X . 8 . EJ . CCCC

piSECURE



This vacuum pump combines high security and the most energy-efficient solution for sealed material, COAX® technology with automatic air-saving function. It has a check valve that traps vacuum in sealed applications and an integrated energy saving device that results in virtually no energy consumption. It is an excellent product when working with vacuum handling devices that have to comply and fulfil legislated lifting norms for handling devices, for example (DIN/SS) – EN 13155, ASME Standard B30.20, etc.

As the piSECURE uses the two stage COAX® MINI Xi10-2 ejector it will provide a fast evacuation to 94 -kPa. It is suitable to use as decentralised (one per cup) for maximum safety. It also has an integrated blow-off release valve for fast and reliable release of object. The optional air saving function (piSECURE ES) can save up to 99% of consumption.

Vacuum flow

COAX® cartridge	Feed pressure	Air consumption	Vacuum flow (Nl/s) at different vacuum levels (-kPa)										Max vacuum
	MPa	Nl/s	0	10	20	30	40	50	60	70	80	90	-kPa
MINI Xi10-2	0.45	0.42	0.75	0.61	0.45	0.28	0.19	0.15	0.11	0.07	0.043	0.003	92
MINI Xi10-2	0.5	0.46	0.75	0.63	0.49	0.33	0.19	0.15	0.11	0.07	0.045	0.011	94
MINI Xi10-2	0.6	0.54	0.74	0.63	0.53	0.42	0.3	0.16	0.11	0.08	0.041	0.01	93

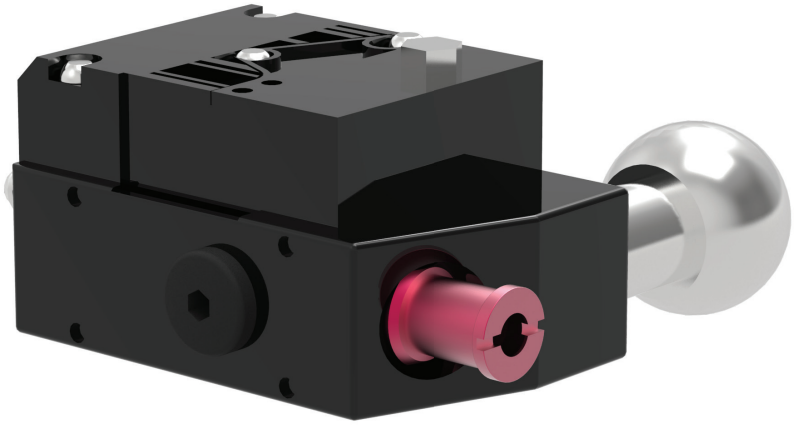
Evacuation times

COAX® cartridge	Feed pressure	Air consumption	Evacuation time (s/l) to reach different vacuum levels (-kPa)									Max vacuum
	MPa	Nl/s	10	20	30	40	50	60	70	80	90	-kPa
MINI Xi10-2	0.45	0.42	0.15	0.3	0.6	1.1	1.6	2.3	3.5	5.3	9.6	92
MINI Xi10-2	0.5	0.46	0.14	0.3	0.6	1	1.6	2.3	3.5	5.3	8.9	94
MINI Xi10-2	0.6	0.54	0.15	0.3	0.5	0.8	1.3	2	3.1	4.8	8.7	93

Ordering information

Name	Art. no.
piSECURE COAX® X10-2 ES	0200984
piSECURE COAX® X10-2	0200986

VGS™3040 family



This is a product design where different suction cups can be integrated with vacuum cartridges based on the patented COAX® technology. The “vacuum gripper” makes selection, sizing and installation of a vacuum system easier. With a VGS™ you will enjoy the benefits of a more cost-efficient and reliable decentralised vacuum system. The VGS™ is compatible with any suction cup with G3/8” male fitting. It has a low weight at 204–340 g. It is available with two- or three-stage COAX® cartridge MINI. Choose a Di cartridge, for very harsh environments, combining high dust and high humidity levels, an Si cartridge for extra vacuum flow, a Pi cartridge for high performance at low feed pressure or an Xi cartridge when high flow and deep vacuum is needed. The three-stage cartridge will give extra high initial vacuum flow, which is suitable in high speed applications. It is available in lockpin 16, 19 or balljoint mountings, industry standard as well as level compensator to compensate for differences in level of object. It can also be fitted with different functions as energy saving, release or blow off.

For automotive customers, VGS™3040 with piSAVE on/off, that has an integrated energy-saving device, piSAVE onoff, results in very low air consumption in sealed applications. The built-in blow off check valve will provide a fast release of the object. Also, VGS™3040 with blow off, it has a built-in blow off check valve for fast release of the handled object. Prevents vacuum from being pulled through the blow-off lines, which means faster response time and completely independent vacuum units.

Vacuum flow

COAX® Cartridge	Feed pressure	Air consumption	Vacuum flow (Nl/s) at different vacuum levels (-kPa)										Max vacuum
	MPa	Nl/s	0	10	20	30	40	50	60	70	80	90	-kPa
MINI Si08-2	0.6	0.44	0.77	0.67	0.51	0.33	0.23	0.16	0.12	0.08	—	—	75
MINI Si08-3	0.6	0.44	1.34	0.73	0.55	0.35	0.23	0.17	0.13	0.08	—	—	75
MINI Xi10-2	0.5	0.46	0.75	0.63	0.49	0.33	0.19	0.15	0.11	0.07	0.045	0.011	94
MINI Xi10-3	0.5	0.46	1.43	0.7	0.5	0.33	0.19	0.15	0.11	0.07	0.045	0.011	94
MINI Pi12-2	0.32	0.44	0.68	0.6	0.44	0.27	0.19	0.14	0.1	0.06	0.03	—	90
MINI Pi12-3	0.32	0.44	1.4	0.6	0.44	0.27	0.19	0.14	0.1	0.06	0.03	—	90

Evacuation times

COAX® Cartridge	Feed pressure	Air consumption	Evacuation time (s/l) to reach different vacuum levels (-kPa)									Max vacuum
	MPa	Nl/s	10	20	30	40	50	60	70	80	90	-kPa
MINI Si08-2	0.6	0.44	0.14	0.31	0.55	0.9	1.4	2.1	3.1	—	—	75
MINI Si08-3	0.6	0.44	0.1	0.25	0.48	0.8	1.3	2	2.9	—	—	75
MINI Xi10-2	0.5	0.46	0.14	0.3	0.6	1	1.6	2.3	3.5	5.3	8.9	94
MINI Xi10-3	0.5	0.46	0.09	0.26	0.5	0.9	1.5	2.2	3.4	5.2	8.8	94
MINI Pi12-2	0.32	0.44	0.17	0.32	0.58	1.1	1.8	2.7	4	6.4	—	90
MINI Pi12-3	0.32	0.44	0.08	0.23	0.49	1	1.7	2.6	3.9	6.3	—	90

Ordering information

For a complete list of available pumps and combinations with further information visit **piab.com**. On our webpage you will also be able to find dimensional drawings, CAD-drawings and much more. Register and get full access to all resources available.

VGS™3040 – Customer Code

Code	Housing
VGS3040	Housing

Code	COAX® cartridge
AB	COAX® cartridge MINI Pi12-2
AC	COAX® cartridge MINI Pi12-3
AD	COAX® cartridge MINI Pi12-2, non-return valve
AE	COAX® cartridge MINI Pi12-3, non-return valve
AF	COAX® cartridge MINI Si08-2
AG	COAX® cartridge MINI Si08-3
AH	COAX® cartridge MINI Si08-2, non-return valve
AI	COAX® cartridge MINI Si08-3, non-return valve
AJ	COAX® cartridge MINI Xi10-2
AK	COAX® cartridge MINI Xi10-3
AL	COAX® cartridge MINI Xi10-2, non-return valve
AM	COAX® cartridge MINI Xi10-3, non-return valve

Code	Mounting style
00	No mounting style
01	Mounting Lock pin 16 mm
02	Mounting Lock pin 19 mm
03	Mounting Ball joint
04	Mounting Lock pin 16 mm level compensator
05	Mounting Lock pin 19 mm level compensator
06	Mounting Ball joint level compensator
07	Mounting Extrusion mount level compensator
08	Mounting Profile mount
09	Mounting Profile mount

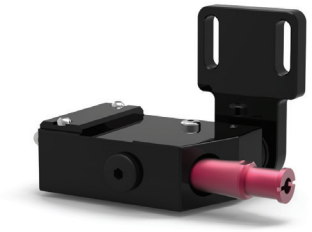
VGS3040 . AB . 01 . AA . 01 . AA

Code	Energy saving
AA	No energy saving
AB	piSAVE onoff 65 -kPa
AC	piSAVE onoff, Adjustable (factory set at 45 -kPa)

Code	Release function
01	Release Blow-off
02	piSAVE release internal
03	piSAVE release external

Code	Vacuum connection
AA	G3/8" female
AB	G3/8" male - 3/8" NPT male adapter

Configuration examples

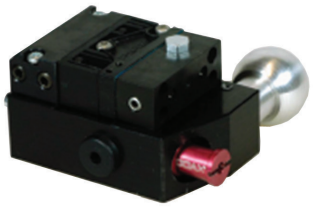


VGS™3040 with profile mount

It makes the attachment easy to a standard extrusion and profile systems with an adjustable position. This will give a quick setup and changeover.

VGS™3040 with level compensator

It is available with level compensator to compensate for differences in level of object.



VGS™3040 with piSAVE onoff •••

It has an integrated energy-saving device, piSAVE onoff, results in very low air consumption in sealed applications. The built-in blow off check valve will provide a fast release of the object It has an adjustable vacuum controlled 2/2 NO valve and is available with large hysteresis for object handling and small hysteresis for process applications.

VGS™3040 with piSAVE release

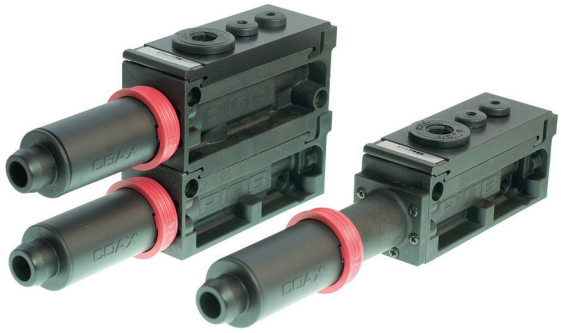
It has a built-in quick release for fast release of object. It works with an internal or separate feed of air. It equalises pressure in the suction cups to provide fast release of the product. The piSAVE release will provide an extra fast release by accumulating and utilising the feed-air pressure as a boost. It has an ON/OFF activated simultaneously with the ejector and no additional controls required — use a single 3/2 control valve for the ejector and piSAVE release.

VGS™3040 with blow off •••

It has a built-in blow off check valve for fast release of object. Prevents vacuum from being pulled through the blow-off lines, which means faster response time and completely independent vacuum units.

••• Recommended

P5010 family



Compact/stackable vacuum pumps are air-driven multistage ejector families. based on COAX® technology. they are equipped with integrated controls and special functions. such as on/off valve. blow-off valve. vacuum switch. energy saving function etc. They are configurable platforms. making it easy to specify the exact control functions needed for the system.

It has a patented COAX® push-in technology that allows insertion and removal of the cartridge without tools. It is available two or three-stage COAX® cartridge MIDI. Choose an Si cartridge for extra vacuum flow. a Pi cartridge for high performance at low feed pressure or an Xi cartridge when high flow and deep vacuum is needed. The P5010 has an integrated flow-through silencer that is unaffected by dust and dirt. It provides substantially lower air-consumption as compared to conventional ejectors of similar sizes.

Vacuum flow

COAX® Cartridge	Feed pressure	Air consumption	Vacuum flow (Nl/s) at different vacuum levels (-kPa)										Max vacuum
	MPa	Nl/s	0	10	20	30	40	50	60	70	80	90	-kPa
Pi48-2	0.31	2	2.8	2.5	1.8	1.1	0.65	0.5	0.35	0.25	0.1	—	90
Pi48-3	0.31	2.05	5.6	2.5	1.8	1.1	0.65	0.5	0.35	0.25	0.1	—	90
Si32-2	0.6	1.75	3.3	3	2.6	1.7	0.9	0.6	0.5	0.35	—	—	75
Si32-3	0.6	1.75	6	3.5	2.6	1.7	0.9	0.6	0.5	0.35	—	—	75
Xi40-2	0.45	1.83	2.8	2.3	1.6	1	0.73	0.58	0.43	0.32	0.18	0.03	95
Xi40-3	0.45	1.83	5.9	3	2	1.3	0.73	0.58	0.43	0.32	0.18	0.03	95

Evacuation times

COAX® Cartridge	Feed pressure	Air consumption	Evacuation time (s/l) to reach different vacuum levels (-kPa)									Max vacuum
	MPa	Nl/s	10	20	30	40	50	60	70	80	90	-kPa
Pi48-2	0.31	2	0.03	0.07	0.13	0.26	0.46	0.7	1	1.6	4	90
Pi48-3	0.31	2.05	0.02	0.06	0.12	0.25	0.45	0.7	1	1.6	4	90
Si32-2	0.6	1.75	0.03	0.07	0.1	0.18	0.33	0.53	0.8	—	—	75
Si32-3	0.6	1.75	0.02	0.05	0.1	0.18	0.33	0.53	0.8	—	—	75
Xi40-2	0.45	1.83	0.04	0.09	0.17	0.28	0.44	0.63	0.9	1.3	2.3	95
Xi40-3	0.45	1.83	0.022	0.062	0.12	0.22	0.37	0.57	0.84	1.2	2.2	95

Ordering information

For a complete list of available pumps and combinations with further information visit **piab.com**. On our webpage you will also be able to find dimensional drawings, CAD-drawings and much more. Register and get full access to all resources available.

Accessory descriptions

AVM™2

The AVM™2 unit has built-in control and monitoring functions. The integrated energy saving function (ES) minimises the air consumption in sealed systems. It has valves for vacuum on/off and blow-off with electrical power failsafe function. The AVM™ has digital outputs, 16 pre-set combinations of vacuum levels, digital vacuum level display and a mechanical valve for blow-off flow adjustment.

CU

The CU has electric valves for vacuum on/off and blow-off and a mechanical valve for blow-off flow adjustment. It also has a special M12 4-pin cable assembly with LED for status of valve signal.

P5010 ES

The P5010 has an integrated air-saving function (piSAVE onoff) that minimises the air consumption by controlling the incoming air flow to the pump. Large hysteresis is recommended for sealed vacuum handling applications such as metal sheet, glass or plastic handling. And small hysteresis is recommended if a very accurate vacuum level has to be maintained in the process. It has an adjustable ES switch level and is a pneumatic function.

P5010 – Customer Code

P5010
Code
P5010

Code	Connection interface
00	Housing, connection Ø 10 mm
01	Housing, connection Ø 3/8"

P5010 . 00 . AA . 01

Code	COAX® Push-in
AA	COAX® push-in module Si32-2X1
AB	COAX® push-in module Si32-3X1
AC	COAX® push-in module Si32-2X1, non-return valve
AD	COAX® push-in module Si32-3X1, non-return valve
AE	COAX® push-in module Si32-2X2
AF	COAX® push-in module Si32-3X2
AG	COAX® push-in module Si32-2X2, non-return valve
AH	COAX® push-in module Si32-3X2, non-return valve
AI	COAX® push-in module Pi48-2X1
AJ	COAX® push-in module Pi48-3X1
AK	COAX® push-in module Pi48-2X1, non-return valve
AL	COAX® push-in module Pi48-3X1, non-return valve
AM	COAX® push-in module Pi48-2X2
AN	COAX® push-in module Pi48-3X2
AO	COAX® push-in module Pi48-2X2, non-return valve
AP	COAX® push-in module Pi48-3X2, non-return valve
AQ	COAX® push-in module Xi40-2X1
AR	COAX® push-in module Xi40-3X1
AS	COAX® push-in module Xi40-2X1, non-return valve
AT	COAX® push-in module Xi40-3X1, non-return valve
AU	COAX® push-in module Xi40-2X2
AV	COAX® push-in module Xi40-3X2
AW	COAX® push-in module Xi40-2X2, non-return valve
AX	COAX® push-in module Xi40-3X2, non-return valve

Code	Connection modules/function
01	Connection module low, G connection
02	Connection module high, G connection
03	Connection module low, NPSF connection
04	Connection module high, NPSF connection
05	Function AVM™2 NO, G connection
06	Function AVM™2 NC (power off - NO), G connection
07	Function AVM™2 NO, NPSF connection
08	Function AVM™2 NC (power off - NO), NPSF connection
09	Function CU NC, G connection
10	Function CU NC, NPSF connection
11	Function ES Vacustat 2/2 NO large hysteres
12	Function ES Vacustat 2/2 NO small hysteres
13	Function AVM™2 NO, automatic blow-off (1 sec), G connection
14	Function AVM™2 NC, automatic blow-off (1 sec), G connection
15	Function AVM™2 NC 2 (power off - NC), G connection
16	Function AVM™2 NO, automatic blow-off (1 sec), NPSF connection
17	Function AVM™2 NC, automatic blow-off (1 sec), NPSF connection
18	Function AVM™2 NC 2 (power off - NC), NPSF connection

P6040 family

Large capacity ejector pumps suitable for liquid filling applications. The P6040 comes with the patented COAX® technology. It is available with a three-stage COAX® cartridge MIDI. Choose an Si cartridge for extra vacuum flow, a Pi cartridge for high performance at low feed pressure or an Xi cartridge when high flow and deep vacuum is needed. This pump has a substantially lower air consumption compare to competition, it is compact with no moving parts. It can be configured with 5–16 cartridges.

Vacuum flow

COAX® Cartridge	Feed pressure	Air consumption	Vacuum flow (Nl/s) at different vacuum levels (-kPa)										Max vacuum
	MPa	Nl/s	0	10	20	30	40	50	60	70	80	90	-kPa
MIDI Pi48-3 x5	0.3	10	28	12.5	9	5.5	3.25	2.5	1.75	1.25	0.5	—	90
MIDI Pi48-3 x6	0.3	12	33.6	15	10.8	6.6	3.9	3	2.1	1.5	0.6	—	90
MIDI Pi48-3 x7	0.3	14	39.2	17.5	12.6	7.7	4.55	3.5	2.45	1.75	0.7	—	90
MIDI Pi48-3 x8	0.3	16	44.8	20	14.4	8.8	5.2	4	2.8	2	0.8	—	90
MIDI Pi48-3 x9	0.3	18	50.4	22.5	16.2	9.9	5.85	4.5	3.15	2.25	0.9	—	90
MIDI Pi48-3 x10	0.3	20	56	25	18	11	6.5	5	3.5	2.5	1	—	90
MIDI Pi48-3 x11	0.3	22	61.6	27.5	19.8	12.1	7.15	5.5	3.85	2.75	1.1	—	90
MIDI Pi48-3 x12	0.3	24	67.2	30	21.6	13.2	7.8	6	4.2	3	1.2	—	90
MIDI Pi48-3 x13	0.3	26	72.8	32.5	23.4	14.3	8.45	6.5	4.55	3.25	1.3	—	90
MIDI Pi48-3 x14	0.3	28	78.4	35	25.2	15.4	9.1	7	4.9	3.5	1.4	—	90
MIDI Pi48-3 x15	0.3	30	84	37.5	27	16.5	9.75	7.5	5.25	3.75	1.5	—	90
MIDI Pi48-3 x16	0.3	32	89.6	40	28.8	17.6	10.4	8	5.6	4	1.6	—	90
MIDI Si32-3 x5	0.6	8.75	30	17.5	13	8.5	4.5	3	2.5	1.75	—	—	75/52*
MIDI Si32-3 x6	0.6	10.5	36	21	15.6	10.2	5.4	3.6	3	2.1	—	—	75/52*
MIDI Si32-3 x7	0.6	12.25	42	24.5	18.2	11.9	6.3	4.2	3.5	2.45	—	—	75/52*
MIDI Si32-3 x8	0.6	14	48	28	20.8	13.6	7.2	4.8	4	2.8	—	—	75/52*
MIDI Si32-3 x9	0.6	15.75	54	31.5	23.4	15.3	8.1	5.4	4.5	3.15	—	—	75/52*
MIDI Si32-3 x10	0.6	17.5	60	35	26	17	9	6	5	3.5	—	—	75/52*
MIDI Si32-3 x11	0.6	19.25	66	38.5	28.6	18.7	9.9	6.6	5.5	3.85	—	—	75/52*
MIDI Si32-3 x12	0.6	21	72	42	31.2	20.4	10.8	7.2	6	4.2	—	—	75/52*
MIDI Si32-3 x13	0.6	22.75	78	45.5	33.8	22.1	11.7	7.8	6.5	4.55	—	—	75/52*
MIDI Si32-3 x14	0.6	24.5	84	49	36.4	23.8	12.6	8.4	7	4.9	—	—	75/52*

COAX® Cartridge	Feed pressure	Air consumption	Vacuum flow (Nl/s) at different vacuum levels (-kPa)										Max vacuum
	MPa	Nl/s	0	10	20	30	40	50	60	70	80	90	-kPa
MIDI Si32-3 x15	0.6	26.25	90	52.5	39	25.5	13.5	9	7.5	5.25	—	—	75/52*
MIDI Si32-3 x16	0.6	28	96	56	41.6	27.2	14.4	9.6	8	5.6	—	—	75/52*
MIDI Xi40-3 x5	0.45	9.15	29.5	15	10	6.5	3.65	2.9	2.15	1.6	0.9	0.15	95/51*
MIDI Xi40-3 x6	0.45	10.98	35.4	18	12	7.8	4.38	3.48	2.58	1.92	1.08	0.18	95/51*
MIDI Xi40-3 x7	0.45	12.81	41.3	21	14	9.1	5.11	4.06	3.01	2.24	1.26	0.21	95/51*
MIDI Xi40-3 x8	0.45	14.64	47.2	24	16	10.4	5.84	4.64	3.44	2.56	1.44	0.24	95/51*
MIDI Xi40-3 x9	0.45	16.47	53.1	27	18	11.7	6.57	5.22	3.87	2.88	1.62	0.27	95/51*
MIDI Xi40-3 x10	0.45	18.3	59	30	20	13	7.3	5.8	4.3	3.2	1.8	0.3	95/51*
MIDI Xi40-3 x11	0.45	20.13	64.9	33	22	14.3	8.03	6.38	4.73	3.52	1.98	0.33	95/51*
MIDI Xi40-3 x12	0.45	21.96	70.8	36	24	15.6	8.76	6.96	5.16	3.84	2.16	0.36	95/51*
MIDI Xi40-3 x13	0.45	23.79	76.7	39	26	16.9	9.49	7.54	5.59	4.16	2.34	0.39	95/51*
MIDI Xi40-3 x14	0.45	25.62	82.6	42	28	18.2	10.22	8.12	6.02	4.48	2.52	0.42	95/51*
MIDI Xi40-3 x15	0.45	27.45	88.5	45	30	19.5	10.95	8.7	6.45	4.8	2.7	0.45	95/51*
MIDI Xi40-3 x16	0.45	29.28	94.4	48	32	20.8	11.68	9.28	6.88	5.12	2.88	0.48	95/51*

* Without/with 1x flap valve.

Evacuation times

COAX® Cartridge	Feed pressure	Air consumption	Evacuation time (s/l) to reach different vacuum levels (-kPa)									Max vacuum
	MPa	Nl/s	10	20	30	40	50	60	70	80	90	-kPa
MIDI Pi48-3 x5	0.3	10	0.004	0.012	0.024	0.05	0.09	0.14	0.2	0.32	0.8	90
MIDI Pi48-3 x6	0.3	12	0.0033	0.01	0.02	0.042	0.075	0.12	0.17	0.27	0.67	90
MIDI Pi48-3 x7	0.3	14	0.0029	0.0086	0.017	0.036	0.064	0.1	0.14	0.23	0.57	90
MIDI Pi48-3 x8	0.3	16	0.0025	0.0075	0.015	0.031	0.056	0.088	0.13	0.2	0.5	90
MIDI Pi48-3 x9	0.3	18	0.0022	0.0067	0.013	0.028	0.05	0.078	0.11	0.18	0.44	90
MIDI Pi48-3 x10	0.3	20	0.002	0.006	0.012	0.025	0.045	0.07	0.1	0.16	0.4	90
MIDI Pi48-3 x11	0.3	22	0.0018	0.0055	0.011	0.023	0.041	0.064	0.091	0.15	0.36	90
MIDI Pi48-3 x12	0.3	24	0.0017	0.005	0.01	0.021	0.038	0.058	0.083	0.13	0.33	90
MIDI Pi48-3 x13	0.3	26	0.0015	0.0046	0.0092	0.019	0.035	0.054	0.077	0.12	0.31	90
MIDI Pi48-3 x14	0.3	28	0.0014	0.0043	0.0086	0.018	0.032	0.05	0.071	0.11	0.29	90
MIDI Pi48-3 x15	0.3	30	0.0013	0.004	0.008	0.017	0.03	0.047	0.067	0.11	0.27	90
MIDI Pi48-3 x16	0.3	32	0.0013	0.0038	0.0075	0.016	0.029	0.044	0.063	0.1	0.25	90
MIDI Si32-3 x5	0.6	8.75	0.004	0.01	0.02	0.036	0.066	0.11	0.16	—	—	75/52*
MIDI Si32-3 x6	0.6	10.5	0.0033	0.0083	0.017	0.03	0.055	0.088	0.13	—	—	75/52*
MIDI Si32-3 x7	0.6	12.25	0.0029	0.0071	0.014	0.026	0.047	0.076	0.11	—	—	75/52*
MIDI Si32-3 x8	0.6	14	0.0025	0.0063	0.013	0.023	0.041	0.066	0.1	—	—	75/52*
MIDI Si32-3 x9	0.6	15.75	0.0022	0.0056	0.011	0.02	0.037	0.059	0.089	—	—	75/52*
MIDI Si32-3 x10	0.6	17.5	0.002	0.005	0.01	0.018	0.033	0.053	0.08	—	—	75/52*
MIDI Si32-3 x11	0.6	19.25	0.0018	0.0045	0.0091	0.016	0.03	0.048	0.073	—	—	75/52*
MIDI Si32-3 x12	0.6	21	0.0017	0.0042	0.0083	0.015	0.028	0.044	0.067	—	—	75/52*
MIDI Si32-3 x13	0.6	22.75	0.0015	0.0038	0.0077	0.014	0.025	0.041	0.062	—	—	75/52*
MIDI Si32-3 x14	0.6	24.5	0.0014	0.0036	0.0071	0.013	0.024	0.038	0.057	—	—	75/52*
MIDI Si32-3 x15	0.6	26.25	0.0013	0.0033	0.0067	0.012	0.022	0.035	0.053	—	—	75/52*

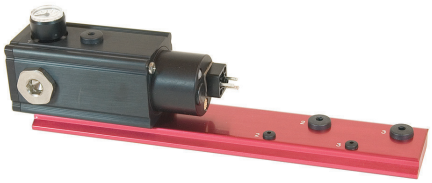
COAX® Cartridge	Feed pressure	Air consumption	Evacuation time (s/l) to reach different vacuum levels (-kPa)									Max vacuum
	MPa	Nl/s	10	20	30	40	50	60	70	80	90	-kPa
MIDI Si32-3 x16	0.6	28	0.0013	0.0031	0.0063	0.011	0.021	0.033	0.05	—	—	75/52*
MIDI Xi40-3 x5	0.45	9.15	0.0044	0.012	0.024	0.044	0.074	0.11	0.17	0.24	0.44	95/51*
MIDI Xi40-3 x6	0.45	10.98	0.0037	0.01	0.02	0.037	0.062	0.095	0.14	0.2	0.37	95/51*
MIDI Xi40-3 x7	0.45	12.81	0.0031	0.0089	0.017	0.031	0.053	0.081	0.12	0.17	0.31	95/51*
MIDI Xi40-3 x8	0.45	14.64	0.0028	0.0078	0.015	0.028	0.046	0.071	0.11	0.15	0.28	95/51*
MIDI Xi40-3 x9	0.45	16.47	0.0024	0.0069	0.013	0.024	0.041	0.063	0.093	0.13	0.24	95/51*
MIDI Xi40-3 x10	0.45	18.3	0.0022	0.0062	0.012	0.022	0.037	0.057	0.084	0.12	0.22	95/51*
MIDI Xi40-3 x11	0.45	20.13	0.002	0.0056	0.011	0.02	0.034	0.052	0.076	0.11	0.2	95/51*
MIDI Xi40-3 x12	0.45	21.96	0.0018	0.0052	0.01	0.018	0.031	0.048	0.07	0.1	0.18	95/51*
MIDI Xi40-3 x13	0.45	23.79	0.0017	0.0048	0.0092	0.017	0.029	0.044	0.065	0.092	0.17	95/51*
MIDI Xi40-3 x14	0.45	25.62	0.0016	0.0044	0.0086	0.016	0.027	0.041	0.06	0.086	0.16	95/51*
MIDI Xi40-3 x15	0.45	27.45	0.0015	0.0041	0.008	0.015	0.025	0.038	0.056	0.08	0.15	95/51*
MIDI Xi40-3 x16	0.45	29.28	0.0014	0.0039	0.0075	0.014	0.023	0.036	0.053	0.075	0.14	95/51*

* Without/with 1x flap valve.

Ordering information

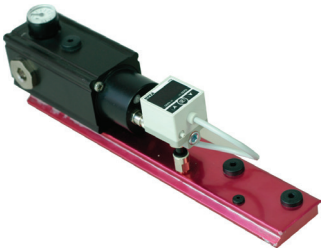
For a complete list of available pumps and combinations with further information visit piab.com. On our webpage you will also be able to find dimensional drawings, CAD-drawings and much more. Register and get full access to all resources available.

Accessory descriptions



P6040 V30

Piab P6040 multi stage ejector with Si, Pi or Xi COAX® technology. Modular design for flexible performance. Compact and durable with no moving parts. Electric 3/2 valve for on/off. Manometer for feed pressure control



P6040 ES Vacuum

Piab P6040 multi stage ejector with Si, Pi or Xi COAX® technology. Modular design for flexible performance. Compact and durable with no moving parts. Electrically operated air-saving device. Adjustable vacuum controlled 2/2 NO valve. Manometer for feed pressure control. Recommended for non-leaking system.

P6040 – Customer Code

P6040 Code
P6040

Code	Application type
V	Vacuum
B	Blow

Code	Mounting
00	Mounting T-slot

Code	Cover/Function plates
AA	Connection G1/2"
AB	Connection 4×G1/2"
AC	Function Valve v30
AD	Function ES-Vacuum
AE	Function ES-Blow

P6040 . V . AA . 00 . AA . 00

Code	Connections for vacuum and exhaust
00	Connections G 1 1/2"
01	Connections G 2"
02	Connections G 2 1/2"
03	Connection G 1 1/2", silencer
04	Connection G 2", silencer
05	Connection G 2 1/2", silencer
06	Connection G 1 1/2", inlet silencer
07	Connection G 2", inlet silencer
08	Connection G 2 1/2", inlet silencer

Code												COAX® Cartridge module
×5	×6	×7	×8	×9	×10	×11	×12	×13	×14	×15	×16	
AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	COAX® Cartridge module Pi48-3
AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	COAX® Cartridge module Pi48-3, non-return valve
AY	AZ	BA	BB	BC	BD	BE	BF	BG	BH	BI	BJ	COAX® Cartridge module Pi48-3, 1× flap valve
BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU	BV	COAX® Cartridge module Si32-3
BW	BX	BY	BZ	CA	CB	CC	CD	CE	CF	CG	CH	COAX® Cartridge module Si32-3, non-return valve
CI	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	COAX® Cartridge module Si32-3, 1× flap valve
CU	CV	CW	CX	CY	CZ	DA	DB	DC	DD	DE	DF	COAX® Cartridge module Xi40-3
DG	DH	DI	DJ	DK	DL	DM	DN	DO	DP	DQ	DR	COAX® Cartridge module Xi40-3, non-return valve
DS	DT	DU	DV	DW	DX	DY	DZ	EA	EB	EC	ED	COAX® Cartridge module Xi40-3, 1× flap valve

Suction cups

Material

Name	Colour	Hardness, Shore A°	Temperature, °F
Nitrile-PVC (NPV)	Black	50	0–90
Polyurethane (PU30)	Yellow	30	10–50
Polyurethane (PU40)	Red transparent	40	10–50
Polyurethane (PU50)	Blue transparent	50	10–50
Polyurethane (PU55)	Orange	55	10–50
Polyurethane (PU60)	Green transparent	60	10–50

Material resistance

Name	Wear resistance	Oil	Weather and ozone	Hydrolysis	Petrol	Concentrated acids	Alcohol	Oxidation
Nitrile-PVC (NPV)	••••	••••	•••	•••	••••	••	•••	•••
Polyurethane (PU)	••••	••••	••••	••	••	••	••/•*	•

•••• Excellent, ••• Good, •• Fair, • Poor, *Ethanol/methanol

piab

Bellows flat friction family (BFF)

- Special designed friction cups for oily surfaces, such as sheets in metal forming processes.
- Normal wear on friction cup will not affect the long term shear force performance.
- Best choice if > 0.1g/m^2 press oil is used on the sheet.
- Thanks to the strong grip on oily surfaces, the suction cups can withstand high shear forces, typically 2–4 times more than corresponding conventional suction cups.
- The “BFF” design is suitable for uneven/curved surfaces or if level compensation is needed, for example in de-stacking applications.
- The flat inner support gives stability during movement in any orientation.
- DURAFLEX® suction cups manufactured in a specially developed material that features the elasticity of rubber and wear resistance of polyurethane. The material does not leave any marks on the objects handled.

Lifting forces

Name	Lifting force vertical to the surface, N, at vacuum level		Lifting force parallell to the surface, N, at vacuum level	
	60 -kPa	90 -kPa	60 -kPa	90 -kPa
BFF30P	24/23*	27/30*	11/5.5*	13.5/7.8*
BFF40P	43/45*	56/60*	60/35*	81/45*
BFF60P	77/82*	112/106*	90/76*	122/93*
BFF80P	176/174*	236/207*	201/110*	240/160*
BFF110P	279/284*	377/345*	298/235*	346/253*

* Dry metal sheet/Oily metal sheet.

General specifications

Name	Outer diameter, mm	Height, mm	Min. curve radius, mm	Max. vertical movement, mm	Volume, cm^3
BFF30P	30	30	15	5	5
BFF40P	45	32–51.5*	23	7	10
BFF60P	61	36–55.3*	35	10	20
BFF80P	85	46–55.8*	50	14	50
BFF110P	115	53-72.5*	95	21	110

* Height range includes fittings.

Available materials

Name	PU55°/PU60°
BFF30P	●
BFF40P	●
BFF60P	●
BFF80P	●
BFF110P	●

Ordering information

G threads

Name	G1/4”	G3/8” female				G3/8” male	G3/8” male / 1/8” NPSF fem.
	female		plastic thread	plastic	17 mm thread	with mesh filter	
BFF30P	0206918	0206908	–	0206599	–	–	0201821
BFF40P	0206940	0118992	–	–	0200697	0118991	–
BFF60P	0206941	0118995	0124742	–	0200699	0118994	–
BFF80P	0206942	0118670	0200365	–	0200695	0118997	–
BFF110P	0206943	0118673	0124734	–	0200696	0118671	–

M, NPT and T-slot threads

Name	M10×1.5	3/8” NPT	T-slot	
	male	female		with mesh filter
BFF30P	–	0206915	0206924	–
BFF40P	0121427	0122278	–	0206925
BFF60P	0121428	0122279	–	0206933
BFF80P	0121384	0122280	–	0206934
BFF110P	0121430	0122281	–	0206935

Bellows flat friction, Thin sheets family (BFFT)

- Special designed friction cups for thin (0.6–0.8 mm) oily metal sheets, such as outer body car parts in a press-to press forming process.
- Long lasting material, normal wear on friction cup will not affect the long term grip performance.
- Refined internal friction pattern provides additional grip performance, the suction cups can withstand high shear forces, typically 3–5 times more than corresponding conventional suction cups.
- Best choice if > 0.1g/m^2 press oil is used on the sheet but also a great choice for dry metal sheets.
- The “BFFT” design is suitable for thin flat or uneven/curved surfaces and if level compensation is needed, for example in de-stacking applications.
- The flat inner support, made of dual hardness, gives stability and good grip during movement in any orientation.
- DURAFLEX® suction cups manufactured in a specially developed material that features the elasticity of rubber and wear resistance of polyurethane. The material does not leave any marks on the objects handled and has a fantastic elastic memory, even after hundreds of thousands of cycles.

Lifting forces

Name	Lifting force vertical to the surface, N, at vacuum level		Lifting force parallell to the surface, N, at vacuum level	
	60 -kPa	90 -kPa	60 -kPa	90 -kPa
BFFT50P	105/104*	146/145*	122/61*	155/85*
BFFT70P	172/165*	220/211*	176/110*	245/148*
BFFT90P	184/184*	228/230*	273/171*	364/232*

* Dry metal sheet/Oily metal sheet.

General specifications

Name	Outer diameter, mm	Height, mm	Min. curve radius, mm	Max. vertical movement, mm	Volume, cm^3
BFFT50P	53	36.6	85	11	14.8
BFFT70P	73	41.1	95	14	36.4
BFFT90P	93	50.4	130	21	83.6

Available materials

Name	PU60°/PU60°/PU30°
BFFT50P	●
BFFT70P	●
BFFT90P	●

Ordering information

	G1/4" female	G3/8" female		G3/8" male / 1/8" NPSF female	3/8" NPT female	T-slot
Name	with mesh filter	with mesh filter	plastic	with mesh filter	with mesh filter	with mesh filter
BFFT50P	0206791	0206522	0206523	0206521	0206519	0206524
BFFT70P	0206792	0206527	0206528	0206526	0206525	0206529
BFFT90P	0206793	0206532	0206533	0206531	0206530	0206534

Deep concave friction family (DCF)

- Special designed friction cups for domed or flat oily surfaces, such as sheets in metal forming processes.
- Long lasting material, normal wear on friction cup will not affect the long term shear force performance.
- Best choice if > 0.1g/m^2 press oil is used on the sheet but also a great choice for dry metal sheets.
- Refined internal friction pattern provides additional grip performance, the suction cups can withstand high shear forces, typically 3–5 times more than corresponding conventional suction cups.
- Thin design that easily will follow convex or concave surfaces. The thin and pliable design in combination with a special inner friction pattern will maximise grip performance.
- DURAFLEX® suction cups manufactured in a specially developed material that features the elasticity of rubber and wear resistance of polyurethane. The material does not leave any marks on the objects handled and has a fantastic elastic memory, even after hundreds of thousands of cycles.

Lifting forces

Name	Lifting force vertical to the surface, N, at vacuum level		Lifting force parallell to the surface, N, at vacuum level	
	60 -kPa	90 -kPa	60 -kPa	90 -kPa
DCF65P	143/141*	193/191*	146/100*	196/134*
DCF90P	255/222*	311/310*	256/183*	358/248*
DCF110P	315/313*	436/433*	377/286*	573/358*

* Dry metal sheet/Oily metal sheet.

General specifications

Name	Outer diameter, mm	Height, mm	Min. curve radius, mm	Max. vertical movement, mm	Volume, cm^3
DCF65P	67.5	37.6	95	9.35	23.9
DCF90P	92.5	41.6	130	12.8	57.5
DCF110P	112.5	50	153	16.05	110.2

Available materials

Name	PU60°/PU60°/PU30°
DCF65P	●
DCF90P	●
DCF110P	●

Ordering information

Name	3/8" NPT female	G3/8" male / 1/8" NPSF female	G3/8" female		G1/4" female	T-slot
	with mesh filter	with mesh filter	with mesh filter	plastic	with mesh filter	with mesh filter
DCF65P	0206535	0206536	0206537	0206538	0206794	0206539
DCF90P	0206540	0206541	0206542	0206543	0206795	0206544
DCF110P	0206545	0206546	0206547	0206548	0206796	0206549

Flat concave friction family (FCF)

- Special designed friction cups for oily surfaces, such as sheets in metal forming processes.
- Normal wear on friction cup will not affect the long term shear force performance.
- Best choice if > 0.1g/m^2 press oil is used on the sheet.
- Thanks to the strong grip on oily surfaces, the suction cups can withstand high shear forces, typically 2–4 times more than corresponding conventional suction cups.
- The “FCF” design is suitable for slightly domed and flat surfaces, e.g., such as those encountered when handling metal sheets in press lines.
- The suction cups have support cleats that prevent thin objects from being disfigured.
- DURAFLEX® suction cups manufactured in a specially developed material that features the elasticity of rubber and wear resistance of polyurethane. The material does not leave any marks on the objects handled.

Lifting forces

Name	Lifting force vertical to the surface, N, at vacuum level		Lifting force parallell to the surface, N, at vacuum level	
	60 -kPa	90 -kPa	60 -kPa	90 -kPa
FCF25P	19/19*	28/29*	7/5*	10/7.2*
FCF35P	42/34*	58/50*	30/26*	42/32*
FCF50P	78/72*	106/101*	77/52*	105/70*
FCF75P	171/163*	236/228*	166/104*	211/139*
FCF100P	347/236*	490/298*	337/139*	484/205*
FCF125P	475/405*	650/442*	445/194*	602/236*

* Dry metal sheet/Oily metal sheet.

General specifications

Name	Outer diameter, mm	Height, mm	Min. curve radius, mm	Max. vertical movement, mm	Volume, cm^3
FCF25P	25	28	27	–	5.5
FCF35P	35	29–47.8*	40	2	5
FCF50P	50	31–49.9*	50	3	10
FCF75P	75	31–41*	100	4	30
FCF100P	100	36–45*	150	6	70
FCF125P	126	42–51.2*	150	8	100

* Height range includes fittings.

Available materials

Name	PU55°/PU60°
FCF25P	●
FCF35P	●
FCF50P	●
FCF75P	●
FCF100P	●
FCF125P	●

Ordering information

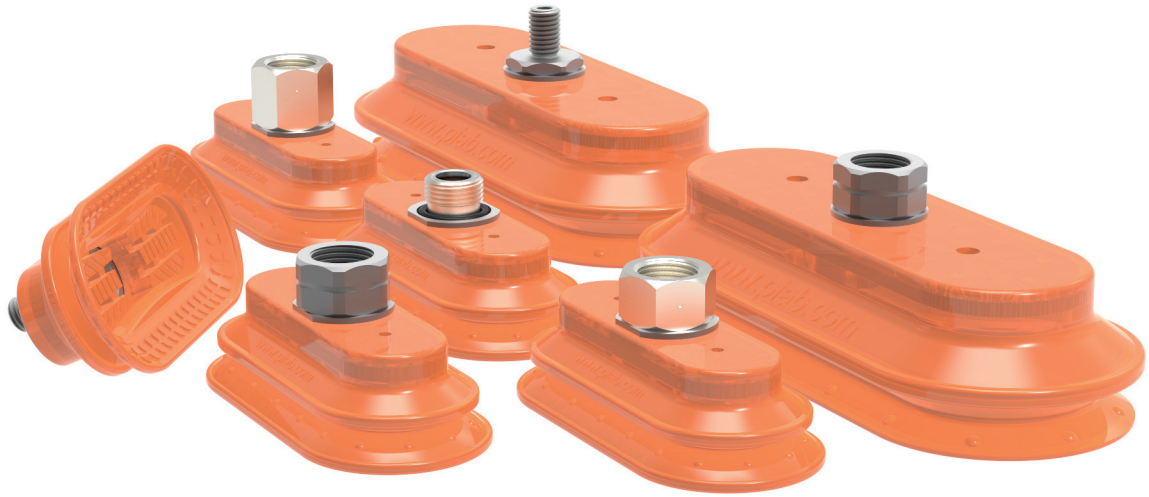
G threads

Name	G1/4" female	G3/8" male with mesh filter	G3/8" male / 1/8" NPSF female	G3/8" female			
					plastic	plastic thread	17 mm thread
FCF25P	0206919	–	0201827	0206909	0206895	–	–
FCF35P	0206921	0119913	–	0118981	0206893	–	0200652
FCF50P	0206936	0118985	–	0118986	0206606	–	0200685
FCF75P	0206937	0118423	–	0118429	–	0124718	0200687
FCF100P	0206938	0118430	–	0118432	–	0124669	0200690
FCF125P	0206939	0118435	–	0118437	–	0124787	0200693

M, NPT and T-slot threads

Name	M10x1.5 male	3/8" NPT female	T-slot	
				with mesh filter
FCF25P	–	0206916	0206926	–
FCF35P	0121431	0122282	–	0206927
FCF50P	0121432	0122283	–	0206929
FCF75P	0121433	0122284	–	0206930
FCF100P	0121385	0122285	–	0206931
FCF125P	0121435	0122286	–	0206932

Oval bellows friction family (OBF)



- Special designed friction cups for oily surfaces, such as sheets in metal forming processes.
- Normal wear on friction cup will not affect the long term shear force performance.
- Best choice if > 0.1g/m^2 press oil is used on the sheet.
- Thanks to the strong grip on oily surfaces, the suction cups can withstand high shear forces, typically 2–4 times more than corresponding conventional suction cups.
- The ”OBF” design is suitable for oblong objects with domed and flat surfaces, such as those encountered with body parts in the automotive industry.
- Can handle objects with height differences.
- Fitting option, male G3/8”, with a swivel function prior to the locking operation, for easy positioning of the oval cup.
- DURAFLEX® suction cups manufactured in a specially developed material that features the elasticity of rubber and wear resistance of polyurethane. The material does not leave any marks on the objects handled.

Lifting forces

	Lifting force vertical to the surface, N, at vacuum level			Lifting force parallell to the surface, N, at vacuum level		
	20 -kPa	60 -kPa	90 -kPa	20 -kPa	60 -kPa	90 -kPa
OBF35×90P	—	140/108*	198/157*	—	125/105*	179/151*
OBF50×140P	—	325/246*	438/372*	—	328/271*	415/347*
OBF65×170P	—	397/403*	570/502*	—	437/538*	619/665*

* Dry metal sheet/Oily metal sheet.

General specifications

	Outer diameter, mm	Height, mm	Min. curve radius, mm	Max. vertical movement, mm	Volume, cm^3
OBF35×90P	105×50	39–47.9*	30	11	36
OBF50×140P	157×67	47–55.8*	50	13	95

	Outer diameter, mm	Height, mm	Min. curve radius, mm	Max. vertical movement, mm	Volume, cm^3
OBF65×170P	187×82	54–62.8*	50	15	200

* Height range includes fittings, ** PU30°/PU60° / PU60°.

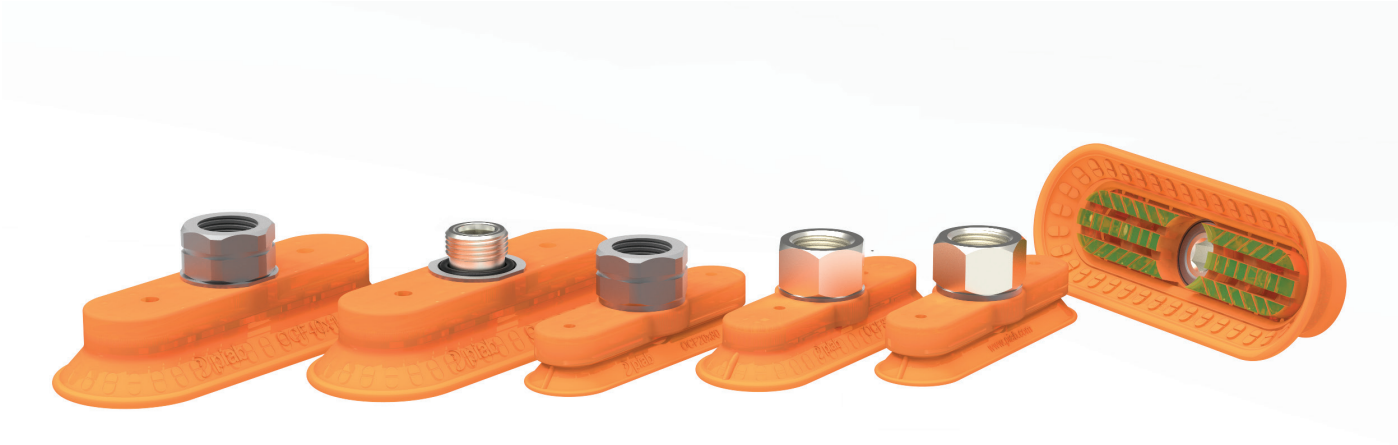
Available materials

	PU55°/PU60°
OBF35×90P	●
OBF50×140P	●
OBF65×170P	●

Ordering information

Name	G3/8" male	G3/8" female		M10x1.5 male	3/8" NPT female
	with mesh filter		17mm thread		
OBF35×90P	0119121	0119123	0200694	0121436	0122287
OBF50×140P	0119125	0119127		0121437	0122288
OBF65×170P	0119129	0119131		0121438	0122289

Oval concave friction family (OCF)



- Special designed friction cups for oily surfaces, such as sheets in metal forming processes.
- Normal wear on friction cup will not affect the long term shear force performance.
- Best choice if > 0.1g/m^2 press oil is used on the sheet.
- Thanks to the strong grip on oily surfaces, the suction cups can withstand high shear forces, typically 2–4 times more than corresponding conventional suction cups.
- The ”OCF” design is suitable for oblong objects with slightly curved or flat surfaces, such as those encountered with body parts in the automotive industry.
- Fitting option, male G3/8”, with a swivel function prior to the locking operation, for easy positioning of the oval cup.
- DURAFLEX® suction cups manufactured in a specially developed material that features the elasticity of rubber and wear resistance of polyurethane. The material does not leave any marks on the objects handled.

Lifting forces

	Lifting force vertical to the surface, N, at vacuum level			Lifting force parallell to the surface, N, at vacuum level		
	20 -kPa	60 -kPa	90 -kPa	20 -kPa	60 -kPa	90 -kPa
OCF20×80P	–	75/82*	111/90*	–	78/35*	112/48*
OCF30×90P	–	111/115*	157/159*	–	107/51*	160/74*
OCF40×110P	–	178/185*	245/246*	–	167/54*	232/78*

* Dry metal sheet/Oily metal sheet.

General specifications

	Outer diameter, mm	Height, mm	Min. curve radius, mm	Max. vertical movement, mm	Volume, cm^3
OCF20×80P	84×24	27–30.1*	20	3	15
OCF30×90P	92.5×32.5	29.5	25	4	17
OCF40×110P	113×43	32.5–35.5*	42	5	34

* Height range includes fittings.

Available materials

	PU55°/PU60°
OCF20×80P	●
OCF30×90P	●
OCF40×110P	●

Ordering information

Name	G3/8"		3/8" NPT female
	male	female	
OCF20×80P	0121847	0122455	0121859
OCF30×90P	0122456	0121786	0122459
OCF40×110P	0122457	0122860	0121865

DURAFLEX® single durometer

- Long lasting.
- Stable with high load bearing capability.
- Mark-free.
- The best option in most applications for sheet metal, glass or plastic handling.

B / B-XP BX F FC OB

B / B-XP – The bellows family is suitable for height differences and slightly uneven or curved surfaces. Several short bellows cups in one lifting device can handle objects with height differences and varying shapes. The bellows also provide a slight lifting movement to separate thin items.
BX – This family is designed for height differences, slightly curved planes and uneven surfaces
F – The cleats stop deformation by preventing suction of the object into the cup. The suction cup has good stability and very little movement. Also suitable when the lifting force is parallel to the surface as the cleats increase friction.
FC – The friction cups in flat concave shape and in the material DURAFLEX® suction cups have been developed to meet the strict demands of the automotive industry and designed for flat and curved surfaces. A typical application is the feeding of sheet metal into a press tool. The FCF-P design is especially suitable for oily surfaces, slightly domed and flat surfaces, e.g., such as those encountered when handling metal sheets in press lines. The suction cups have support cleats that prevent thin objects from being disfigured.
OB – The oval suction cups are suitable for handling of long and narrow objects and surfaces when maximum lifting force is desired. Oval suction cups are especially suitable for irregular surfaces and when level compensation is desired. This program of oval suction cups has characteristics that are especially suited for handling of metal sheet material.

Lifting forces

Name	Lifting force vertical to the surface, N, at vacuum level		Lifting force parallell to the surface, N, at vacuum level	
	60 -kPa	90 -kPa	60 -kPa	90 -kPa
B75P PU60	196	255	229	298
B10XP PU60	4.6	5.5	2.5	3

Name	Lifting force vertical to the surface, N, at vacuum level		Lifting force parallell to the surface, N, at vacuum level	
	60 -kPa	90 -kPa	60 -kPa	90 -kPa
B15XP PU60	10	12	5	9
B20XP PU60	19.7	23	11	15
B25XP PU60	27	30	13	18
B52XP PU60	109	150	70	90
B75XP PU60	222	307	200	230
B110XP PU60	440	500	380	460
BF80P PU60	225	294	127	166
BF110P PU60	334	293	231	305
BX10P PU60	2.3	3.7	–	–
BX15P PU60	5	6	–	–
BX20P PU60	7	11	–	–
BX25P PU60	14	18	11	14
BX35P PU60	25	30	23	28
BX52P PU60	56	75	44	54
BX75P PU60	120	166	114	150
BX110P PU60	365	424	244	293
F75P PU60	231	330	113	169
F110P PU60	334	293	231	305
FC20P PU60	12	16	9	12
FC25P PU60	20	27	12	18
FC35P PU50	36	51	51	62
FC35P PU60	34	49	41	51
FC50P PU40	77	103	82	100
FC50P PU60	77	104	93	111
FC75P PU40	157	215	200	230
FC75P PU60	168	225	225	255
FC100P PU40	284	377	318	420
FC100P PU60	328	446	264	382
FC150P PU40	647	922	765	902
FC150P PU60	716	932	568	863
OB20×60P	34	57	37	48
OB35×90P PU60	117	185	85	111
OB50×140P PU60	231	368	292	396
OB65×170P PU60	310	533	440	600

General specifications

Name	Outer diameter, mm	Height, mm	Min. curve radius, mm	Max. vertical movement, mm	Volume, cm^3
B75P PU60	79	37.3	90	20	110
B10XP PU60	11	13.9	6	3	0.19
B15XP PU60	16	14.8	10	3.4	0.4
B20XP PU60	21	10.4	9	4.6	1.04
B25XP PU60	26	13.5	11	5.5	1.63

Name	Outer diameter, mm	Height, mm	Min. curve radius, mm	Max. vertical movement, mm	Volume, cm^3
B52XP PU60	53	27	29	11.2	13.3
B75XP PU60	77.5	42.7–44.3	60	16	42.8
B110XP PU60	113.7	48.5	90	23.4	123
BF80P PU60	84	44–46.5	50	15	40
BF110P PU60	115	53–66	70	24	110
BX10P PU60	11	16.5	6	4.5	0.56
BX15P PU60	16	18.5	6	5.5	0.92
BX20P PU60	21	15.2	8.5	7.5	1.16
BX25P PU60	26	19	8	8.5	3
BX35P PU60	37	26.8	10	14	10
BX52P PU60	53	39	32	19	30
BX75P PU60	77.5	51.7–64.7	23	26	80
BX110P PU60	113.7	74–87	55	39	230
F75P PU60	77	13	150	2	19
F110P PU60	115	20	250	4	60
FC20P PU50	21.8	9.4	25	1.9	1
FC25P PU50	28.5	17–23	45	4	3
FC35P PU50/PU60	35	15	32	5.5	5
FC50P PU40/PU60	50	33.5	53	5	10
FC75P PU40/60	75	24–37	78	6.5	30
FC100P PU40/PU60	100	27	110	10.2	80
FC150P PU40/PU60	150	40.5	165	14.2	250
OB20×60P	62	23.6	7	4.5	24
OB35×90P PU60	95.6	27.2	30	10.5	38
OB50×140P PU60	146	34.5	26	11.3	95
OB65×170P PU60	177	41.5	38	16	175

* Height range includes fittings.

Available materials

Name	PU40°	PU50°	PU60°
B75P			●
B10XP			●
B15XP			●
B20XP			●
B25XP			●
B52XP			●
B75XP			●
B110XP			●
BF80P			●
BF110P			●
BX10P			●
BX15P			●
BX20P			●
BX25P			●

Name	PU40°	PU50°	PU60°
BX35P			●
BX52P			●
BX75P			●
BX110P			●
F75P			●
F110P			●
FC20P		●	
FC25P		●	
FC35P		●	●
FC50P	●		●
FC75P	●		●
FC100P	●		●
FC150P	●		●
OB20×60P			●
OB35×90P			●
OB50×140P			●
OB65×170P			●

Ordering information

No fitting & NPT threads

Name	No fitting	1/8" NPT male with mesh filter	1/4" NPT male with mesh filter	3/8" NPT male with mesh filter
B75P PU60	0111594	–	–	–
B10XP PU60	0205169	–	–	–
B15XP PU60	0205172	–	–	–
B20XP PU60	0205176	0205180	–	–
B25XP PU60	0205185	0205188	–	–
B35XP PU60	0205192	–	0205196	–
B52XP PU60	0205200	–	0205204	0205206
B110XP PU60	0205220	–	–	–
BX10P PU60	0122966	–	–	–
BX15P PU60	0124237	–	–	–
BX20P PU60	0124249	0125673	–	–
BX25P PU60	0108240	–	–	–
BX25P PU60 with filter	0109397	0125683	–	–
BX35P PU60	0107477	–	–	–
BX35P PU60 with filter	0107376	–	0107567	9909187
BX52P PU60	0107381	–	–	–
BX52P PU60 with filter	0108039	–	0107391	0107516
BX110P PU60 with filter	0108340	–	–	–
F75P PU60	0111584	–	–	–
F110P PU60	0111593	–	–	–
FC20P PU50	0106016	0107355	–	–
FC25P PU50	0104803	0107356	–	–

Name	No fitting	1/8” NPT male with mesh filter	1/4” NPT male with mesh filter	3/8” NPT male with mesh filter
FC35P PU50	0103290	–	0103715	–
FC35P PU60	0103291	–	0103716	0103724
FC100P PU40	0103297	–	–	–
FC100P PU 60	0103299	–	–	–
FC150P PU40	0101946	–	–	–
FC150P PU60	0103301	–	–	–
OB35×90P PU60	0109912	–	–	–
OB50×140P PU60	0109914	–	–	–
OB65×170P PU60	0109916	–	–	–

M threads

Name	M5 male	M5 female	5xM5 female
B10XP PU60	0205168	–	–
B15XP PU60	0205171	–	–
B20XP PU60	–	0205175	0205183
B25XP PU60	–	0205184	0205189
BX10P PU60	0122967	–	–
BX15P PU60	0124345	–	–
BX20P PU60	–	0125109	0125111
BX25P PU60 with filter	0109400	–	0109401
FC20P PU 50	–	0106717	9908665
FC25P PU 50	–	0106719	9907342

NPSF threads

Name	1/8” NPSF female		3/8” NPSF female		5x1/8” NPSF female
		with mesh filter		with mesh filter	
B75P PU60	–	0111600	0108791	0111602	–
B35XP PU60	–	0205191	–	–	–
B52XP PU60	–	0205199	–	–	0205207
B75XP PU60	–	–	–	0205883	–
B110XP PU60	–	–	–	0205885	–
BF80P PU60	–	–	0103309	–	–
BF110P PU60	–	–	0110288	–	–
BX35P PU60 with filter	0107561	–	–	–	–
BX52P PU60 with filter	0107383	0107382	–	–	0107389
BX110P PU60 with filter	–	–	0108404	–	–
F75P PU60	–	0111585	0108801	0111587	–
F110P PU60	–	–	0108803	–	–
FC35P PU50	0103707	0103705	–	–	–
FC35P PU60	0103708	0103706	–	–	0103728
FC75P PU40	–	–	0108796	–	–

Name	1/8” NPSF female		3/8” NPSF female		5x1/8” NPSF female
		with mesh filter		with mesh filter	
FC75P PU 60	–	–	0108797	–	–
FC100P PU 40	–	0103731	0108798	0103737	–
FC100P PU 60	–	0103733	0108799	0103739	–
F110P PU 60	–	–	–	0111596	–
FC150P PU 40	–	–	–	0103749	–
FC150P PU 60	–	–	–	0103751	–
OB35×90P PU60	–	–	0108672	–	–
OB50×140P PU60	–	–	0108674	–	–
OB65×170P PU60	–	–	0108676	–	–

Threaded insert & O-ring

Name	for thread insert	thread insert G1/8” male	thread insert G1/4” male	thread insert G3/8” male		with O-ring
					with mesh filter	
B75P PU60	0107318	–	–	–	0107319	–
B75XP PU60	0205209	0205208	0205212	0205213	–	–
B110XP PU60	–	–	–	0205219	–	–
BF110P PU60	–	–	–	–	0110287	0110286
BX75P PU60 with filter	0107150	0201083	0201074	0107149	–	–
BX110P PU60 with filter	–	–	–	0108341	–	–
F75P PU60	0107320	–	–	–	0107321	–
F110P PU60	0107322	–	–	–	0107323	–
FC75P PU40	0106948	–	–	–	0106959	–
FC75P PU 60	0107302	–	–	–	0107303	–
FC100P PU 40	0106835	–	–	–	0106836	–
FC100P PU 60	0107304	–	–	–	0107305	–
OB35×90P PU60	–	–	–	–	0108673	–
OB50×140P PU60	–	–	–	–	0108675	–
OB65×170P PU60	–	–	–	–	0108677	–

G1/8”–G1/4” threads

Name	G1/8” male			G1/8” male / M5 female	G1/4” male
		M5 female	with mesh filter	with mesh filter	with mesh filter
B75P PU60	–	–	–	–	–
B20XP PU60	–	–	0205179	0205181	–
B25XP PU60	–	–	0205187	0205190	–
B35XP PU60	–	–	0205194	–	–
B52XP PU60	–	–	0205202	–	0205203
BF80P PU60	–	–	–	–	–
BX20P PU60	0125112	0125110	–	–	–

Name	G1/8” male			G1/8” male / M5 female	G1/4” male
		M5 female	with mesh filter	with mesh filter	with mesh filter
BX25P PU60 with filter	0114149	0109398	–	9909111	–
BX35P PU60 with filter	–	–	9912152	–	9907493
BX52P PU60 with filter	–	–	9912154	–	0107385
F75P PU60	–	–	–	–	–
F110P PU60	–	–	–	–	–
FC20P PU 50	–	9906801	0106722	0106718	–
FC25P PU 50	–	9908541	0106721	0106720	–
FC35P PU 50	–	–	–	–	0103711
FC35P PU60	–	–	–	–	0103712
OB20×60P PU60	0115291	–	–	–	–

G3/8”–G1/2” threads

Name	G3/8” female		G3/8” male			G1/2” female
		with mesh filter		with mesh filter	1/8” NPSF female	with mesh filter
B75P PU60	–	0111601	–	–	–	0111603
B25XP PU60	–	–	–	0205197	–	–
B35XP PU60	–	–	–	0205205	–	–
B75XP PU60	–	–	0107476	0107327	0205214	–
BF80P PU60	0103307	–	–	–	–	–
BX25P PU60 with filter	–	–	–	0107379	–	–
BX35P PU60 with filter	–	–	–	0107387	–	–
F75P PU60	–	0111586	–	–	–	0111588
F110P PU60	–	0111595	–	0103720	–	0111597
FC35P PU 50	–	–	–	0103719	–	–
FC50P PU40	–	–	–	–	0103289	–
FC50P PU60	–	–	–	–	0103293	–
FC75P PU40	–	–	–	–	0103294	–
FC75P PU60	–	–	–	–	0103296	–
FC100P PU40	–	0103734	–	–	–	0103740
FC100P PU 60	–	0103736	–	–	–	0103742
FC150P PU 40	–	0103743	–	–	–	0103755
FC150P PU 60	–	0103745	–	–	–	0103757

DURAFLEX® dual durometer

- Extremely flexible lip and stiff body.
- Conforms well to unevenness and roughness.
- Mark-free.
- Good for auto-racking, plastic parts with rough surfaces or texture, edges, joints, seams, height transitions.

B / B-XP BX F OB

B / B-XP – The bellows family is suitable for height differences and slightly uneven or curved surfaces. Several short bellows cups in one lifting device can handle objects with height differences and varying shapes. The bellows also provide a slight lifting movement to separate thin items.
BX – This family is designed for height differences, slightly curved planes and uneven surfaces
F – The cleats stop deformation by preventing suction of the object into the cup. The suction cup has good stability and very little movement. Also suitable when the lifting force is parallel to the surface as the cleats increase friction.
OB – The oval suction cups are suitable for handling of long and narrow objects and surfaces when maximum lifting force is desired. Oval suction cups are especially suitable for irregular surfaces and when level compensation is desired. This program of oval suction cups has characteristics that are especially suited for handling of metal sheet material.

Lifting forces

Name	Lifting force vertical to the surface, N, at vacuum level		Lifting force parallell to the surface, N, at vacuum level	
	60 -kPa	90 -kPa	60 -kPa	90 -kPa
B10XP PU 30/60	3.8	4.5	2	2.5
B15XP PU 30/60	9	11	5	8
B20XP PU 30/60	15	20	7	10
B25XP PU 30/60	19	22	12	15
B35XP PU 30/60	39	50	30	40
B52XP PU 30/60	84	102	60	85
B75P PU 30/60	149	202	96	114
B75XP PU 30/60	176	228	150	180

Name	Lifting force vertical to the surface, N, at vacuum level		Lifting force parallell to the surface, N, at vacuum level	
	60 -kPa	90 -kPa	60 -kPa	90 -kPa
B110XP PU 30/60	380	470	350	430
BF80P PU 30/50	157	196	88	117
BF110P PU 30/60	229	225	210	246
BX10P PU 30/60	2.3	3.7	–	–
BX15P PU 30/60	4	4.5	–	–
BX20P PU 30/60	7	9.5	–	–
BX25P PU 30/60	13	17	10	12
BX35P PU 30/60	20	28	19	26
BX52P PU 30/60	56	75	44	54
BX75P PU 30/60	110	141	83	116
BX110P PU 30/60	306	346	230	260
F75P PU 30/60	193	273	176	308
F110P PU 30/60	432	591	441	617
OB35×90P PU 30/60	119	174	73	100
OB50×140P PU 30/60	235	366	260	349
OB65×170P PU 30/60	335	541	379	532

General specifications

Name	Outer diameter, mm	Height, mm	Min. curve radius, mm	Max. vertical movement, mm	Volume, cm^3
B10XP PU 30/60	11	13.9–22.4	4	3	0.19
B15XP PU 30/60	16	14.8	5.5	3.4	0.4
B20XP PU 30/60	21	10.4	5.5	4.6	1.04
B25XP PU 30/60	26	13.5	9	5.5	1.63
B35XP PU 30/60	37	18.6	16	9.5	4.4
B52XP PU 30/60	53	27	25	11.2	13.3
B75P PU 30/60	79	37.3	90	20	110
B75XP PU 30/60	77.5	42.7–47.3	50	16	42.8
B110XP PU 30/60	113.7	48.5	80	23.4	123
BF80P PU 30/50	84	44–46.5	50	15	40
BF110P PU 30/60	115	53–66	55	24	110
BX10P PU 30/60	11	16.5	4	4.5	0.56
BX15P PU 30/60	16	18.5	5.5	5.5	0.92
BX20P PU 30/60	21	15.2	10	7.5	1.16
BX25P PU 30/60	26	19	6	8.5	3
BX35P PU 30/60	37	26.8	10	14	10
BX52P PU 30/60	53	39	32	19	30
BX75P PU 30/60	77.5	51.7–64.7	23	26	80
BX110P PU 30/60	113.7	74	55	39	230
F75P PU 30/60	77	13	150	2	19
F110P PU 30/60	115	20	250	4	60
OB35×90P PU 30/60	95.6	27.2	30	10.5	38
OB50×140P PU 30/60	146	34.5	23	11.3	95
OB65×170P PU 30/60	177	41.5	38	16	175

* Height range includes fittings.

Available materials

Name	PU 30°/50°	PU 30°/60°
B10XP		●
B15XP		●
B20XP		●
B25XP		●
B35XP		●
B52XP		●
B75P		●
B75XP		●
B110XP		●
BF80P	●	●
BF110P		●
BX10P		●
BX15P		●
BX20P		●
BX25P		●
BX35P		●
BX52P		●
BX75P		●
BX110P		●
F75P		●
F110P		●
OB35×90P		●
OB50×140P		●
OB65×170P		●

Ordering information

No fitting & NPT threads

Name	No fitting	1/8” NPT male with mesh filter	1/4” NPT male with mesh filter	3/8” NPT male with mesh filter	1/2” NPT male
B75P 30/60	0104723	–	–	–	–
B10XP 30/60	0204978	–	–	–	–
B15XP 30/60	0204992	–	–	–	–
B20XP 30/60	0204994	0205047	–	–	–
B25XP 30/60	0204998	0205095	–	–	–
B35XP 30/60	0205002	–	0205106	0205108	–
B52XP 30/60	0205007	–	0205131	0205133	–
B110XP 30/60	0205021	–	–	–	–
BX10P 30/60	0118329	–	–	–	–
BX15P 30/60	0118505	–	–	–	–
BX20P 30/60	0118507	0125670	–	–	–
BX25P 30/60	0109006	–	–	–	–
BX25P 30/60 with filter	0109312	0125684	–	–	–
BX35P 30/60 with filter	0106619	–	0107563	9906975	–

Name	No fitting	1/8” NPT male with mesh filter	1/4” NPT male with mesh filter	3/8” NPT male with mesh filter	1/2” NPT male
BX35P 30/60	0106292	–	–	–	–
BX52P 30/60	0104529	–	–	–	–
BX52P 30/60 with filter	0104729	–	0106047	0107515	–
BX110P 30/60	0107093	–	–	–	–
BX110P 30/60 with filter	0108164	–	–	–	–
F75P 30/60	0104724	–	–	–	–
F110P 30/60	0104725	–	–	–	–
OB35×90P 30/60	0109913	–	–	–	–
OB50×140P 30/60	0109915	–	–	–	–
OB65×170P 30/60	0109917	–	–	–	–

NPSF threads

Name	1/8” NPSF female		5x1/8” NPSF female	3/8” NPSF female	
		with mesh filter			with mesh filter
B75P 30/60	–	0106345	–	0108790	0106347
B35XP 30/60	–	0205098	–	–	–
B52XP 30/60	–	0205110	0205134	–	–
B75XP 30/60	–	–	–	–	0205868
B110XP 30/60	–	–	–	–	0205884
BF80P 30/50	–	–	–	0102371	–
BF110P 30/60	–	–	–	0110291	–
BX35P 30/60 with filter	0106604	9906223	–	–	–
BX35P 60 with filter		9907509	–	–	–
BX52P 30/60 with filter	0104727	0106044	0106046	–	–
BX75P 30/60 with filter	–	–	–	0108794	–
BX75P 60 with filter	–	–	–	0108795	–
BX110P 30/60 with filter	–	–	–	0108403	–
F75P 30/60	–	0106349	–	0108800	0106351
F110P 30/60	–	–	–	0108802	0106354
OB35×90P 30/60	–	–	–	0109857	–
OB50×140P 30/60	–	–	–	0109859	–
OB65×170P 30/60	–	–	–	0109861	–

Threaded insert & O-ring

Name	for thread insert	G1/4” male thread insert	G1/8” male thread insert	G3/8” male		with O-ring
				thread insert	thread insert with mesh filter	
B75P 30/60	0106832	–	–	–	0106833	–
B75XP 30/60	0205157	0205161	0205156	0205162	–	–
B110XP 30/60	–	–	–	0205019	–	–
BF110P 30/60	–	–	–	–	0110290	0110289
BX75P 30/60 with filter	0107145	0201073	0201082	0107151	–	–
BX110P 30/60 with filter	–	–	–	0108273	–	–

Name	for thread insert	G1/4” male thread insert	G1/8” male thread insert	G3/8” male thread insert	G3/8” male thread insert with mesh filter	with O-ring
F75P 30/60	0106829	–	–	–	0106830	–
F110P 30/60	0106796	–	–	–	0106798	–
OB35x90P 30/60	–	–	–	–	0109856	–
OB50x140P 30/60	–	–	–	–	0109858	–
OB50x170P 30/60	–	–	–	–	0109860	–

M threads

Name	M5 male	M5 female	5×M5 female
B10XP 30/60	0204977	–	–
B15XP 30/60	0204991	–	–
B20XP 30/60	–	0204993	0205049
B25XP 30/60	–	0204997	0205096
BX10P 30/60	0122869	–	–
BX15P 30/60	0124344	–	–
BX20P 30/60	–	0125104	0125107
BX25P 30/60 with filter	–	0109404	0109405

G1/8”–G1/4” threads

Name	G1/8” male		G1/8” male / M5 female		G1/4” male
		with mesh filter		with mesh filter	with mesh filter
B20XP 30/60	–	0205046	–	0205048	–
B25XP 30/60	–	0205050	–	0205097	–
B35XP 30/60	–	0205100	–	–	0205105
B52XP 30/60	–	0205129	–	–	0205130
BX20P 30/60	0125108	–	0125105	–	–
BX25P 30/60 with filter	–	0114131	0109402	9907924	–
BX35P 30/60 with filter	–	9912151	–	–	0114449
BX52P 30/60 with filter	–	9912153	–	–	0106045

G3/8”–G1/2” threads

Name	G3/8” female		G3/8” male		G3/8” male / 1/8” NPSF female	G1/2” female
		with mesh filter	standard	with mesh filter		with mesh filter
B75P 30/60	–	0106346	–	–	–	0106348
B35XP 30/60	–	–	–	0205107	–	–
B52XP 30/60	–	–	–	0205132	–	–
B75XP 30/60	–	–	–	–	0205010	–
BF80P 30/50	0102370	–	0106985	0107326	–	–
BX35P 30/60 with filter	–	–	–	0107377	–	–
BX52P 30/60 with filter	–	–	–	0106740	–	–
BX75P 30/60 with filter	–	–	–	–	0106606	–
BX75P 30/60	–	–	–	–	0106293	–
F75P 30/60	–	0106350	–	–	–	0106352
F110P 30/60	–	0106353	–	–	–	0106355

XLF 150

- Suitable for handling large and heavy sheets, such as glass and metal, with a flat or slightly concave surface.
- Friction pattern increases safety and capabillity to handle tilted or standing glass/metal sheets.
- Double lip design increases safety against over-load or tear on the outer lip.
- Durable and abrasive resistant material reduces the risk for marks.
- Flat mounting plate facilitates customised mounting interfaces.
- Auxiliary port, suitable for vacuum sensing or efficient blow-off/release.

Lifting forces

	Lifting force vertical to the surface, N, at vacuum level			Lifting force parallell to the surface, N, at vacuum level		
	20 -kPa	60 -kPa	90 -kPa	20 -kPa	60 -kPa	90 -kPa
XLF150	330/520*	500/770*	780/1130*	281	425	663

*Inner/Outer lip.

General specifications

	Outer diameter, mm	Height, mm	Min. curve radius, mm	Max. vertical movement, mm	Volume, cm^3
XLF150	153	27	500	8	145

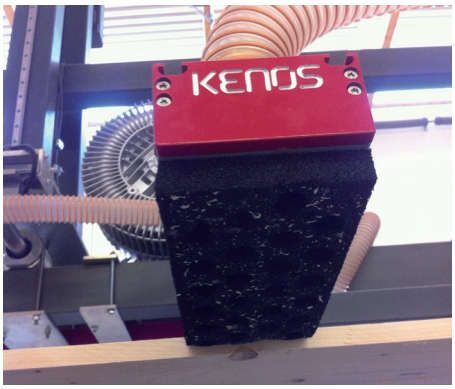
Available materials

	Nitrile-PVC, NPV
XLF150	●

Ordering information

Name	Art. no
XLF150 Extra Large Flat cup, G1/2” female	0127131

Kenos Vacuum Gripping Systems



KVG

KVGL-S

KVGL-CJ

Kenos Vacuum Gripper – KVG

KVG series represents a flexible solution for the handling manipulation of several products with different shapes, dimensions and porosity due to the double technology available (check valve or flow restrictions).

- Check valves or flow reducers can fulfill the needs.
- The KVG gripping system can be equipped with integrated vacuum generation or suitable for separated vacuum generation.
- The integrated vacuum generator is a modular multi-stage COAX® ejector of easy maintenance.
- The material of the KVG gripping system is made of a technical foam, with different pitch holes and thickness or suction cups.
- Typical applications within the automotive industry are handling of engine covers and inner carpets.

Kenos Vacuum Gripper Layer – KVGL-S

KVGL-S product series, Kenos Vacuum Gripper Layer - Standard, looks at the wide world of automotive such as end of line automation and other applications.

- Our adjustable check valve technology and the technical foam allows for superior gripping on different kind of boxes, wrap around packaging and primary ones.
- The large availability of standard dimensioning and the modularity make this series highly effective.

Kenos Vacuum Layer – Cans Jars – KVGL-CJ

KVGL-CJ series, Kenos Vacuum Layer – Cans Jars, born for the need to handle the complete layer of cans, jars that can be open or covered on the gripping area.

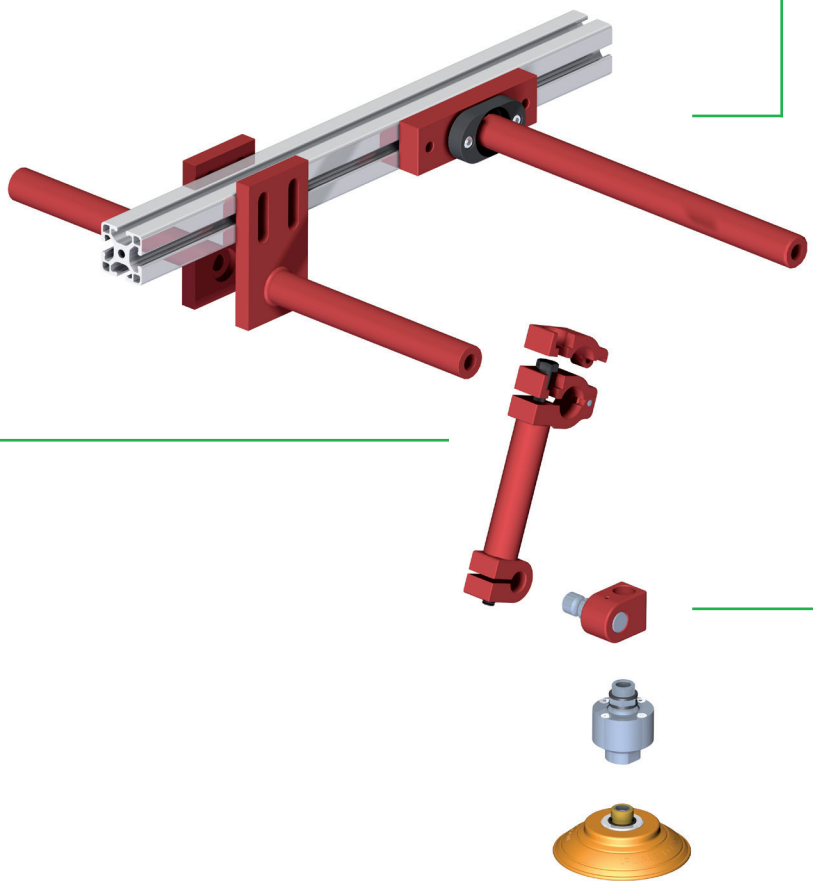
- In the automotive industry it can be applied for engine and transmission parts.

Ordering information

For a complete list of available Kenos Vacuum Grippers visit **piab.com**. Register to receive full access to all resources available.

PMAT – Piab Modular Automation Tooling

PMAT – Piab Modular Automation Tooling



Connections to main frame/ structure of the end-effector

Durable mounting bars, clamp blocks with tubes and special parts that will all fit to any type of welded frames or extrusions.

They form the structure of the PMAT end-effector and interfaces nicely with the swivel arms and in some cases directly with a function attachment.

Centralised vacuum connection

Connect your PMAT system to a centralised vacuum pump.

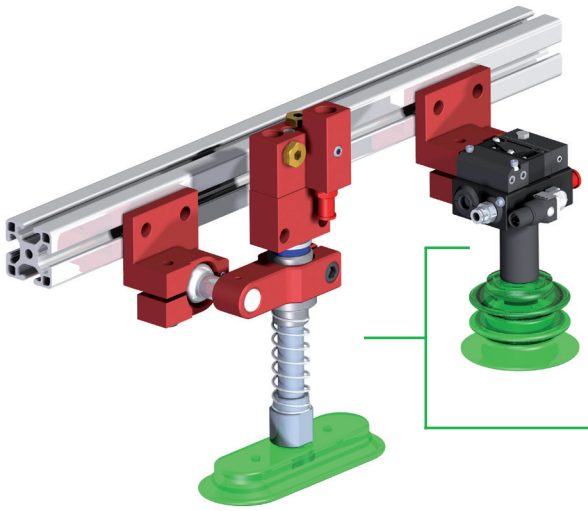
Ball joint

Swivel arms

The swivel arm is the part which allows for unlimited positioning of the suction cup. A single-bolt on the swivel arm will tighten the entire assembly of arm, function attachment and cup in the right position. Swivel arms are available in different lengths for increased flexibility and they can be mounted to a rod/bar by a slide-on function or be clamped to the rod/bar.

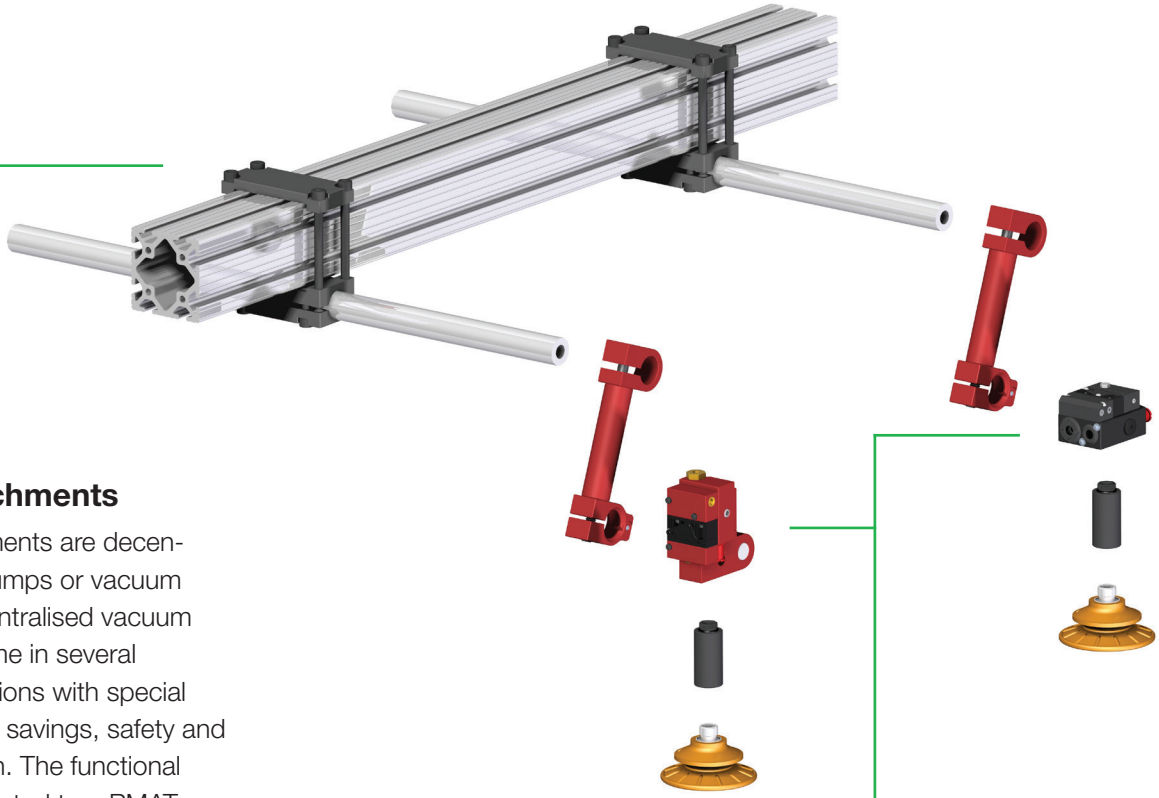
Piab suction cups

Piab suction cups are available in a variety of sizes and materials to efficiently handle your application. To prevent damage to the surface of metal sheets common in automotive and large appliance applications, Piab's DURAFLEX® cups feature a dual-hardness design and soft cup body. Lower vacuum force is needed to seal the cups to part surfaces for gentler handling. The soft lip of Piab's DURAFLEX® cups also molds easily to curved surfaces for less vacuum leakage and stronger grip.



Accessories for suction cups

The PMAT offers a wide range of suction cup accessories to optimise and facilitate the installation. For instance, the accessories can help to avoid bending stress on the suction cup when lifting heavy objects, extend the cup to reach areas in cramped spaces or simply height adjust the cup to the right level.



Function attachments

Functional attachments are decentralised vacuum pumps or vacuum connections for centralised vacuum systems. They come in several different configurations with special features for energy savings, safety and level compensation. The functional attachment is mounted to a PMAT swivel arm by a fully flexible ball joint or a more rigid and rotating lock-pin. The suction cup or the suction cup accessory have a matching interface for the function attachment.

Connections to main frame of the end-effector

Mounting bar – welded

- Rigid mounting with low deflection.
- Slotted mounting for adjustability.
- 100–600 mm (4”-24”) lengths.

Profile mount ball clamp

- Fits on standard size extrusion.
- Used with any Ball joint style function attachment.

Technical Data

Description	Torsional twist	Load, vertical, max.	Load, torque, max.
Mounting bar welded L=100	1°	–	–
Mounting bar welded L=150	1.2°	–	–
Mounting bar welded L=200	1.6°	–	–
Mounting bar welded L=300	2.5°	–	–
Mounting bar welded L=600	4.6°	–	–
Profile mount ball clamp, left hand	–	800 N	40 Nm
Profile mount ball clamp, right hand	–	800 N	40 Nm

Ordering information

Name	Art. no
Mounting bar welded L=100	0119784
Mounting bar welded L=150	0119785
Mounting bar welded L=200	0119786
Mounting bar welded L=300	0119787
Mounting bar welded L=600	0119788
Profile mount ball clamp, left hand	0110641
Profile mount ball clamp, right hand	0110648

Swivel arms

Swivel arm – clamp on

- Standard mounting to 25 mm and 1” bars, easily removable connection.
- Easy single screw adjustment.
- Available in lock pin 16, 19 or ball joint mountings, industry standard.
- Available in 50, 100, 150 mm lengths.

Swivel arm – slide on

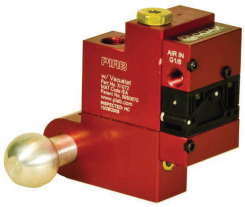
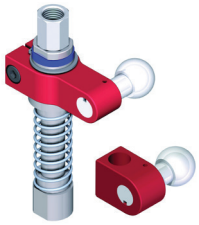
- Standard mounting to 25 mm or 1” bars.
- Easy single screw adjustment.
- Available in lock pin 16, 19 or ball joint mountings, industry standard.
- Available in 50, 100, 150 mm lengths.

Technical Data

Description	Load, vertical, max.	Load, torque, max.
Swivel arm – clamp on	400 N	40 Nm
Swivel arm – slide on	400 N	40 Nm

Vacuum check valve VT-1H



- Check valve that traps vacuum in sealed applications for safe operation.
- Built-in blow off check valve for fast release of object.
- Available in lock pin 16, 19 or ball joint mountings, industry standard.
- Available with level compensator to compensate for differences in level of object.
- Two-stage COAX® cartridge MINI Pi12-2 integrated (VT-1H with COAX® / VT-1H Vacustat with COAX®).
- Integrated energy-saving device, Vacustat results in virtually no air consumption in sealed applications.

Technical Data

Description	Vacuum flow, max.
Vacuum Check Valve VT-1H	0.68 Nl/s
Vacuum Check Valve VT-1H with COAX®	0.68 Nl/s
Vacuum Check Valve VT-1H Vacustat with COAX®	0.68 Nl/s

Ordering information

Only ordering information for the vacuum check valve VT-1H with ball joint is presented in the table beneath. For ordering information for the vacuum check valve VT-1H with lock pin 16 connection and lock pin 19 connection or without a connection please visit piab.com.

Name	Art. no.
Vacuum Check Valve VT-1H with level compensator, G threads, Ball joint, Left hand connection	0120993
Vacuum Check Valve VT-1H with level compensator, G threads, Ball joint, Right hand connection	0121020
Vacuum Check Valve VT-1H, G threads, Ball joint, Left hand connection	0125578
Vacuum Check Valve VT-1H, G threads, Ball joint, Right hand connection	0125577
Vacuum Check Valve VT-1H, NPT threads, Ball joint, Left hand connection	0125584
Vacuum Check Valve VT-1H, NPT threads, Ball joint, Right hand connection	0125583
Vacuum Check Valve VT-1H with level compensator, NPT threads, Ball joint, Left hand connection	0121060
Vacuum Check Valve VT-1H with level compensator, NPT threads, Ball joint, Right hand connection	0121061
Vacuum Check Valve VT-1H COAX®, G threads, Ball joint, Left hand connection	0110435
Vacuum Check Valve VT-1H COAX®, G threads, Ball joint, Right hand connection	0121018
Vacuum Check Valve VT-1H COAX® with level compensator, G threads, Ball joint, Left hand connection	0120990
Vacuum Check Valve VT-1H COAX® with level compensator, G threads, Ball joint, Right hand connection	0121021
Vacuum Check Valve VT-1H COAX®, NPT threads, Ball joint, Left hand connection	0121056
Vacuum Check Valve VT-1H COAX®, NPT threads, Ball joint, Right hand connection	0121057
Vacuum Check Valve VT-1H COAX® with level compensator, NPT threads, Ball joint, Left hand connection	0121062
Vacuum Check Valve VT-1H COAX® with level compensator, NPT threads, Ball joint, Right hand connection	0121063

Name	Art. no.
Vacuum Check Valve VT-1H Vacustat with COAX®, G threads, Ball joint, Left hand connection	0119676
Vacuum Check Valve VT-1H Vacustat with COAX® with level compensator, G threads, Ball joint, Left hand connection	0120997
Vacuum Check Valve VT-1H Vacustat with COAX® with level compensator, G threads, Ball joint, Right hand connection	0121022
Vacuum Check Valve VT-1H Vacustat with COAX®, NPT threads, Ball joint, Left hand connection	0127836
Vacuum Check Valve VT-1H Vacustat with COAX®, NPT threads, Ball joint, Right hand connection	0127837
Vacuum Check Valve VT-1H Vacustat with COAX®, G threads, Ball joint, Right hand connection	0121019

Accessories

Cross connector

- Connects 25 mm bars at any angle.
- Can be used with a Suction cup extension.

Level compensator – profile mount

- Compensates for differences in height.
- Provides certain degree of shock absorption.
- Fits on standard size extrusion.

Proximity mounting bracket

- For mounting of sensors or visions systems.
- Multiple interfaces.

Technical Data

Description	Load, vertical, max.	Load, torque, max.	Load, horizontal, max.
Cross connector 25-25/65	400 N	120 Nm	–
Level compensator – profile mount	698 N	–	698 N

Ordering information

Name	Art. no
Cross connector 25-25/65	0121170
LCS 200 profile mounted level compensator G3/8" female x G3/8" female	0121220
LCS 200 profile mounted level compensator 3/8" NPT female x 3/8" NPT male	0121219
Proximity mounting bracket	0121176

PMAT Configurable Products

Facilitate the selection of our great assortment of function attachments and swivel arm options by using the combined swivel arm and function attachment code configurator. Note that all function attachments are not presented in the code.

Select rod extension	PMAT code
Rod extension 50	AA
Rod extension 100	AB
Rod extension 150	AC

Bar mounting style	PMAT code
Bar clamp, clamp-on 25	00
Bar clamp, slide-on 25	01
Bar clamp, slide-on 1”, pin 16	02
Bar clamp, slide-on 1”, pin 19	14
Bar clamp, slide-on 1”, ball joint	04

Swivel style	PMAT code
Swivel style pin 16	P
Swivel style pin 19	C
Swivel style ball joint	I

Function attachment	PMAT code			
No attachment	00			
	Left hand		Right hand	
		LCS *		LCS *
Centralised vacuum connection, G	XX1	XX2	XX1RH	XX2RH
Centralised vacuum connection, NPT	X1	X2	X1RH	X2RH
Vacuum Check Valve VT-1H, G	XAB	XAM	XABRH	XAMRH
Vacuum Check Valve VT-1H, NPT	AB	AM	ABRH	AMRH
Vacuum Check Valve VT-1H COAX® cartridge MINI Pi12-2, G	XAA	XAL	XAARH	XALRH
Vacuum Check Valve VT-1H COAX® cartridge MINI Pi12-2, NPT	AA	AL	AARH	ALRH
Vacuum Check Valve VT-1H Vacustat COAX® cartridge MINI Pi12-2, G	XEA	XBTF	XEARH	XBTFRH
Vacuum Check Valve VT-1H Vacustat COAX® cartridge MINI Pi12-2, NPT	EA	BTF	EARH	BTFRH

* With level compensator, LCS.

Accessories

Mounting elements (ME)

Mounting bracket MB

- Mounting brackets suitable for extruded profile systems.
- Level compensators and height adjusters with external thread in sizes M12, M16, M20 and M25 are ideal for clamping on the mounting brackets.
- Facilitates the installation of a suction cup and positioning in X-direction.
- Long and short versions available.

Height adjuster HA

- Facilitates the positioning (y-direction) of a suction cup.
- Provides an adjustable height extension between a mounting bracket (MB) and a suction cup.
- Can be used with a suction cup / rod extension to further elongate the cup position.
- Key handle to avoid rotation when connecting vacuum ports.

Suction cup extension SE

- Solid rod extension with air/vacuum channel.
- For mounting a suction cup.
- Available in several sizes.
- Can be used with a height adjuster (HA) or level compensator (LC).

Technical Data

Description	Load, vertical, max.	Load, torque, max.	Load, horizontal, max.	Action range/ Stroke
Mounting bracket MB12S, MB16S, MB20S	200 N	7 Nm	–	–
Mounting bracket MB12L, MB16L, MB20L	200 N	7 Nm	–	–
Mounting bracket MB25S, MB25L	300 N	15 Nm	–	–
Height adjuster HA12	44 N	–	31 N	50 mm
Height adjuster HA16	87 N	–	61 N	50 mm
Height adjuster HA20	214 N	–	150 N	50 mm
Suction cup extension 50, G3/8” male x G3/8” female	700 N	–	400 N	–
Suction cup extension SE12	44 N	–	31 N	–
Suction cup extension SE16	87 N	–	61 N	–
Suction cup extension SE20	214 N	–	150 N	–

Ordering information

Name	Art. no
Mounting bracket MB12S	0200449
Mounting bracket MB16S	0200450
Mounting bracket MB20S	0200451
Mounting bracket MB25S	0200452
Mounting bracket MB16L	0200454
Mounting bracket MB12L	0200455
Mounting bracket MB20L	0200456

Name	Art. no
Mounting bracket MB25L	0200457
Height adjuster HA12	0200461
Height adjuster HA16	0200462
Height adjuster HA20	0200463
Height adjuster HA25	0121122
Suction cup extension 50, G3/8" male x G3/8" female	0110655
Suction cup extension SE12	0200458
Suction cup extension SE16	0200459
Suction cup extension SE20	0200460

Level Compensators

Level compensator LC

- Adjust differences in levels, for example on lifting devices with several suction cups.
- Less demand for exact positioning of vacuum handling device.
- Provides a certain degree of shock and vibration absorption.
- Allows for soft placement of cups on sensitive or thin objects.
- Non-rotational design, suitable for use with oval suction cups.
- Wide range of thread connections and stroke lengths.

Level compensators

- Adjust differences in levels, for example on lifting devices with several suction cups on a frame.
- A level compensator is often advantageous since it places less demand on exact vertical positioning, for example on a handling robot.
- The level compensator provides a certain degree of shock absorbtion.
- Level Compensator G1/2” with stiffer spring is identical to standard level compensator G1/2” except for thicker spring material. Suits e.g. robot vision systems in applications such as auto-racking.

Level compensator LC30

- Tailor made for the Vacuum Gripper System, VGS™, but can also be used together with other Piab products.
- Developed for use with standard profile systems.
- Easy installation with the option of fine adjustments and positioning of the suction cup.
- Non-rotational for use with, for example, oval suction cups. Can easily be made rotational.
- Quiet and reliable level compensation with load protection and shock absorbtion.

Technical Data

Description	Load, vertical, max.	Spring force	Action range/ Stroke	Thread
Level compensator LC12-F0510 / LC12-M0510	–	1.9–4.1 N	10 mm	M5
Level compensator LC12-F0525 / LC12-M0525	–	2–5 N	25 mm	M5
Level compensator LC16-F1820 / LC16-M1820	–	3.6–9 N	20 mm	G1/8”
Level compensator LC16-F1835 / LC16-M1835	–	4.3–9.5 N	35 mm	G1/8”
Level compensator LC20-F1425 / LC20-M1425	–	4.1–11 N	25 mm	G1/4”
Level compensator LC20-F1450 / LC20-M1450	–	4.3–11.4 N	50 mm	G1/4”
Level compensator LC25-F3840 / LC25-M3840	–	5.6–16.5 N	40 mm	G3/8”
Level compensator LC25-F3880 / LC25-M3880	–	6–17 N	80 mm	G3/8”
Level compensator G1/2” with stiffer spring	490 N	90–150 N	15 mm	G1/2”
Level compensator M5	29.4 N	2–5 N	7 mm	M5
Level compensator G1/8”	245 N	3–9.4 N	20 mm	G1/8”
Level compensator G1/2”	490 N	24–37 N	15 mm	G1/2”
Level compensator LC30	700 N	5–42 N	30 mm	G3/8”

Ordering information

Name	Art. no
Level compensator LC12-F0510	0127103
Level compensator LC12-M0510	0127104
Level compensator LC12-F0525	0127105
Level compensator LC12-M0525	0127106
Level compensator LC16-F1820	0124951
Level compensator LC16-M1820	0124952
Level compensator LC16-F1835	0124953
Level compensator LC16-M1835	0124954
Level compensator LC20-F1425	0124955
Level compensator LC20-M1425	0124956
Level compensator LC20-F1450	0124957
Level compensator LC20-M1450	0124958
Level compensator LC25-F3840	0124959
Level compensator LC25-M3840	0124960
Level compensator LC25-F3880	0124961
Level compensator LC25-M3880	0124962
Level compensator G1/2” with stiffer spring	0114291
Level compensator M5	3350068
Level compensator G1/8”	3350069
Level compensator G1/2”	3350071
Level compensator LC30	0111552

Level compensator LC30 EOAT

- Easy installation with the option of fine adjustments and positioning of the suction cup.
- Conical spring means very low total height in relation to stroke. For example, that can help increase cycle speed in sheet metal press-to-press stamping applications.
- Non-rotational for use with, for example, oval suction cups. Can easily be made rotational.
- Mounting interfaces for standard flexible end-of-arm-tooling (EOAT) systems.
- Developed for use with decentralised vacuum pump/generator units such as VGS™3010 and VGS™3040 or a centralised vacuum pump/generator.
- Quiet and reliable level compensation with load protection and shock absorption.

Level compensator – profile mount

- Compensates for differences in height.
- Provides certain degree of shock absorption.
- Fits on standard size extrusion.

Level compensator KSPH

- Compensates for differences in height.
- Provides certain degree of shock absorption.
- Fits on standard size extrusion.
- Level compensators feature a generic design.
- Non-rotational for use with, for example, oval suction cups. Can easily be made rotational.

Technical Data

Description	Load, vertical, max.	Action range/Stroke	Thread
Level compensator LC30 EOAT	700 N	30 mm	G3/8” / 1/8”NPSF
Level compensator – profile mount	700 N	50 mm	G3/8” / 3/8” NPT
Kenos level compensator – KSPH-M20-XX-25 (XX: Male or female thread connection)	–	25 mm	1/8”, 1/4”, 3/8”
Kenos level compensator – KSPH-M20-XX-50 (XX: Male or female thread connection)	–	50 mm	1/8”, 1/4”, 3/8”
Kenos level compensator – KSPH-M20-XX-75 (XX: Male or female thread connection)	–	75 mm	1/8”, 1/4”, 3/8”

Ordering information

Name	Art. no
Level compensator LC30 w ball joint LH	0124213
Level compensator LC30 w lock pin 19 LH	0124214
Level compensator LC30 w lock pin 16 LH	0124215
LCS 200 profile mounted level compensator G3/8” female x G3/8” female	0121220
LCS 200 profile mounted level compensator 3/8” NPT female x 3/8” NPT male	0121219
KSPH-M20-1M-25, 1/8”	K-25-00630
KSPH-M20-1M-50, 1/8”	K-25-00642
KSPH-M20-1M-75, 1/8”	K-25-00652
KSPH-M20-1F-25, 1/8”	K-25-00631
KSPH-M20-1F-50, 1/8”	K-25-00643
KSPH-M20-1F-75, 1/8”	K-25-00653
KSPH-M20-2M-25, 1/4”	K-25-00632
KSPH-M20-2M-50, 1/4”	K-25-00644
KSPH-M20-2M-75, 1/4”	K-25-00654
KSPH-M20-2F-25, 1/4”	K-25-00633
KSPH-M20-2F-50, 1/4”	K-25-00645
KSPH-M20-2F-75, 1/4”	K-25-00655
KSPH-M20-3M-25, 3/8”	K-25-00634
KSPH-M20-3M-50, 3/8”	K-25-00646
KSPH-M20-3M-75, 3/8”	K-25-00656
KSPH-M20-3F-25, 3/8”	K-25-00635
KSPH-M20-3F-50, 3/8”	K-25-00647
KSPH-M20-3F-75, 3/8”	K-25-00657

Valves

piSAVE release

- Equalises pressure in the suction cups to provide fast release of the product.
- Extra fast release by accumulating and utilising the feed-air pressure as a boost.
- ON/OFF activated simultaneously with the ejector.
- No additional controls required — use a single 3/2 control valve for the ejector and piSAVE release.

AQR (Atmospheric Quick-Release Valve)

- Equalises pressure in vacuum gripper systems to provide fast release of product.
- Consumes no additional compressed air.
- ON/OFF activated simultaneously with the ejector.
- No additional controls required — use a single 3/2 control valve for the pump and AQR.

Blow-off Check Valve G1/8”

- Prevents vacuum from being pulled through the blow-off lines, which means faster response time and completely independent vacuum units.
- Reliable quick-release function even in larger systems with several units, due to the very low feed pressure required to break away for blow-off.
- Suitable in applications where cleaning of the suction cup filters or cooling of the object to be picked is important.

Technical Data

Description	Flow, atmospheric	Flow rate
piSAVE release G1/8"	3.85 Nl/s	–
piSAVE release G1/4"	7.85 Nl/s	–
Atmospheric quick-release valve – AQR	3.3 Nl/s	–
Blow-off Check valve G1/8”	–	1.5–2.8 Nl/s (@ 0.3-0.7 MPa)

Ordering information

Name	Art. no
piSAVE release G1/4"	0119720
piSAVE release G1/8"	0119721
Atmospheric quick-release valve – AQR	0111236
Blow-off Check valve 1/8" NPSF female	0115314

Optimisers

piSAVE sense 02/03

- Vacuum check valves which allows a few suction cups to miss the object(s) and still maintain enough vacuum level in the system with quick response and release times.
- The vacuum check valves shall be used in a centralised vacuum system, one for each suction cup.
- Designing with vacuum check valves will require a smaller vacuum pump and save energy.
- Suitable for handling different size or different number of leaking or sealed objects such as metal sheets with a flexible handling device.
- Also suitable for objects with surface leakage around the lip of the suction cup.
- Available in four sizes with different flow performance/characteristics to suit different degree of leakage on handled material and different size of cups.
- The smallest sizes are mainly suitable for sealed and smooth materials, such as metal and glass (02/06 for small cups and 03/60 for large cups).
- The valves are supplied separately for integration or mounted in an Al-fitting with female and male threaded connections to facilitate installation.

Technical Data

Description	Pump flow/cup min.	Pump flow/cup to close valve
piSAVE sense 02/60 (yellow)	0.001 (@ 45 -kPa) Nl/s	0.21 (@ 3 -kPa) Nl/s
piSAVE sense 03/60 (green)	0.06 (@ 45 -kPa) Nl/s	0.37 (@ 3 -kPa) Nl/s

Ordering information

Name	Art. no
piSAVE sense Multiple port fitting 02/60 (yellow)	0202396
piSAVE sense 02/60 (yellow),10p, incl. Assembly tool	0202394
piSAVE sense 02/60 (yellow), 100p, incl. Assembly tool	0202395
piSAVE sense Multiple port fitting 03/60 (green)	0128719
piSAVE sense 03/60 (green), 10p, incl. Assembly tool	0202424
piSAVE sense 03/60 (green), 100p, incl. Assembly tool	0202427

piSAVE onoff

- Independent pneumatic air-saving device for vacuum pumps.
- Adjustable vacuum controlled 2/2 NO valve.
- Available with large hysteresis for object handling and small hysteresis for process applications.
- The Vacustat is recommended for vacuum pumps in non-leaking systems.
- The vacuum pump must be fitted with a non-return valve.

Technical Data

Description	Flow	Flow rate
piSAVE onoff	7.3 Nl/s (@ P1=6 bar & Δp=0.5 bar)	–
Blow-off Check valve	–	1.5–2.8 Nl/s (@ 0.3-0.7 MPa)

Ordering information

Name	Art. no
piSAVE onoff with small hysteresis	0118100
piSAVE onoff with large hysteresis	0118200

piSAVE optimize

- Vacuum controlled proportional pressure regulator, a fully pneumatic device suitable for air-driven ejectors/pumps.
- The feed pressure to the vacuum pump/ejector is automatically regulated and controlled to maintain the set vacuum level. Air/energy usage is kept to a minimum for the application (optimised).
- Recommended for leaking and sealed applications to save energy and secure the right vacuum level.
- Extra port for Vacuum gauge.
- Air ventilation port with filter.
- Swivel compressed air connections.
- piSAVE optimize gives maximum feed pressure/flow to vacuum pump/ejector until vacuum level starts to build up.
- Separate mounting bracket kit.
- Upgrade kit - available as an integrated module for piCLASSIC and Classic vacuum pumps.

Technical Data

Description	Vacuum flow
piSAVE optimize	1.67–15 Nl/s

Ordering information

Name	Art. no
piSAVE optimize stand-alone 25–70 -kPa G3/8"	0128999
piSAVE optimize standalone 25–70 -kPa 3/8" NPT	0129000
piSAVE optimize upgrade kit piCLASSIC/Classic	0129002

Vacuum switch VS4128

- Pre-set vacuum switch with digital output.
- Durable and compact design with G1/8” 90° angle swivel connection for easy installation.
- VS4128 suitable for plug in I/Os. Available in PNP NO or NPN NO models.
- Possible to connect several units serially with T-connectors to provide a common output (VS4128 PNP).

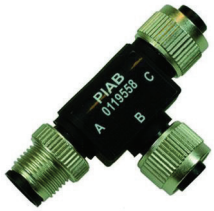
Technical Data

Description	Hysteresis	Signal range
Vacuum Switch VS4128 30 -kPa, M12 PNP NO	8 kPa	26–34 -kPa
Vacuum Switch VS4128 50 -kPa, M12 PNP NO	8 kPa	46–54 -kPa
Vacuum Switch VS4128 50 -kPa, M12 NPN NO	8 kPa	46–54 -kPa

Ordering information

Name	Art. no
Vacuum Switch VS4128 30 -kPa, M12 PNP NO	0110630
Vacuum Switch VS4128 50 -kPa, M12 PNP NO	0110631
Vacuum Switch VS4128 50 -kPa, M12 NPN NO	0124450

T-connector M12 male



- Serially connects two or several vacuum switches, VS4128, into one common output to the PLC or BUS-I/0.
- Quick and simple installation with standard male to female M12 eurofast cable assemblies.
- Suitable if the PLC or BUS-I/O is limited to one or two input signals from a vacuum system with several vacuum switches.

Technical Data

Description	Current, max.	Safety classification	Voltage, max.
T-connector M12 male	4000 mA	IP65	60 VDC

Ordering information

Name	Art. no.
T-connector M12 male, 2×M12 female	0119558

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AMERICAS

ARGENTINA

Piab Argentina S.A.

25 de Mayo 1807
San Martín
AR-1650 BUENOS AIRES
Phone: +54 11 4713 8550
Fax: +54 11 4713 8552
Email: info-argentina@piab.com

BRAZIL

Regional office South America

Piab do Brasil Ltda.

R. Capitão Joaquim da Silva Rocha, 50
Jardim Ana Maria
BR-13208-750 JUNDIAI – SP
Phone: +55 11 4492 9050
Fax: +55 11 4522 4066
Email: info-brasil@piab.com

MEXICO

Piab Mexico & Central América

65 Sharp Street
HINGHAM MA 02043 US
Phone: +1 781 337 7309
Fax: +1 781 337 6864
Email: info-mxca@piab.com

USA/CANADA

Regional office North America

Piab USA, Inc.

65 Sharp Street
HINGHAM MA 02043 US
Phone: +1 781 337 7309
Fax: +1 781 337 6864
Email: info-usa@piab.com

ASIA

CHINA

Piab (Shanghai) Co., Ltd

Unit 401, Blk B1, No. 6000 Shenzhuan Rd
Songjiang District
CN-201619 SHANGHAI
Phone: +86 21 5237 6545
Fax: +86 21 5237 6549
Email: info-china@piab.com

INDIA

Piab Vacuum Technology Pvt. Ltd

Plot no 11/C8, 11th block,
Mugappair East,
IN-600 037 CHENNAI
Phone: +91 9444 25 36 48
Email: info-india@piab.com

JAPAN

Piab Japan Ltd.

8-43-17 Tateishi Katsushika-ku,
JP-124-0012 TOKYO
Phone: +81 3 6662 8118
Fax: +81 3 6662 8128
Email: info-japan@piab.com

SINGAPORE

Regional office Asia Pacific

Piab Asia Pte Ltd

4008 Ang Mo Kio Ave 10
03-16 Techplace 1
SG-569625 SINGAPORE
Phone: +65 6455 7006
Fax: +65 6455 0081
Email: info-singapore@piab.com

SOUTH KOREA

Piab Korea Ltd

C-2402 Daelim Acrotel
KR-Kangnam-Gu 467-6
DOKOK-DONG
Phone: +82 2 3463 0751
Fax: +82 2 3463 0754
Email: info-korea@piab.com

EUROPE

FRANCE

Piab

Parc d'entreprises L'Esplanade
10 rue Enrico Fermi
Saint-Thibault des Vignes
FR-77462 LAGNY SUR MARNE Cedex
Phone: +33 1 6430 8267
Fax: +33 1 6430 8285
Email: info-france@piab.com

GERMANY

Regional office Europe

Piab Vakuum GmbH

Otto-Hahn-Str. 14
DE-35510 BUTZBACH
Phone: +49 6033 7960 – 0
Fax: +49 6033 7960 – 199
Email: info-germany@piab.com

ITALY

Piab ITALIA Srl

Via Cuniberti, 58
IT-10151 TORINO
Phone: +39 011 226 36 66
Fax: +39 011 226 21 11
Email: info-italy@piab.com

POLAND

Piab Polska Sp. z o.o.

Ul. Astronomow 1
PL-80-299 GDANSK
Phone: +48 58 785 08 50
Fax: +48 58 785 08 51
Email: info-poland@piab.com

SPAIN

Vacío Piab, S.L.

Avda. Pineda, 2
CASTELLDEFELS
ES-08860 BARCELONA
Phone: +34 93 6333876
Fax: +34 93 6380848
Email: info-spain@piab.com

SWEDEN

Head office

Piab AB

Box 4501
SE-183 04 TÄBY
Phone: +46 8 630 25 00
Fax: +46 8 630 26 90
Email: info-sweden@piab.com

UNITED KINGDOM

Piab Ltd.

Unit 7 Oaks Industrial Estate
Festival Drive
LOUGHBOROUGH LE11 5XN
Phone: +44 1509 857 010
Fax: +44 1509 857 011
Email: info-uk@piab.com

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piab

www.piab.com

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