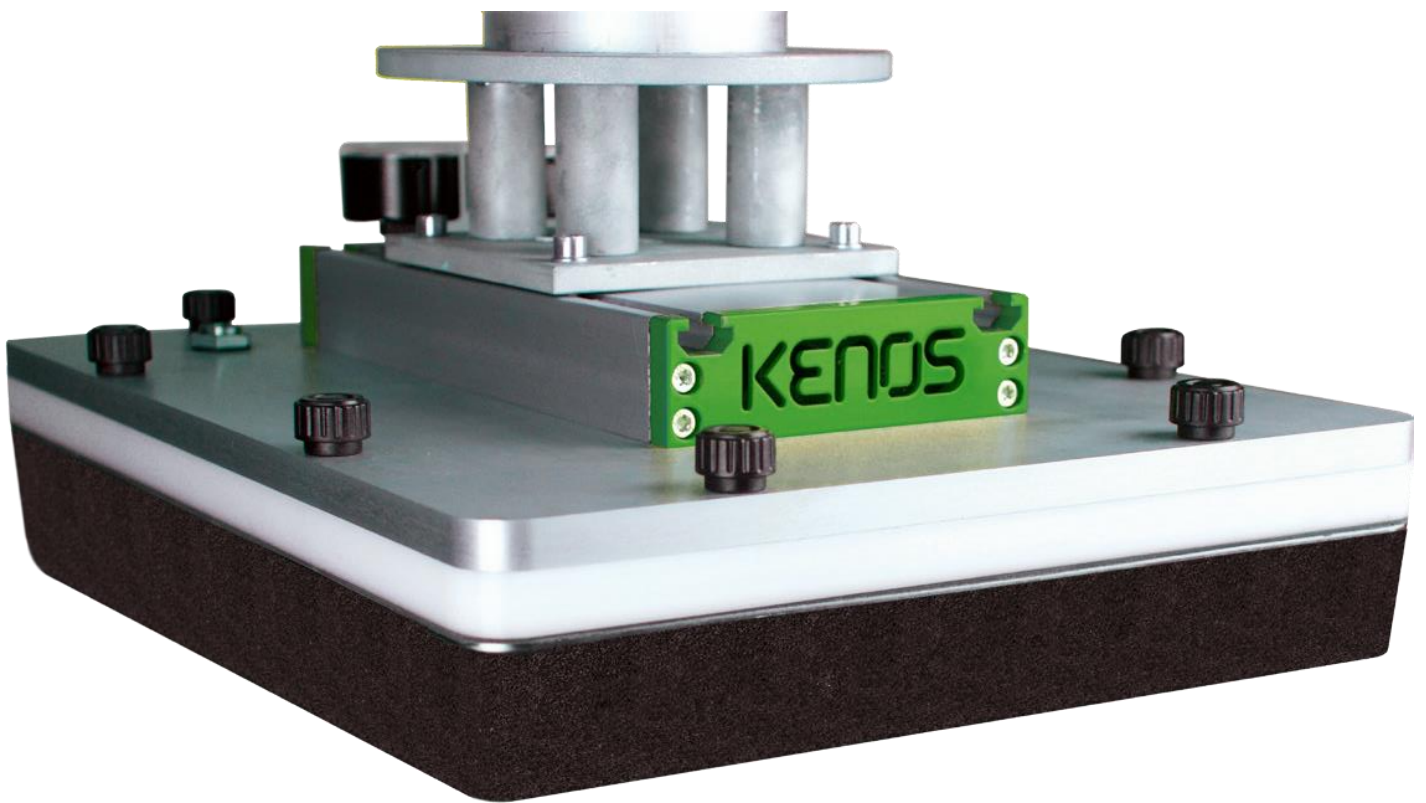


# KVGL-S SERIES ASSEMBLY MANUAL



Rev: 05

## INDEX

1.	GENERAL SAFETY INSTRUCTIONS .....	3
2.	DANGEROUS AREAS .....	5
3.	PICTOGRAMS.....	6
4.	R.E.S.S. APPLIED AND RESPECTED .....	7
5.	INSTALLATION .....	9
6.	WORKING CYCLE DETAILS .....	13
7.	PARTS LIST .....	14
8.	MAINTENANCE .....	17
9.	PROBLEMS/SOLUTIONS.....	24
10.	ACCESSORIES .....	25
11.	TECHNICAL DATA .....	27
12.	PNEUMATIC DIAGRAM.....	28
13.	SPARE PARTS .....	29
14.	WARRANTIES .....	31

### © Copyright protection

This manual has the Use and Maintenance instructions for the vacuum gripping system and as such it must be treated with the utmost confidentiality. It is intended exclusively for use by persons authorized in your company. The transfer to third parties can only take place with the prior written consent of Piab AB. All is protected under the copyright law. Transmission to third parties and reproduction of this documentation is prohibited.



## 1. GENERAL SAFETY INSTRUCTIONS

The correct use of pneumatic equipment within a system is the responsibility of the system designer or the person who determines its technical specifications.

The use of safety guards is recommended to minimize the risk of injury to persons; pay close attention to the fact that compressed air may lead to the explosion of closed containers, and vacuum may lead to the implosion of closed containers. The vacuum generator, even if silenced, makes noise: if necessary, wear suitable protection. In the event that, contrary to indications, dusts, oil mists, fumes, etc. are suctioned, these will be mixed with the discharge air of the vacuum generator and expelled via the discharge conduit; use suitable, approved air filters to avoid possible intoxications. The discharge air has a high output speed. Do not obstruct the discharge of the gripper module. Ensure that the components are properly secured; regularly check that connections are in good working order, as high cycles or vibrations may cause them to loosen. Consider the possibility of pressure drops in the pneumatic supply line: then provide for a safety system that, in order to prevent injury to the operator or damage to the machine prevent the risk of the piece being released.

Consider the possibility the electrical or pneumatic supply is interrupted, to protect persons and systems.

Consider the emergency stop when designing the system.

### **Pneumatic supply and connection**

The supply pressure should not exceed the recommended one of 7 Bar. (102 psi)

If the compressed air contains impurities, the components may

malfunction. Install a filter upstream of the component; the filter grade should be at least 5 µm. Air containing excessive quantities of condensate may cause the components to malfunction. Installing condensate drains or dryers prevents these malfunctions. For more information, see the Installation and Commissioning section.

### **Electric connection**

Connect the cables separately from power or high voltage lines, avoiding parallel wiring or wiring in the same conduit of the same lines. Control circuits that include sensors and coils may malfunction due to the noise from these other lines.

Carefully follow the electrical wiring instructions, paying close attention to avoiding the short-circuiting of loads.

### **Assembly**

Compressed air may be dangerous if used by unskilled personnel. Assembling, using and maintaining systems should solely be carried out by experienced and specially trained personnel. Both for fastening and supplying, solely use the bores and methods provided by the manufacturer. Prior to assembly/disassembly of the components, cut off voltage and pressure. Install and maintain the components only after thoroughly reading and understanding this manual.

### **Maintenance**

Maintenance must be carried out in accordance with the instructions in this manual. Prior to any maintenance work, check the conditions to prevent the sudden release of pieces, then suspend

pneumatic/electrical supply, and discharge residual pressure.

### **Safety instructions**

Handle the components with care. During installation and maintenance, cut off voltage and pressure.

Modifying the components is prohibited.

Cleaning the environment and place of use is recommended.

Follow the installation and commissioning instructions.

The electrical and pneumatic connections should be permanently connected to the component.

### **Storage**

For a correct storage of the system or its spare parts, we recommend:

Exclude outdoor areas, areas exposed to the elements or with excessive humidity or exposed to direct sunlight.

The environment must be sufficiently clean, arrange the system almost in such a way that it has a stable base of support and make sure that there is no risk of unexpected movements.



### Intended use

The gripper is intended exclusively for handling, lifting and storing products of appropriate size, as reported in the agreement.

The products handled by this equipment must have the following characteristics:

- They must not be deformed;
- Have a uniform height over the entire gripping surface. Any height differences must be reported in the agreement. If they are not reported, Piab AB and / or Kenos will not be responsible for malfunction.



### Not intended use

The gripper must not be used:

- For uses other than those established by the manufacturer or reported in this manual;
- In direct contact with corrosive gases, chemical products, water, vapor or in environments with droplets or splashes of water, oil, etc.;
- In explosive atmospheres;
- In environments subject to strong vibrations and/or impacts;

### Waste disposal

In case of disposal of the system or non-working parts, follow these procedures:



Provide for disposal to Authorized Bodies, in full compliance with current regulations regarding waste.

Where non-reusable and / or deemed RAEE "waste" such as electrical and electronic equipment are not to be given in urban waste collection bins. As far as the metal mass of the system is concerned, is sufficient to subdivide the different materials for a correct recycling.

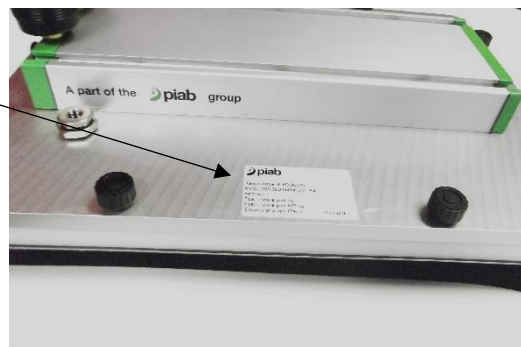
### Identification data and product number

Example of label:



Kenos Code: K-60-00203-00  
 Type model product: KVGL.400.240.N405.CVM.S3  
 Item no: 9929775  
 Foam spare part no: 0210532  
 Foam spare part MP no: 9929689  
 Country of origin: ITALY

-- 06/03/2019 --



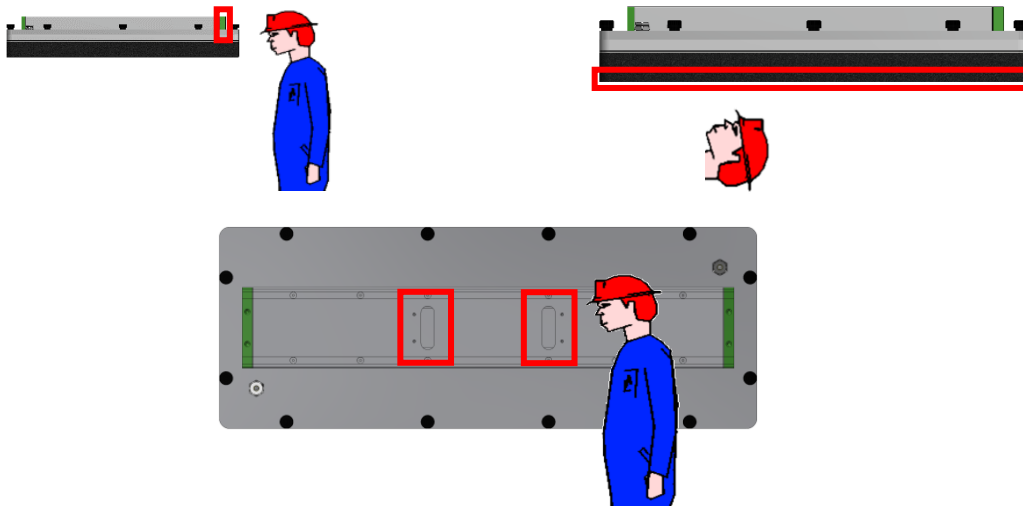
Each system is identified by a label on which the reference data of the same is indelibly marked. For any communication with Piab AB or Service Centers always refer these references.

## 2. DANGEROUS AREAS

Areas with danger of crushing



Areas with danger of air ejection



### Notes for the final manufacturer of machinery and end user

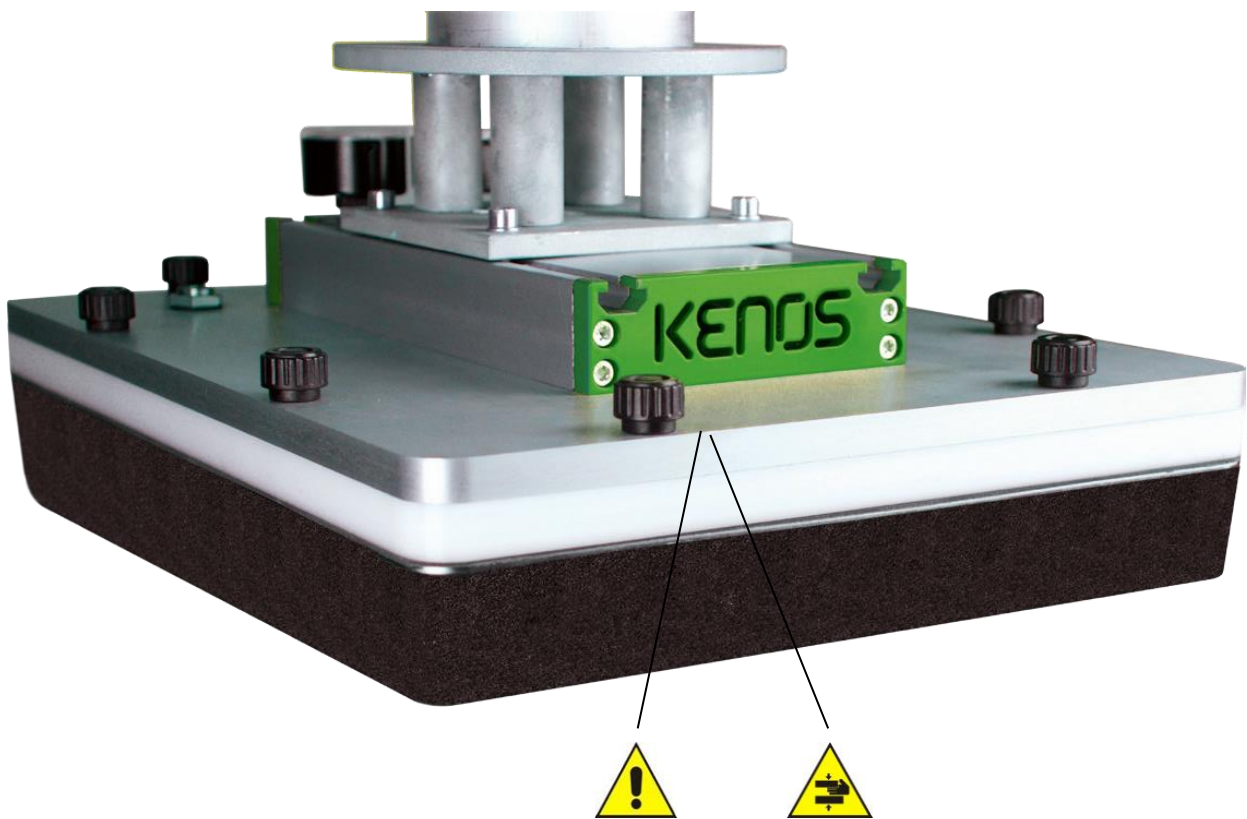
It is prohibited stopping or passing through the work area of the gripper module. In case of electrical or pneumatic supply failure, the load handled by the module is released.

Never look and / or insert the hands in cavities, holes or openings (for example: air discharge, openings / holes under the foam etc.).

The gripping module described in this manual is designed for implementation in industrial systems; therefore, it must not be used with the conditions other than those specified.

The final evaluation of the safety systems to be applied for starting up the system, after the assembly of the gripping module, is the task of the final manufacturer of machinery. It is up to the final manufacturer of machinery to report the PPE needed by the operators who are stationed in the surroundings or the operators who have access to the work area. In addition, the same manufacturer will certify the final commissioning according to the regulations in force for each individual country.

3. PICTOGRAMS



PIC.	DESCRIPTION
	Generic danger. Warning!
	Danger of crushing or entrapment of upper limbs!
	Danger of air ejection or expulsion of particles!

Pictograms related to the operator's qualification highlighted in this manual

PIC.	DESCRIPTION PICTOGRAMS
	<b>Generic operator:</b> operator without specific skills, able to perform only simple tasks on the orders of qualified technicians.
	<b>Mechanical maintenance technician:</b> qualified technician able to intervene on the mechanical parts to make the necessary adjustments, maintenance and repairs.
	<b>Lifting and handling driver:</b> operator enabled to use lifting and handling equipment in compliance with the laws in force in the country <u>of the final assembler</u> .

4. R.E.S.S. APPLIED AND RESPECTED

Essential Health and Safety Requirement	Compliance
<b>1 ESSENTIAL SAFETY AND PROTECTION OF HEALTH</b>	
<b>1.1 General considerations</b>	
1.1.1 definitions	✓
1.1.2 Principles of safety integration	✓
1.1.3 Materials and products	✓
1.1.4 Lighting	
1.1.5 Design of machinery to facilitate its handling	✓
1.1.6 Ergonomics	
1.1.7 Jobs	
<b>1.1.8 Seats</b>	
1.2.1 Safety and reliability of control systems	
1.2.2 Control devices	
1.2.3 Startup	
<b>1.2.4 Shutdown</b>	
1.2.4.1 Normal Shutdown	
1.2.4.2 Operational stop	
1.2.4.3 Emergency Stop	
1.2.4.4 Assembling machines	✓
1.2.5 Selection of control or operating	
1.2.6 Failure of the power supply	
<b>1.3 Measures of protection against mechanical hazards</b>	
1.3.1 Risk of loss of stability	
1.3.2 Risk of break-up during operation	✓
1.3.3 Risks due to falling or ejected objects	✓
1.3.4 Risks due to surfaces, edges or corners	✓
1.3.5 Risks related to combined machinery	
1.3.6 Risks related to variations in operating conditions	
1.3.7 Risks related to moving parts	✓
1.3.8 Choice of protection against risks related to moving parts	
1.3.8.1 Moving transmission	
1.3.8.2 Moving parts directly involved in the process	
1.3.9 Risks of uncontrolled movements	
<b>1.4 Required characteristics of guards and protection devices</b>	
1.4.1 General Requirement	✓
1.4.2 Requirement for special shelters	
1.4.2.1 Repair fixed	
1.4.2.2 Interlocking movable guards	
1.4.2.3 Adjustable guards restricting access	
1.4.3 Special requirements for protective devices	

Essential Health and Safety Requirement	Compliance
<b>1.5 Risks due to other hazards</b>	
1.5.1 Electric Power	
1.5.2 Static Energy	
1.5.3 Energy supply other than electricity	√
1.5.4 Assembly errors	
1.5.5 Extreme temperatures	
1.5.6 Fire	
1.5.7 Explosion	
1.5.8 Noise	√
1.5.9 Vibrations	
1.5.10 Radiation	
1.5.11 External Radiation	
1.5.12 laser radiation	
1.5.13 Emission of hazardous materials and substances	
1.5.14 Risk of being trapped in the machine	√
1.5.15 Risk of slipping, tripping or falling	
1.5.16 Lightning	
<b>1.6 Maintenance</b>	
1.6.1 Maintaining the Machine	√
1.6.2 Access to jobs and servicing points used for the maintenance	
1.6.3 Isolation from sources of energy supply	
1.6.4 Operator intervention	√
1.6.5 Cleaning of internal parts	√
<b>1.7 Informations</b>	
1.7.1 Information and warnings on the machine	√
1.7.1.1 Information and information devices	
1.7.1.2 Warning Devices	
1.7.2 Warning of residual risks	√
1.7.4 Instructions	√
1.7.4.1 Basis of preparation	√
1.7.4.2 Contents of the instructions	√
1.7.4.3 Publications illustrative and promotional	

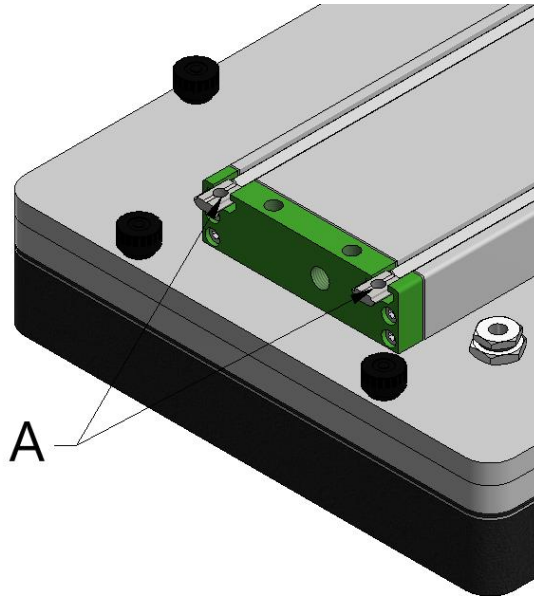


5. INSTALLATION

a. Mounting on the handling system

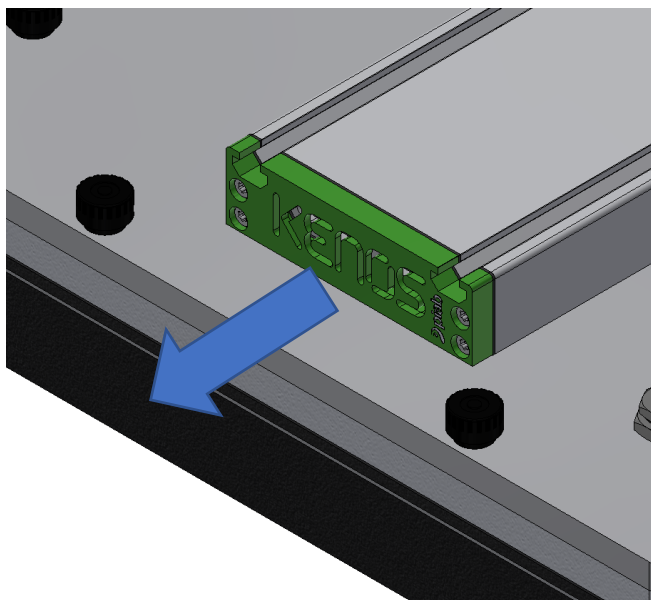


The gripping system is secured with the aid of slot nuts. Special slots for these nuts are provided in the basic body. The gripper can be mounted either directly, via a robot flange or via spring mountings. Information about the slots are present in the section dedicated to the accessories.

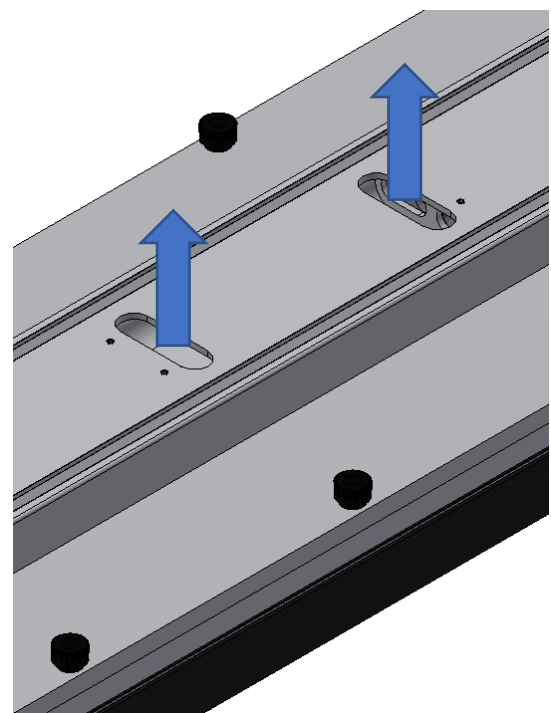


Pos.	Description
A	T-Slot Nut

b. Ejector exhaust



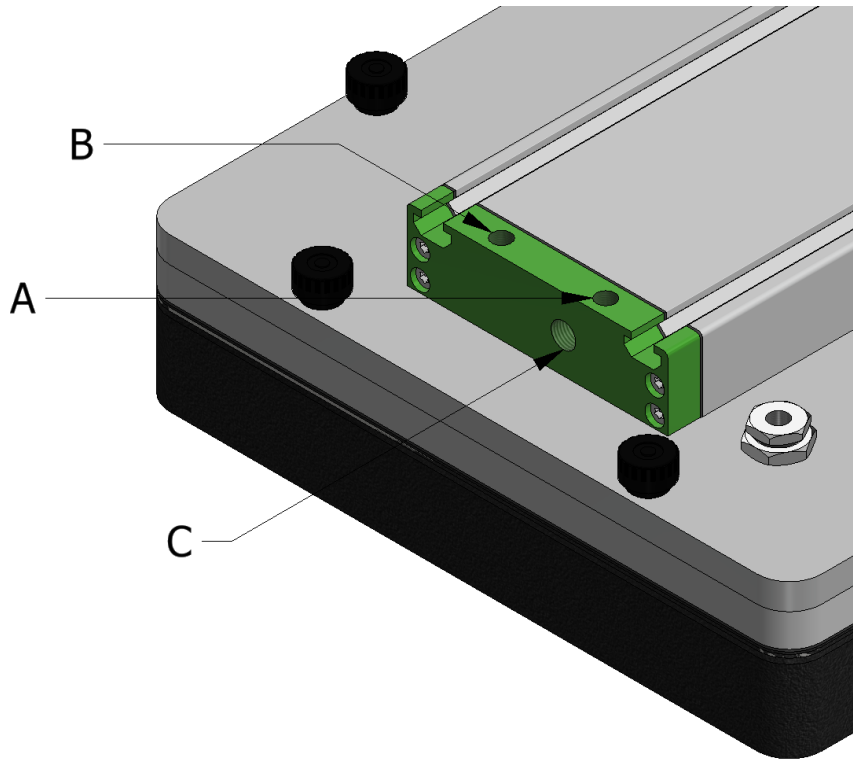
Single ejector version (S1÷S4)



Double ejector version (S6-S8)

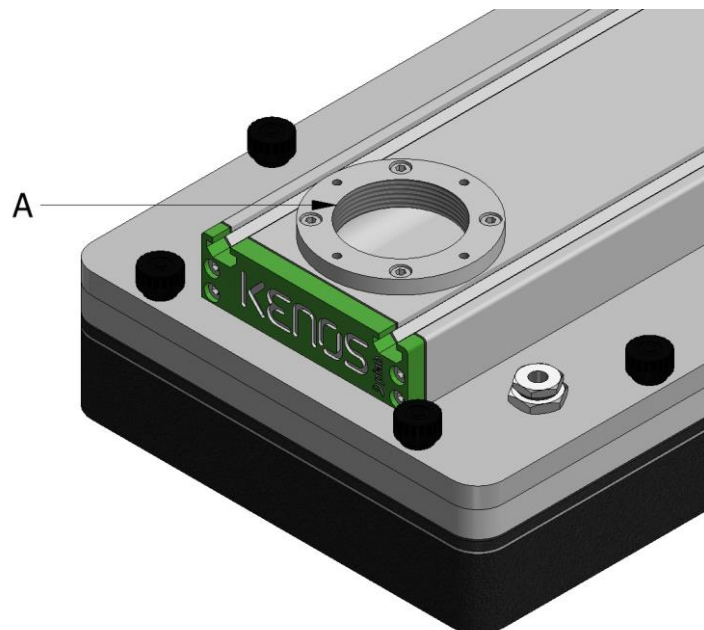
The blue arrows show the exhaust air flow, DO NOT COVER THE WRITTEN KENOS (Single ejector version) OR SLOTS (double ejector version).

c. Pneumatic connection ejector version



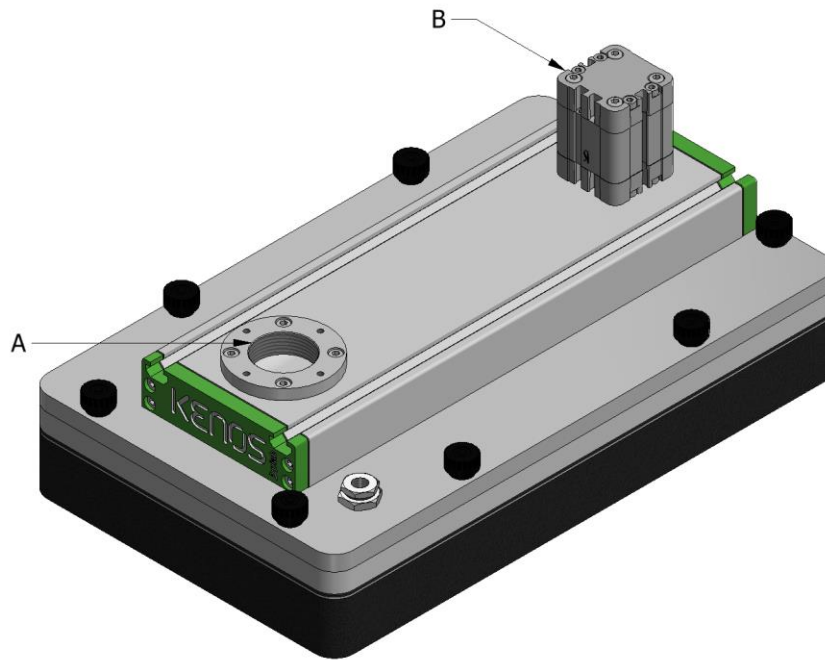
Pos.	Description
A	Connection G 1/8" for pressure monitoring
B	Connection G 1/8" for vacuum monitoring
C	Compressed air connection G 1/4" for vacuum (optimal pressure 0.6 MPa)

d. Pneumatic connection BL version



Pos.	Description
A	Vacuum connection G 1-1/4" or G 2"

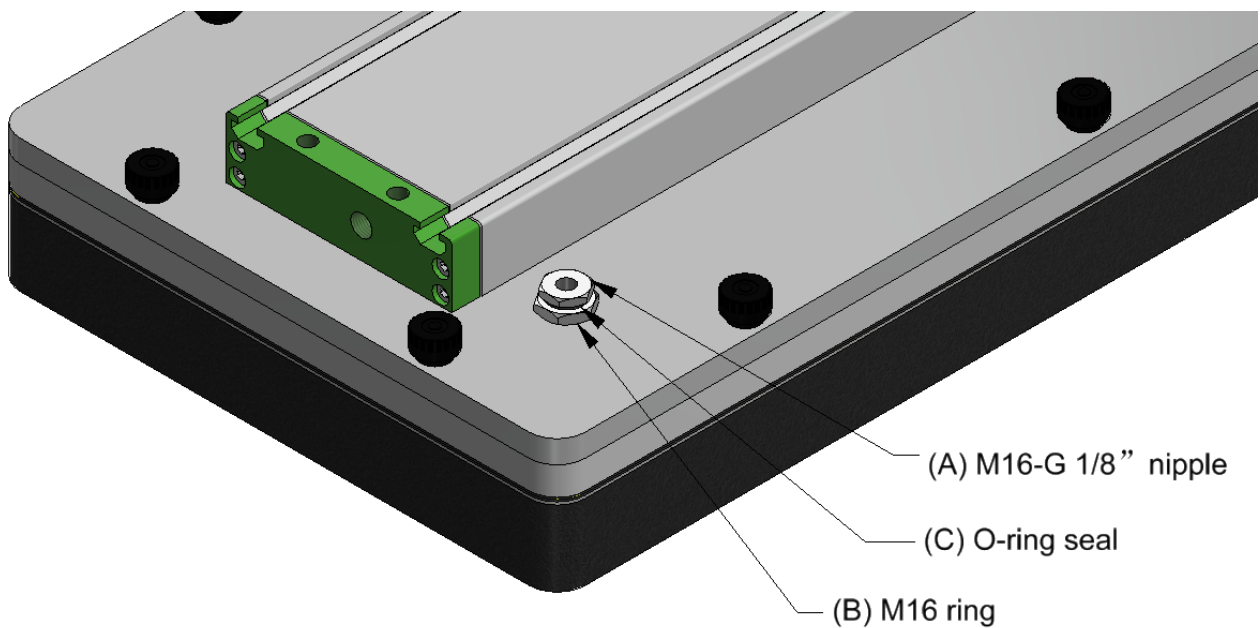
e. Pneumatic connection PU version



Pos.	Description
A	Vacuum connection G 1-1/4" or G 2"
B	Grip/release switching cylinder

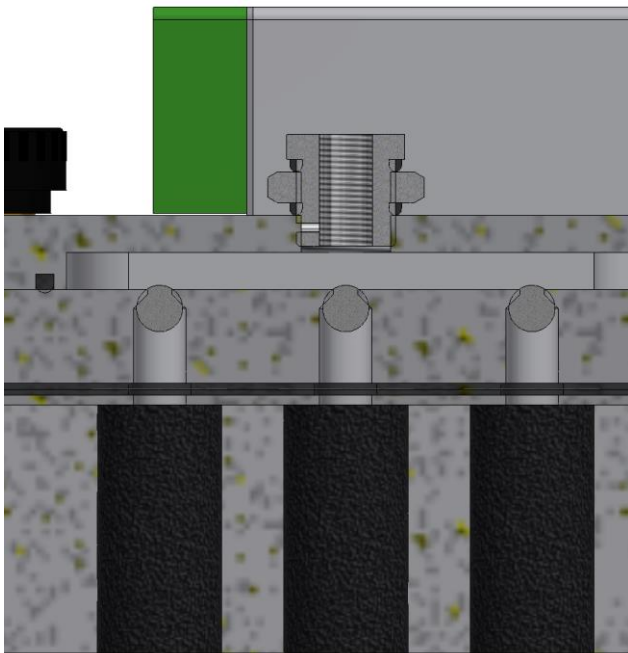
f. Piece presence monitoring

The KVGL-S gripping system with piece presence monitoring is supplied with a M16 retaining ring (B) that keeps the connection nipple raised (A). In case the piece presence monitoring function is deactivated, the G 1/8" hole can be used to monitor the overall vacuum within the chamber or as connection for the piece release blow-off.

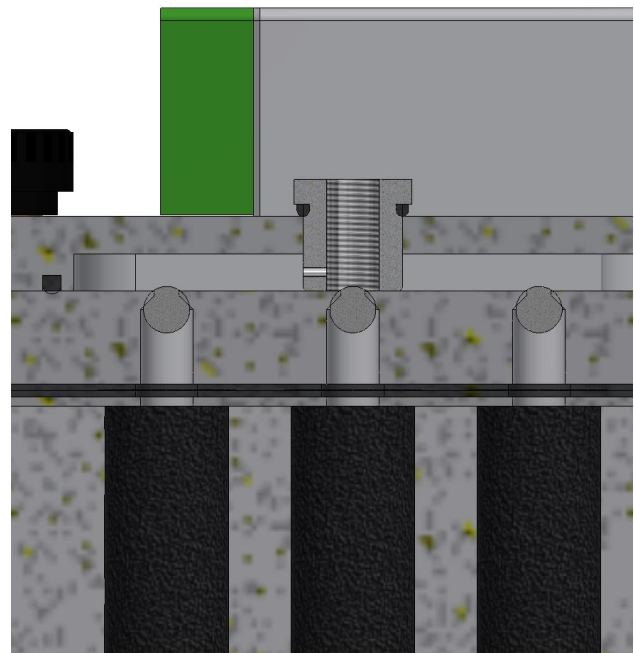


To enable the piece presence monitoring function, the M16 ring must be removed and the nipple tightened all the way.

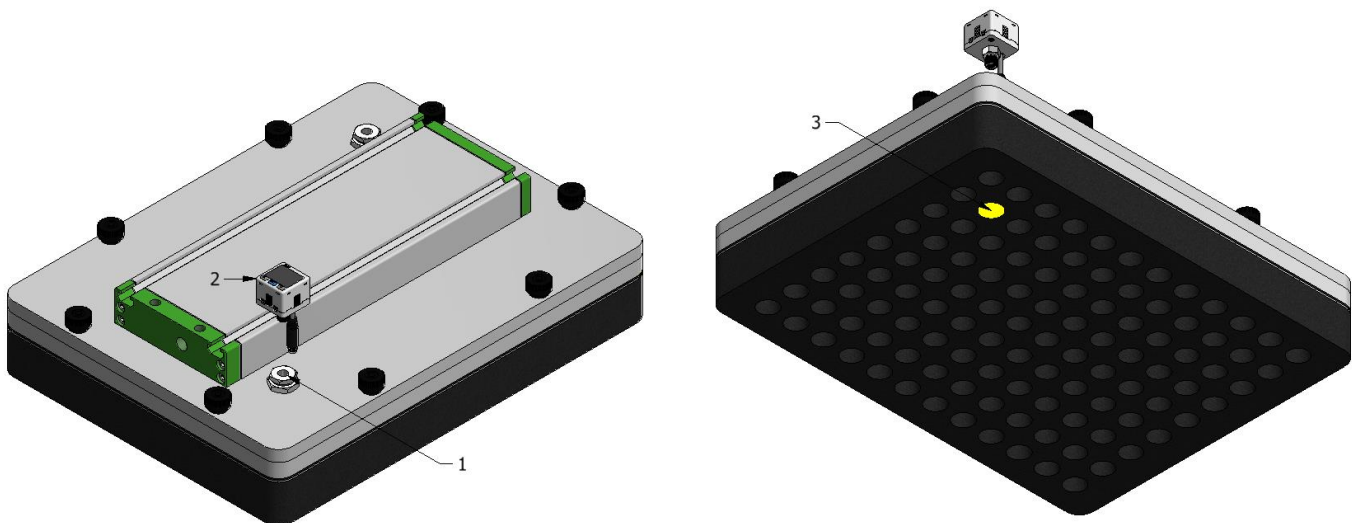
Inactive monitoring



Active monitoring



Note: if it is not necessary to use the monitor or the blow-off, it is necessary to plug the G1/8" connection.

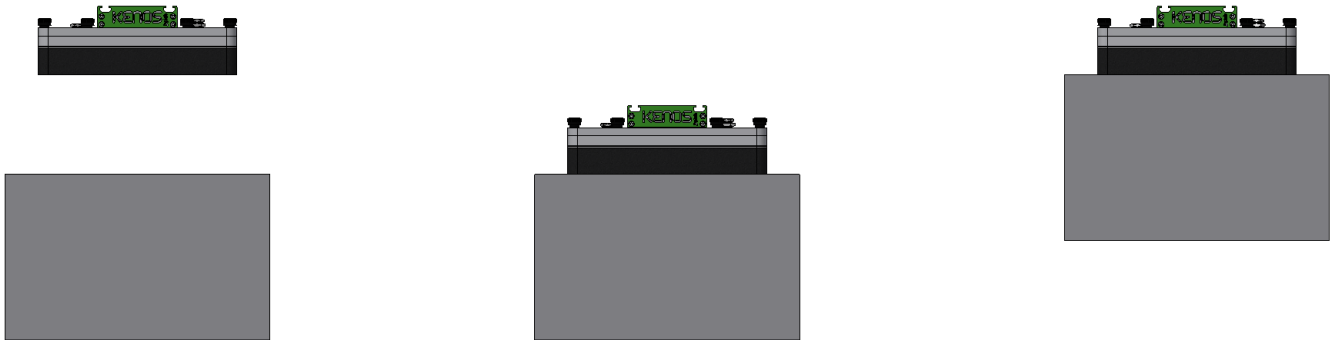


The piece presence monitor (1) enables using, for example, a digital vacuum switch (2) as a sensor to detect the object has been gripped. The vacuum switch only detects the value of the vacuum for the hole in the foam (3) highlighted in yellow in the figure.

Therefore, the essential requirement for properly signalling the presence of the piece, is that the gripped object completely covers the area highlighted in yellow in the figure.

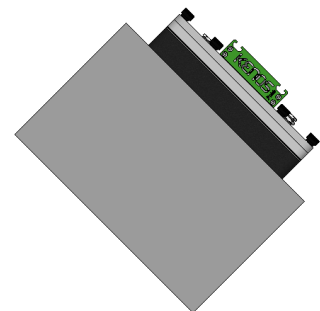
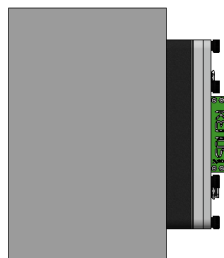
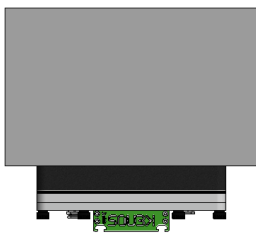
## 6. WORKING CYCLE DETAILS

The working cycle of the gripper module with check valve technology consists of 5 distinct steps:



1. Positioning the module at the object to handle with the grip pad parallel to the grip surface.
2. Lowering of module until contact with the grip surface.
3. Vacuum activation.
4. Pick-up of object to handle.
5. Drop-off of object with removal of vacuum and blow-off if necessary.

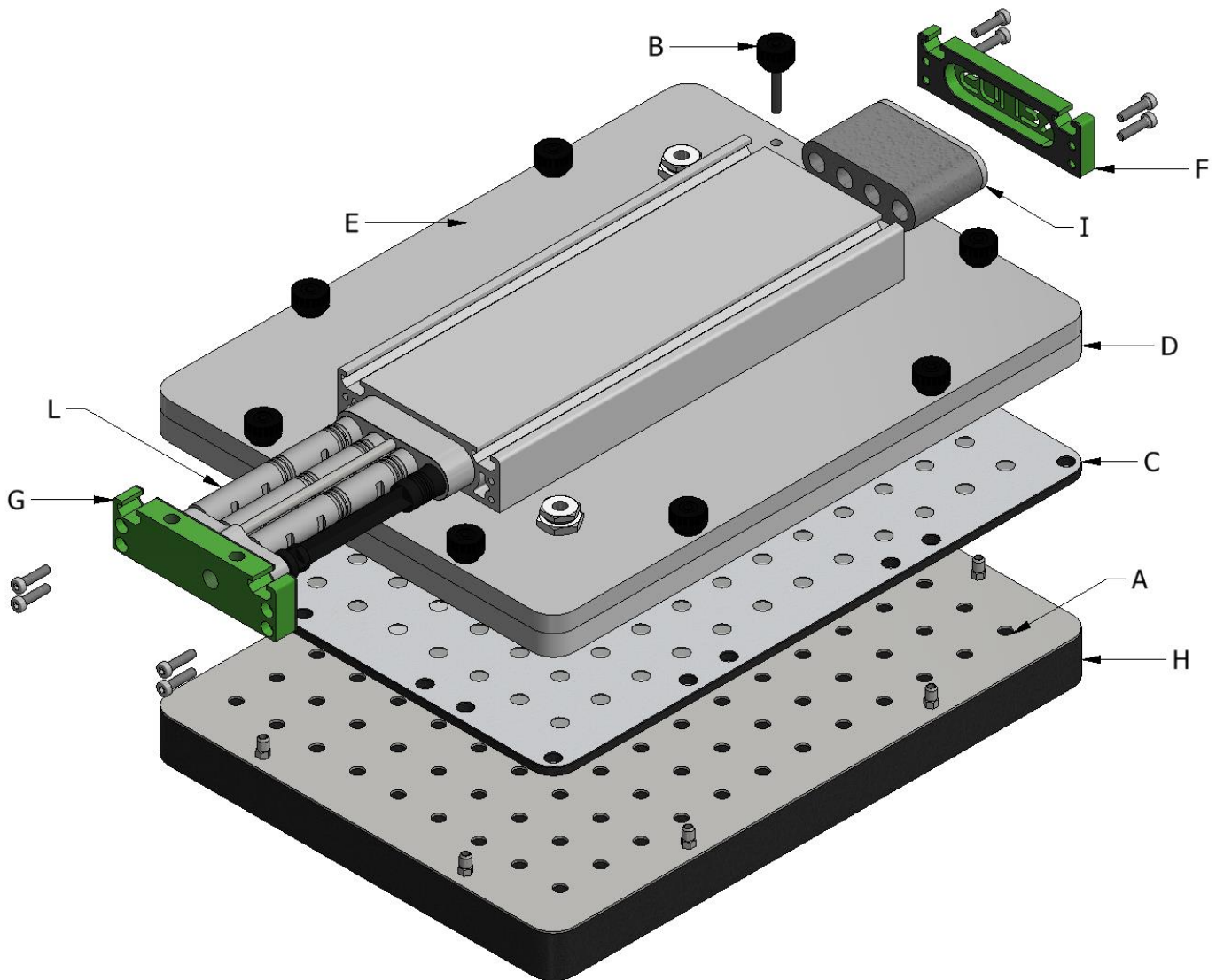
**Note:** If vacuum is activated before KVGL-S is in contact with the workpiece, the workpiece will not be gripped because the check valves will be closed and not allowed the handling.



- ▶ The KVGL-S gripper module is designed for horizontal use; turning the module upside down by 180°, or vertical grips are not possible. Maximum tilt allowed is 45°.
- ▶ Stopping or passing through the work area of the gripper module is prohibited, as in case of electrical or pneumatic supply failure, the load handled by the module is released.
- ▶ The maximum vertical acceleration allowed is 5 m/s<sup>2</sup>.

7. PARTS LIST

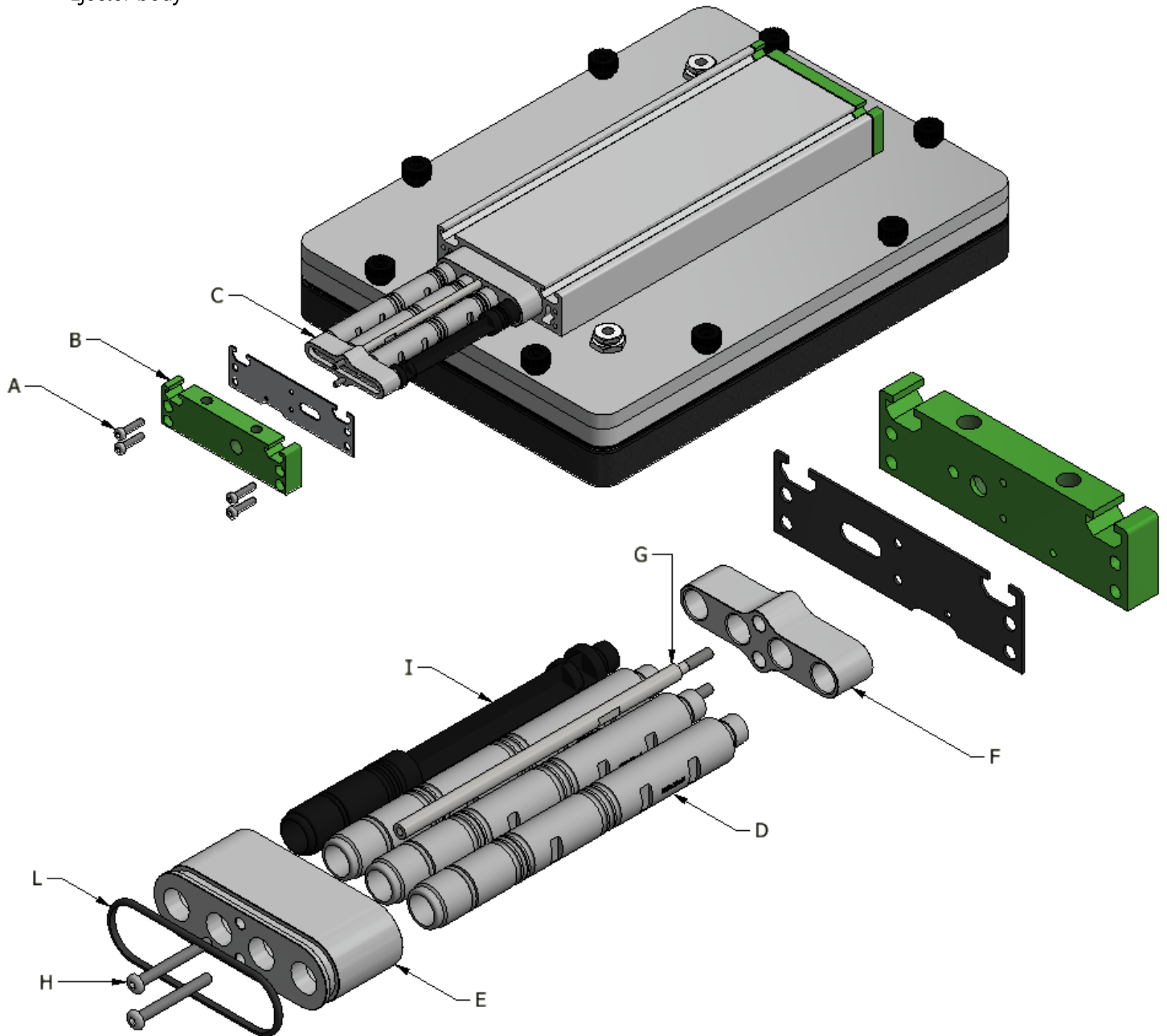
a. Parts list ejector version



Pos.	Description
A	Foam with metal plate
B	Quick release knob
C	Gasket with filter
D	Base of valves
E	Base body
F	Exhaust cover with seal
G	Supply cover with seal
H	Technical foam
I	Silencer
L	Ejector

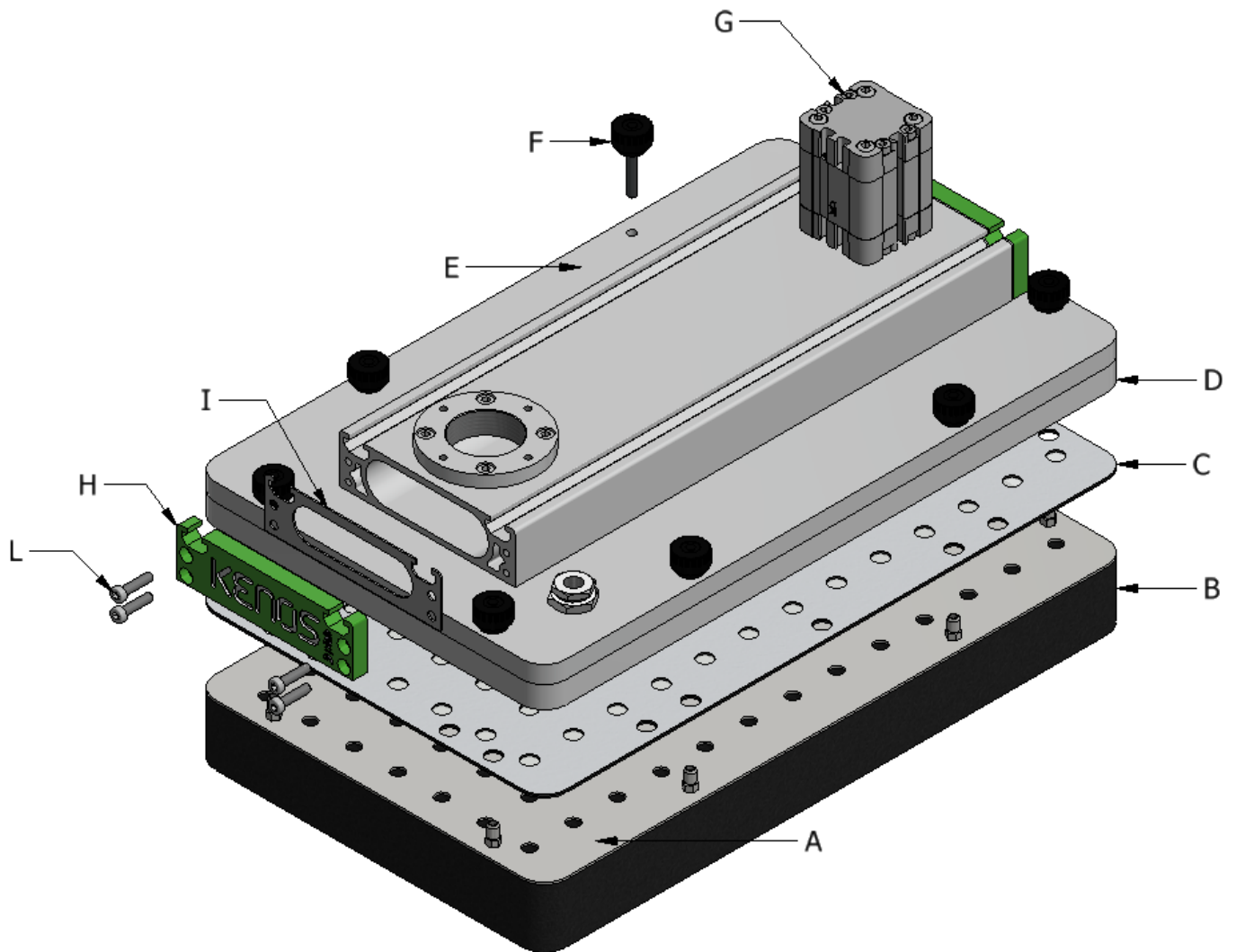


Ejector body



Pos.	Description
A	Cover closing screws
B	Supply cover
C	Push in ejector
D	Multistage COAX® cartridge
E	Posterior housing
F	Anterior housing
G	Tie-beam
H	Screws
I	Blind Cartridge for Midi COAX
L	O-ring

## b. Parts list BL / PU (special) version

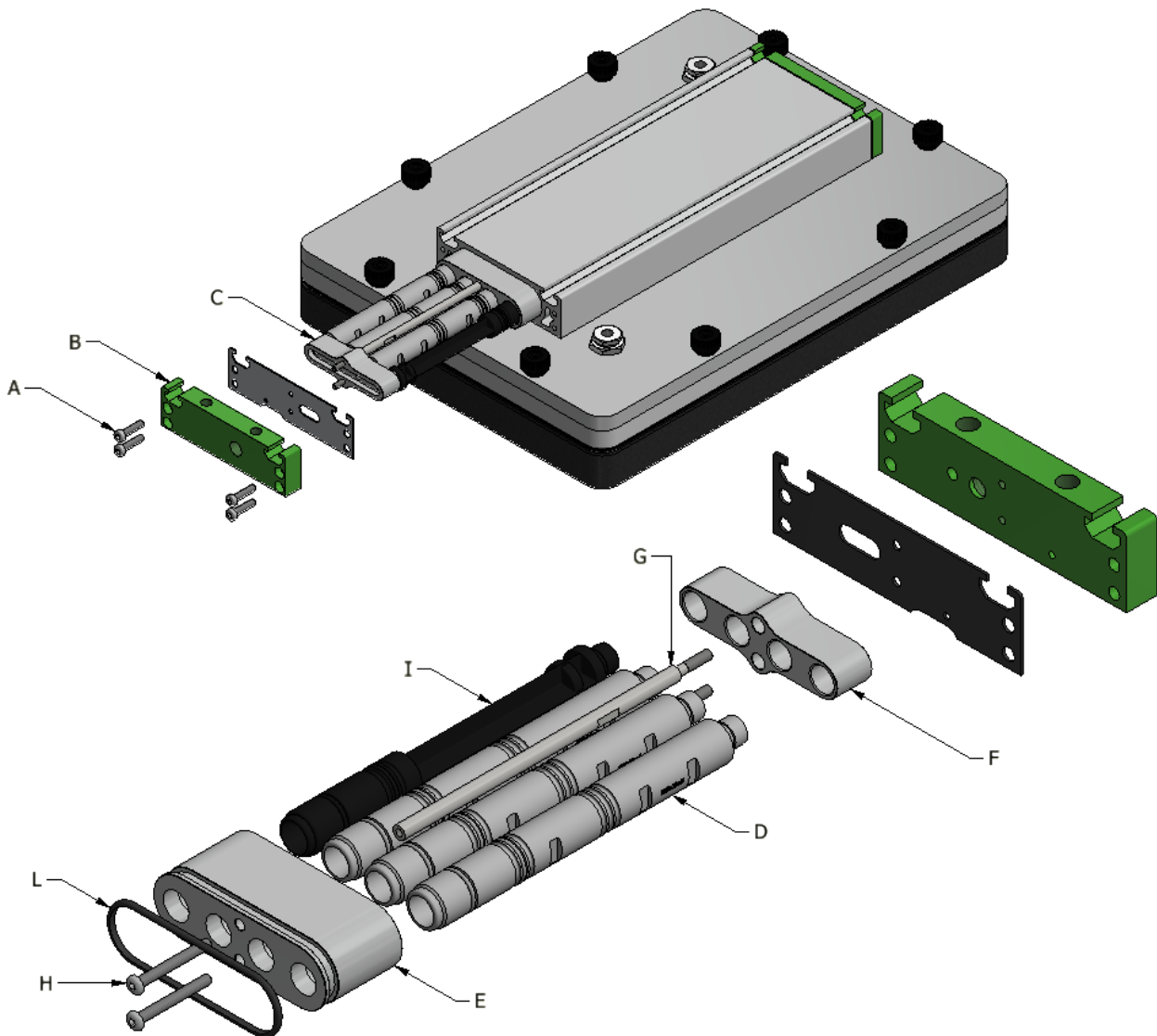


Pos.	Description
A	Foam with metal plate
B	Technical foam
C	Gasket with filter
D	Base of valves
E	Base body
F	Quick release knob
G	Grip/release switching cylinder
H	Close cover
I	Exhaust cover seal
L	Cover closing screws



## 8. MAINTENANCE

## a. Ejector maintenance (version from 19/10/2020)



For the maintenance of the push in ejector follow these steps:

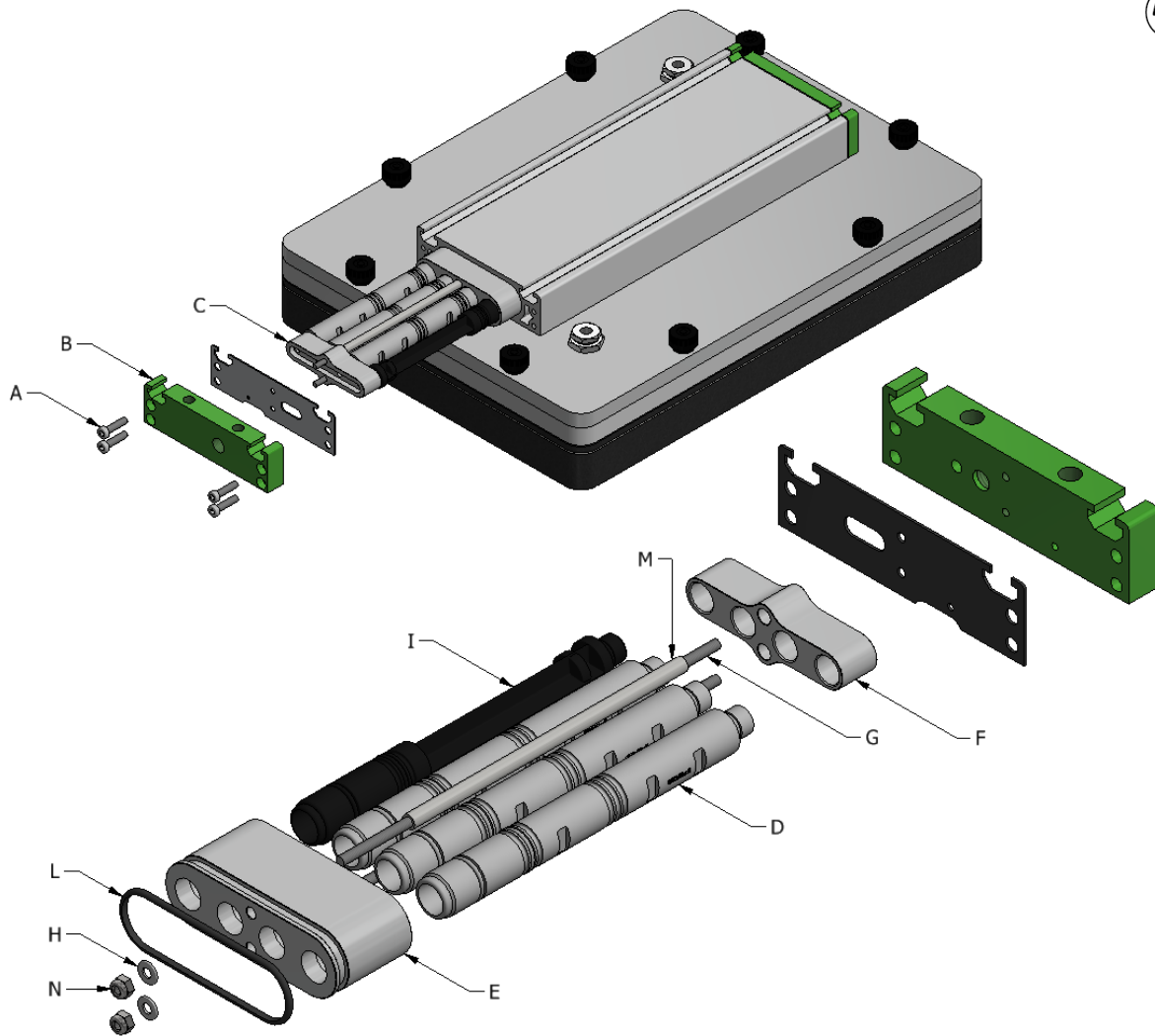
- ▶ Loosen A closing screws of the supply cover and extract the complex B+C.
- ▶ Blow and clean the ejectors with compressed air. Verify that the plastic body is intact.
- ▶ Check the condition of the O-ring L, in case of damage it has to be replaced.
- ▶ Push in the complex B+C and close with A screws.

The push in ejector is modular and so it is expandable. You can, in this way, very easily increase the performance. Follow these steps:

- ▶ Loosen H screws
- ▶ Slip off posterior housing E
- ▶ Remove blind cartridge I
- ▶ Insert a new cartridge in the free housing
- ▶ Assembly the posterior housing E
- ▶ Fix H screws

More information about ejectors are present in the Spare parts section.

## b. Ejector maintenance (version from 21/10/2019 until 18/10/2020)



For the maintenance of the push in ejector follow these steps:

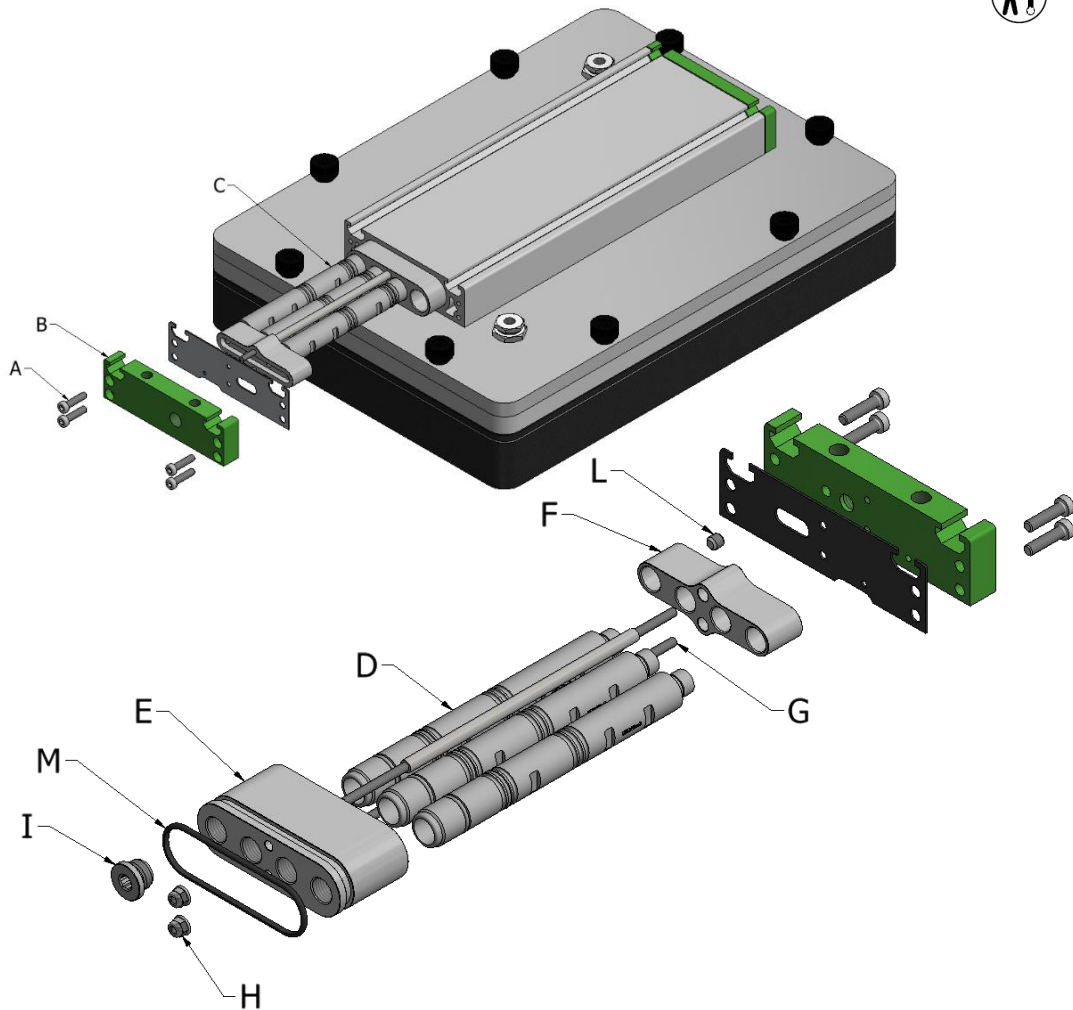
- ▶ Loosen A closing screws of the supply cover and extract the complex B+C.
- ▶ Blow and clean the ejectors with compressed air. Verify that the plastic body is intact.
- ▶ Check the condition of the O-ring L, in case of damage it has to be replaced.
- ▶ Push in the complex B+C and close with A screws.

The push in ejector is modular and so it is expandable. You can, in this way, very easily increase the performance. Follow these steps:

- ▶ Loosen N nuts
- ▶ Slip off posterior housing E
- ▶ Remove blind cartridge I
- ▶ Insert a new cartridge in the free housing
- ▶ Assembly the posterior housing E
- ▶ Fix the tie-beam G with N nuts

More information about ejectors are present in the Spare parts section.

## c. Ejector maintenance (version until 21/10/2019)



For the maintenance of the push in ejector follow these steps:

- ▶ Loosen A closing screws of the supply cover and extract the complex B+C.
- ▶ Blow and clean the ejectors with compressed air. Verify that the plastic body is intact.
- ▶ Check the condition of the O-ring M, in case of damage it has to be replaced.
- ▶ Push in the complex B+C and close with A screws.

The push in ejector is modular and so it is expandable. You can, in this way, very easily increase the performance. Follow these steps:

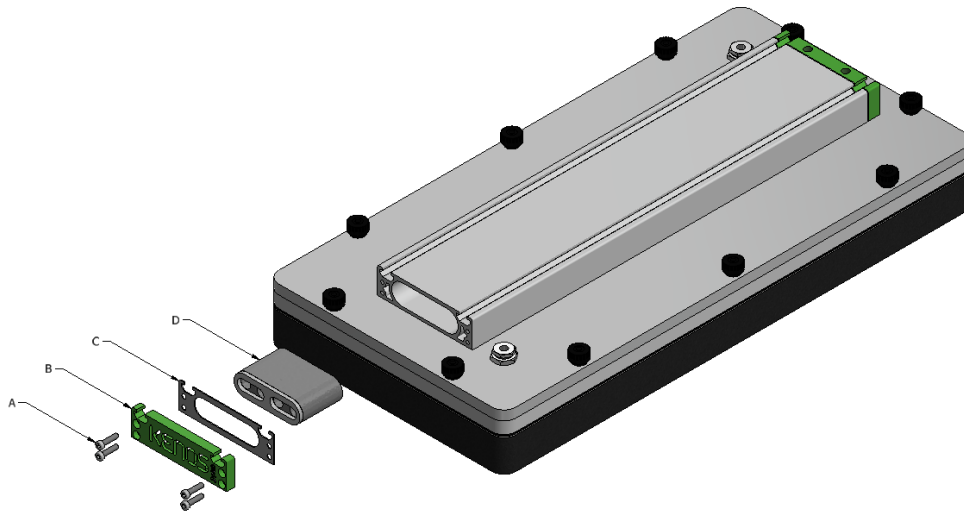
- ▶ Loosen H nuts
- ▶ Slip off posterior housing E
- ▶ Loosen the tie-beam G
- ▶ Remove plugs I and L
- ▶ Insert a new cartridge in the free housing
- ▶ Screw the assembly tie-beam to the supply cover B
- ▶ Assemble the posterior housing E
- ▶ Fix the tie-beam with H nuts

More information about ejectors are present in the Spare parts section.



#### d. Silencer maintenance

With single ejector version:



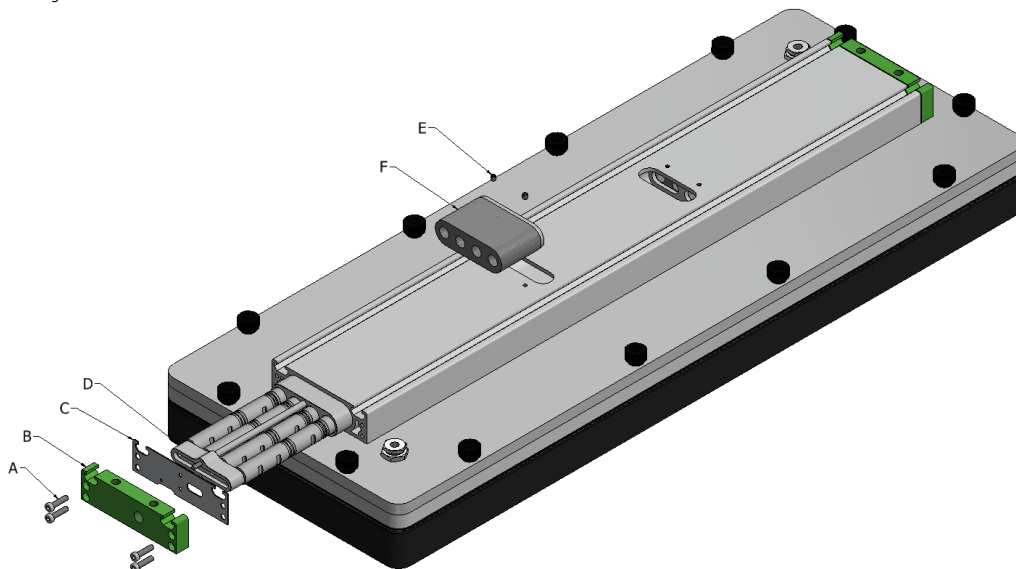
For the maintenance of the silencer follow these steps:

- ▶ Loosen A closing screws of the exhaust cover B and extract the silencer D.
- ▶ Verify that the exhaust covers' gasket C is in good conditions, in case of damage it has to be replaced.
- ▶ Push in the new silencer and close the exhaust cover B with A screws.

N.B.: The new silencer must be brought to the same extent as the previous silencer. If the old silencer is smaller than the new one, cut the new silencer as the old one.

More information about silencer are present in the Spare parts section.

With double ejector version:



For the maintenance of the silencer follow these steps:

- Loosen A closing screws of the supply cover and extract the complex B+D.
- Loosen E screws and extract the old silencer F.
- Push in the new silencer and fix with E screws on the metal part of the silencer.
- Push in the complex B+D and close with A screws.

e. Foam maintenance



The foam that builds the gripping surface can be damaged during normal use. The medium lifetime depends on many factors: nature of the handled objects, quality of the gripping surface, work conditions, cycle times, etc.

Fast Foam Replacement with MP System:

	<p>Unscrew the knobs.</p>
	<p>Remove the old foam with mounting plate. Install the new one and screw the knobs.</p>

Foam Replacement:

	<p>Remove the old foam. If it is necessary, clean the plate surface from any adhesive and dust residues (e.g. with solvent). Attention: be careful that the holes are not obstructed by any kind of residue. If they are, clean them.</p>
	<p>Remove the silicon paper from the foam.</p>
	<p>Align the holes on the plate surface with those on the foam. Fix the new foam on mounting plate.</p>
	<p>Attention: Prevent formation of channels, they must be avoided.</p>
	<p>Press the new foam.</p>
<p>To store the foam:</p>	<p>Temperature (5 °C to 25 °C) Not under the light Be free of tension No dust chemical protected In a dry environment</p>








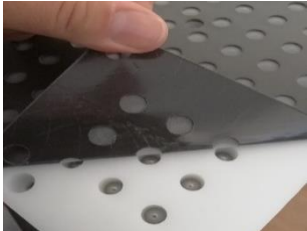
**f. Gasket maintenance**

The gasket with filter, between base of valves and mounting plate, can be dirtied and the filter can be obstructed during normal use.









If the filter is obstructed, it can be cleaned with compressed air.

**Gasket replacement**

If it is necessary, the gasket with filter can be replaced with new one following the steps below.

First solution for gasket replacement:	
	Unscrew the knobs and remove the gripping foam with mounting plate.
	Turn the gripping system upside down to have the gasket upwards.
	Remove the old gasket with filter. IT IS ABSOLUTELY FORBIDDEN TO REMOVE THE GASKET WITHOUT IT FACING UPWARDS. This to prevent accidental fall of the spheres.
	Clean the plate surface from any adhesive and dust residues (e.g. with solvent). Attention: Be careful that the holes of valves are not obstructed by any kind of residue, if they are, clean them.
	Remove the silicon paper from the gasket.
	Align the holes on the plate surface with those on the gasket. Fix the new gasket on base of valves.



Second solution for gasket replacement:	
	<p>Unscrew the knobs and remove the gripping foam with mounting plate.</p>
	<p>Remove all the screws under the base of valves. Remove the base of valves. Attention: Between the base of valves and the aluminium body, there is the sealing cord, this element could fall from the aluminium body.</p>
	<p>Turn the base of valves upside down to have the gasket upwards.</p>
	<p>Remove the old gasket with filter. IT IS ABSOLUTELY FORBIDDEN TO REMOVE THE GASKET WITHOUT IT FACING UPWARDS. This to prevent accidental fall of the spheres.</p>
	<p>Clean the plate surface from any adhesive and dust residues (e.g. with solvent). Attention: Be careful that the holes of valves are not obstructed by any kind of residue, if they are, clean them.</p>
	<p>Remove the silicon paper from the gasket.</p>
	<p>Align the holes on the plate surface with those on the gasket. Fix the new gasket on base of valves.</p>
	<p>Re-install the base of valves on the aluminium body. Attention: Between the base of valves and the aluminium body, there is the sealing cord, this element could fall from the aluminium body.</p>

## g. Maintenance plan

	Daily	Weekly	Monthly	Every 6 months	Every 12 months
Check the vacuum		•			
Check the filter			•		
Check the silencer			•		
Check tightening				•	
Check the foam	•				
Check supply air pressure		•			
Check the air connection		•			
Check the general condition					•
Clean gripper exterior				•	

## 9. PROBLEMS/SOLUTIONS

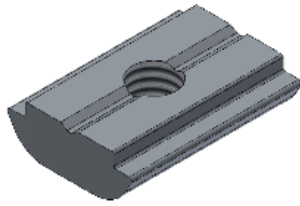
Problem	Possible reason	Solutions
Insufficient vacuum level or vacuum achieved too slowly	Operating pressure too low	Increase the pressure
	Internal diameter of pressure/vacuum hose too small	Use hoses with larger internal diameter
	Damaged sealing	Check and replace if necessary
	Leak in hoses	Check hoses
	Dirty ejector	Clean
Object not gripped	Low vacuum level	See above
	Insufficient suction capacity	Insert one more cartridge ejector/increase suction capacity of blower
	Dirty check valves	Clean
	Lift is too fast	Slow down lift, avoid acceleration peaks (max 5 m/s <sup>2</sup> )
	Pieces not suitable for lift with this system	Replace grip solution
	Occluded filter in the gasket	Replace gasket with filter
	Occluded silencer	Replace silencer
Foam wears very quickly	The system is not corrected placed on the workpiece	The gripping system must be parallel to the workpiece surface

Note: We recommend always running preventative tests with original samples. We are available for running such tests.



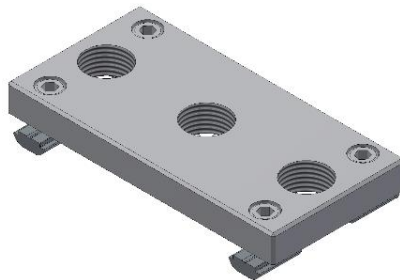
10. ACCESSORIES

a. T-slot nut kits:



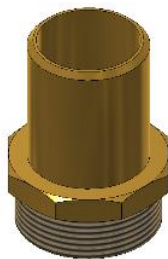
Item n. PIAB	Description
0209862	T-slot nut kit 11079-M4-U10 - 4pcs
0209585	T-slot nut kit 11080-M5-U10 - 4pcs
0209586	T-slot nut kit 11081-M6-U10 - 4pcs
0209588	T-slot nut kit 11082-M8-U10 - 4pcs

b. Kit Flange:



Item n. PIAB	Description
0209503	KIT-FL-FX-KVG120-60

c. Hose connectors:



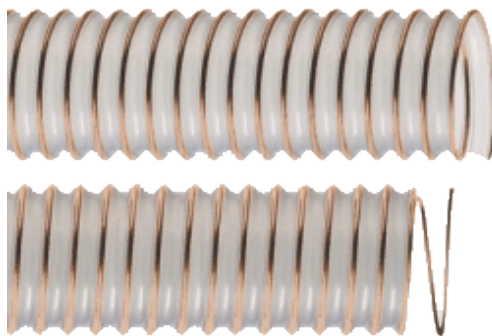
Item n. PIAB	Description
0208949	Hose connector KP-1-1/4-32
0208950	Hose connector KP-1-1/4-40
0208953	Hose connector KP-2-50
0208954	Hose connector KP-2-60

d. Hose Clamps:



Item n. PIAB	Description
0208957	Hose Clamp KB-45-60
0208958	Hose Clamp KB-55-70
0208959	Hose Clamp KB-70-90

e. Hoses:



Item n. PIAB	Description
0210867	Hose KTU-M-41-32-PU
0210660	Hose KTU-M-49-40-PU
0210661	Hose KTU-M-61-50-PU
0210868	Hose KTU-M-70-60-PU

f. Monitoring:



Item n. PIAB	Description
3101603	Pressure gauge w. nut 1 MPa/140 psi
3101602	Vacuum gauge w. nut -100 kPa/-30 inHg
0212040	Vacuum Switch 3-color Digital Display M8

## 11. TECHNICAL DATA

### a. Air consumption

Type	Air consumption at 6 bar (NI/s)/ 87.0 psi (scfm)
KVGL.XXX.XXX.NXXX.CVX.S3	5.25 / 11.12
KVGL.XXX.XXX.NXXX.CVX.S4	7.0 / 14.83
KVGL.XXX.XXX.NXXX.CVX.S6	10.5 / 22.25
KVGL.XXX.XXX.NXXX.CVX.S8	14.0 / 29.66

### b. Pneumatic technical information

Description	Unit	COAX®
		Si32-3 Si MIDI-cartridge (1-8 nozzles)
Feed pressure, optimal	MPa [psi]	0.6 [87]
Max vacuum at opt. pressure	-kPa [-inHg]	75 [22.1]
Air consumption at opt. pressure / nozzle	NI/s [scfm]	1.75[3.71]
Max vacuum flow at opt. pressure / nozzle	NI/s [scfm]	6 [12.71]

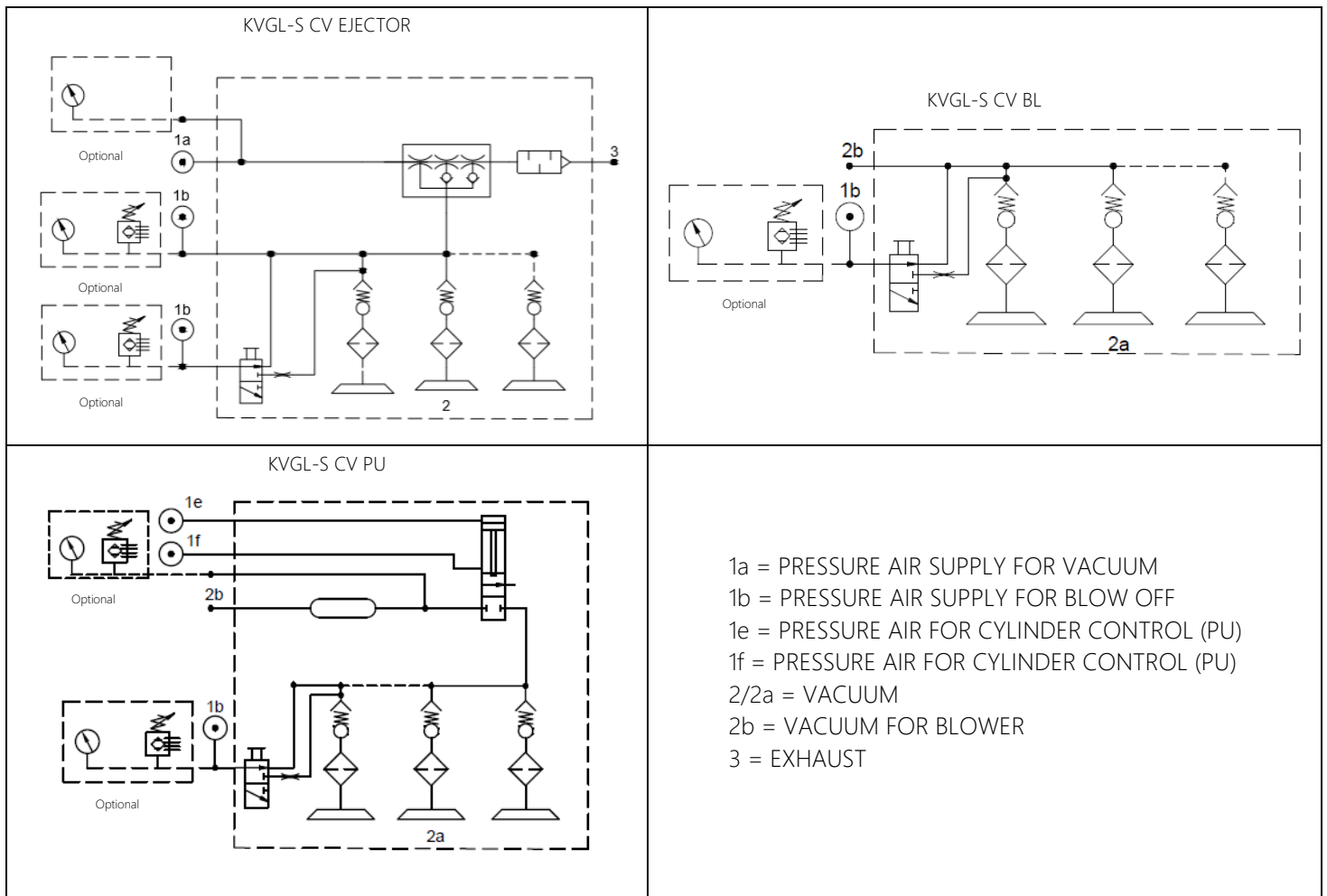
### c. Air

Description	
Supply air connection size	8mm internal diameter by up to 2 meters (6.5ft)
Air quality	DIN ISO 8573-1 class 4
Optimal cylinder air supply pressure	0.5 MPa

### d. Temperature

Description	
Operating temperature environment	0-50° (32-122F)
Operating temperature workpiece	0-50° (32-122F)

12. PNEUMATIC DIAGRAM

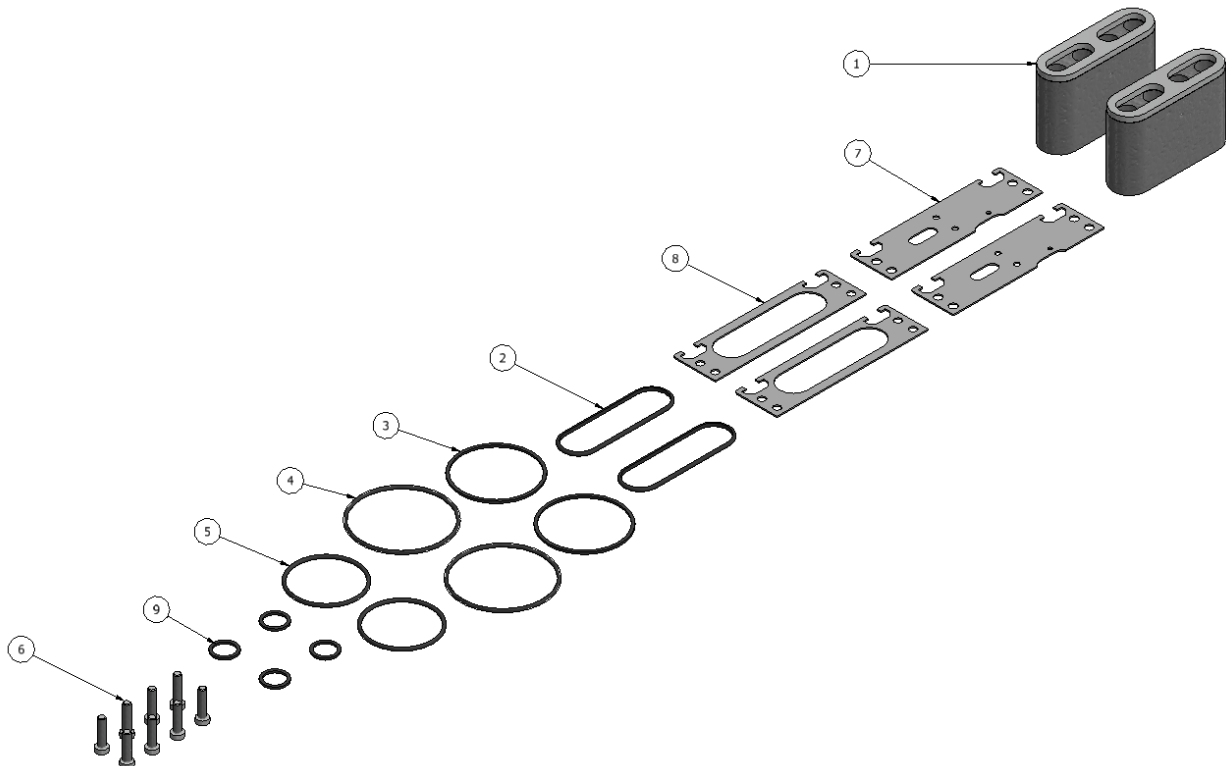


13. SPARE PARTS

a. Single spare parts list

Item n. PIAB	Description
0107053	COAX® cartridge MIDI Si32-3
0112527	Blind Cartridge for Midi COAX

b. Spare parts kit KVGL-S



Art. No	Description
0211506	Spare parts kit KVGL-S
	8x Cover screw KVG120-60-ISO 14580 – M5 x 20 (6)
	2x OR3212-53,64X2,62-NBR70 (2)
	2x O-ring NBR 53x2 (3)
	2x O-ring NBR 62x2 (4)
	2x O-ring NBR 46x2 (5)
	2x Supply cover seal KVGL120-34 (7)
	2x Exhaust cover seal KVGL120-34 (8)
	2x Silencer KVG120-60 (1)
	4x O-ring NBR 14x2 (9)

c. Foam spare parts

If you are unsure which type you have please check the part code of your configured KVGL-S product, the first part of the code is the foam spare part code, when you put "FOAM" in front, see below.

KVGL-S product code:

**KVGL.400.240.N405** CVL.S3



Foam spare part code:

**FOAM.KVGL.400.240.N405.MP**

Mounting plate

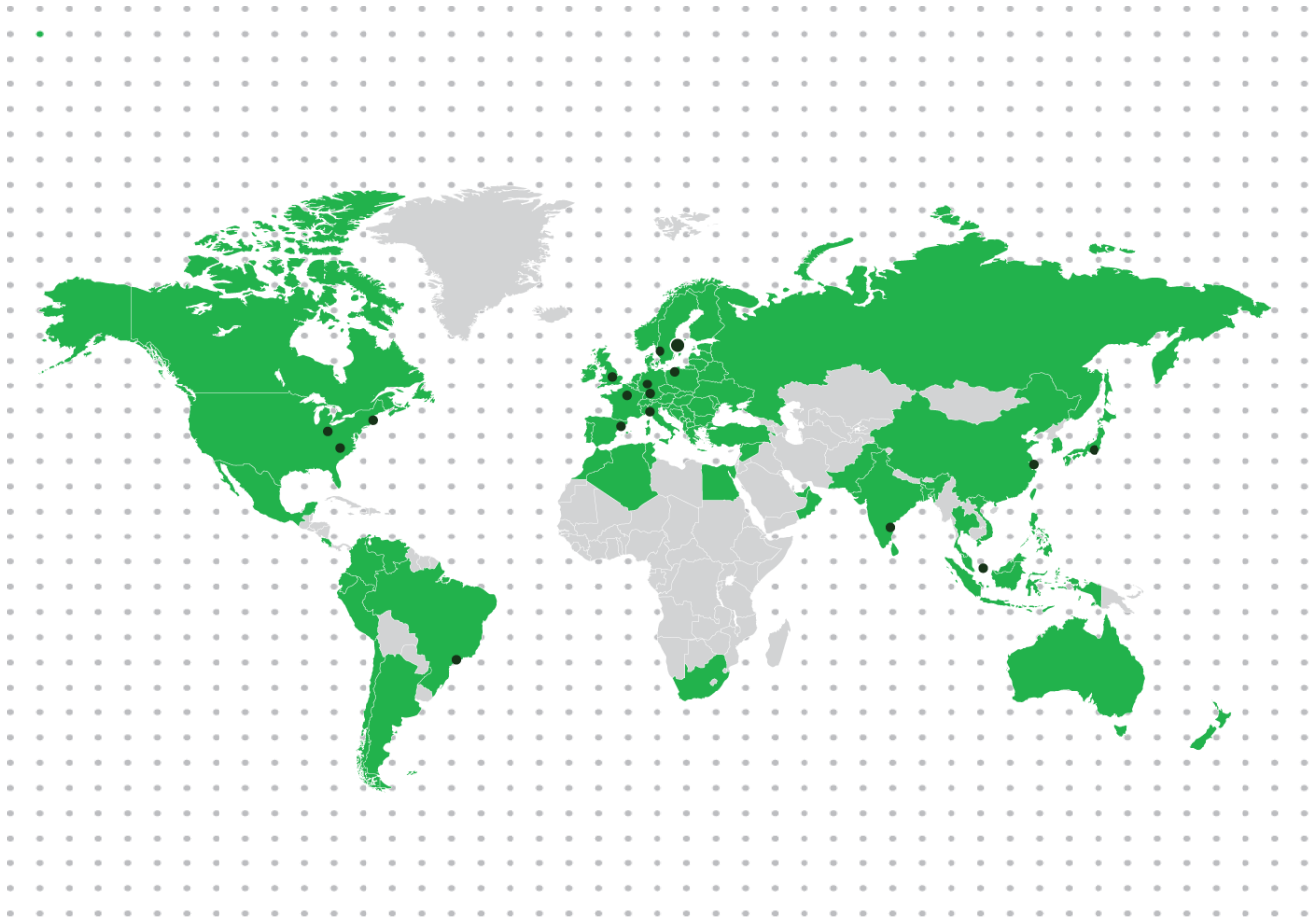
**FOAM.KVGL.400.240.N405**

Foam without mounting plate

Foam thickness

#### 14. WARRANTIES

- The Seller gives its Customers a one-year warranty from the receipt of the Products, accessories, control devices and Kenos products included.
- It is a duty of the Buyer to check the goods at the time of delivery at the agreed destination. Complaints relating to the state of the packaging, quantity, number or external characteristics of the products (apparent defects) must be reported to the seller, under penalty of forfeiture of the guarantee, by means of a reservation noted on the transport document upon receipt of the products; the transport document with the noted reservation must be forwarded to the Seller by fax, e-mail, registered mail with notice of collection, within 8 (eight) days of receipt of the goods.
- The warranty covers manufacture and materials defects in the Products and it also covers if the Products do not conform to the Product specification, excluding minor defects, if reasonably acceptable and that do not compromise efficiency in their use.
- The warranty does not apply to any Product (including any component or other parts in such Products (such as suction cups, filter elements, sealings, hoses, foam, etc.) or to the software of any Products) that it was used other than the intended purpose, and: (a) has been subjected to abuse, misuse, negligence, improper storage, improper handling, improper use, improper installation, abnormal physical stress, abnormal environmental or working conditions, or use, application, installation, care, control or maintenance contrary to any applicable manual or instructions for the Products issued by the Seller or good trade practice regarding the same; or (b) has been reconstructed, repaired or altered by any persons or entities other than the Seller or its authorized representatives, or have a defect as a result of fair wear and tear or willful damage or caused by subsequent damages caused by other defective products.
- The product warranty set forth in this Section is the only warranty given by the Seller in relation to the Products. The Customer may not rely, and has not relied, on any other information, statement or warranty (express or implied), whether based on applicable law or otherwise. In any case, the compensation is limited to the price of the products agreed between the parties and is excluded for indirect damages.
- During the warranty period, the Seller shall replace or repair, at its own expense, faulty products determined by the Seller, in its sole discretion, to be covered by the warranty set out herein.
- It is at the Seller's discretion whether a faulty Product should be returned to the Seller for replacement or if it should be repaired by the Seller at the location of the Customer. Any replaced Products shall become the property of the Seller.
- The Seller is not responsible for the cost of fitting replacement parts or components of any Products in to any products or alike of the Customer.
- These Terms & Conditions shall apply to any repaired or replaced Products by the Seller.



**www.piab.com**

**BRAZIL** – Sao Paulo  
 Phone: +55 11 4492 9050  
 Email: info-brasil@piab.com

**CANADA** – Hingham MA (US)  
 Phone: +1 781 337 7309  
 Email: info-usa@piab.com

**CHINA** – Shanghai  
 Phone: +86 21 5237 6545  
 Email: info-china@piab.com

**FRANCE** – Lagny sur Marne  
 Phone: +33 1 6430 8267  
 Email: info-france@piab.com

**GERMANY** – Butzbach  
 Phone: +49 6033 7960-0  
 Email: info-germany@piab.com

**GERMANY** – Schmallenberg  
 Robotic gripping  
 Phone: +49 (0) 29 72/962 17-11  
 Email: info-germany@piab.com

**MEXICO** – Hingham MA (US)  
 Phone: +1 781 337 7309  
 Email: info-mxca@piab.com

**INDIA** – Chennai  
 Phone: +91 9444 25 36 48  
 Email: info-india@piab.com

**ITALY** – Torino  
 Phone: +39 011 226 36 66  
 Email: info-italy@piab.com

**JAPAN** – Tokyo  
 Phone: +81 3 6662 8118  
 Email: info-japan@piab.com

**POLAND** – Gdansk  
 Phone: +48 58 785 08 50  
 Email: info-poland@piab.com

**SPAIN** – Barcelona  
 Phone: +34 93 6333876  
 Email: info-spain@piab.com

**SINGAPORE**  
 Phone: +65 6455 7006  
 Email: info-singapore@piab.com

**SWEDEN – Stockholm (HQ)**  
 Phone: +46 8 630 25 00  
 Email: info-sweden@piab.com

**SWEDEN** – Mölndal  
 Ergonomic handling  
 Phone: +46 31 67 01 00

Email: info-sweden@piab.com

**UNITED KINGDOM** – Loughborough  
 Phone: +44 1509 857 010  
 Email: info-uk@piab.com

**USA** – Hingham (MA)  
 Phone: +1 781 337 7309  
 Email: info-usa@piab.com

**USA** – Xenia (OH)  
 Robotic gripping  
 Phone: +1 888 727 3628  
 Email: info-usa@piab.com

**USA** – Charlotte (NC)  
 Ergonomic handling  
 Phone: +1 704 527 5052  
 Email: info-usa@piab.com