

KVG120 SERIES ASSEMBLY MANUAL COAX® VERSION



Rev: 08

INDEX

1.	GENERAL SAFETY INSTRUCTIONS	3
2.	DANGEROUS AREAS	5
3.	PICTOGRAMS.....	6
4.	R.E.S.S. APPLIED AND RESPECTED.....	7
5.	INSTALLATION FOR FOAM AND CUPS VERSIONS	9
6.	WORKING CYCLE DETAILS FOR FOAM VERSION	14
7.	WORKING CYCLE DETAILS FOR CUPS VERSION.....	16
8.	PARTS LIST FOR FOAM AND CUPS VERSION	17
9.	MAINTENANCE	19
10.	PROBLEMS/SOLUTIONS.....	26
11.	ACCESSORIES	27
12.	TECHNICAL DATA	28
13.	PNEUMATIC DIAGRAM.....	29
14.	SPARE PARTS	32
15.	WARRANTIES	36

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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:

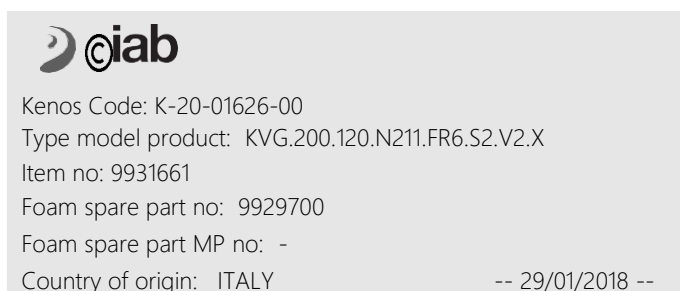


Provide for disposal to Authorized Bodies, in full compliance with current regulations regarding waste.

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:



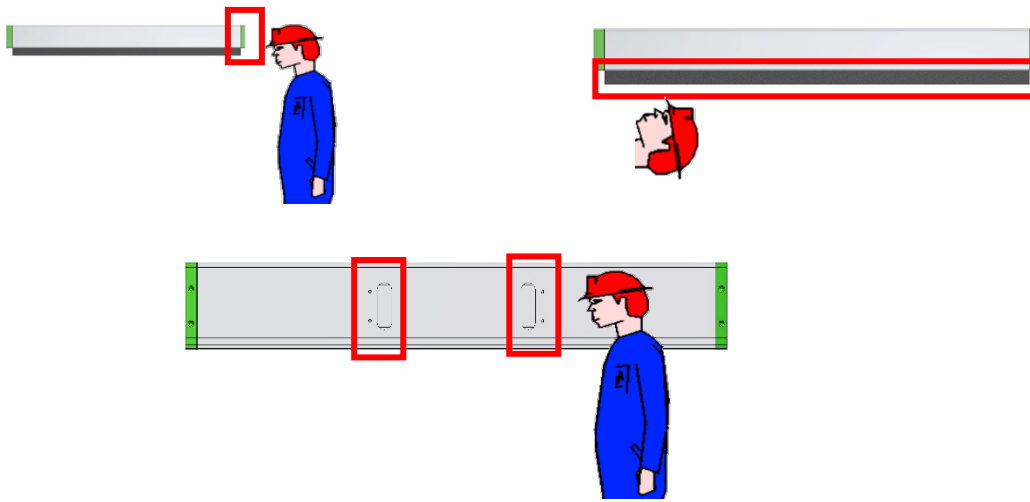
Each system is identified by a label on which the reference data of the same is indelibly marked.
For any communication with Piab AB or Service Centers always refer these references.

2. DANGEROUS AREAS

Areas with danger of crushing



Areas with danger of air ejection



Notes for the final manufacturer of machinery and end user

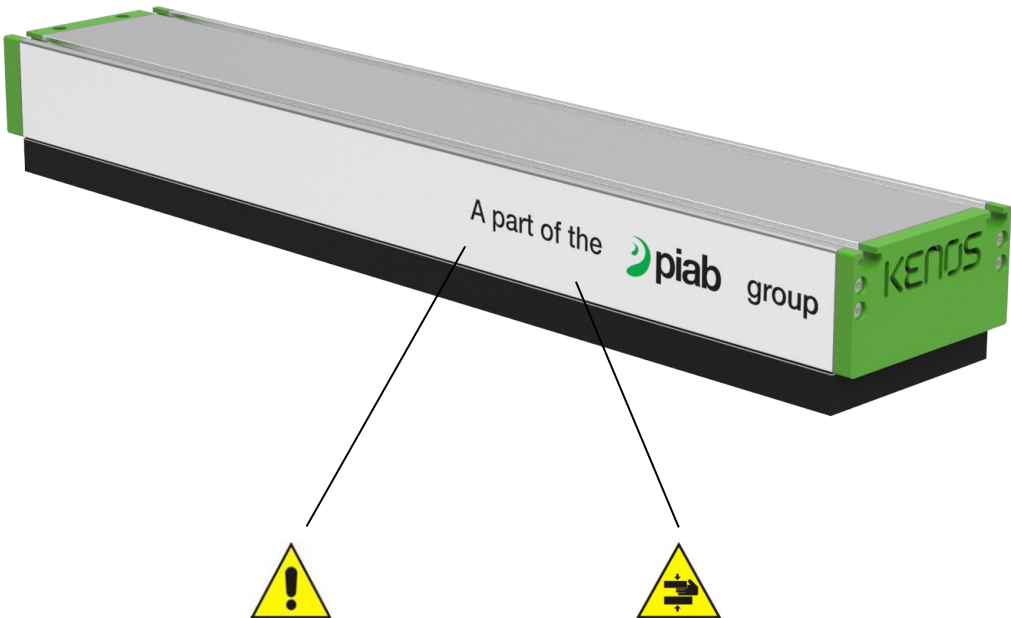
It is prohibited stopping or passing through the work area of the gripper module. In case of electrical or pneumatic supply failure, the load handled by the module is released.

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 country.

3. PICTOGRAMS



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

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

PIC.	DESCRIPTION PICTOGRAMS
	Generic operator: operator without specific skills, able to perform only simple tasks on the orders of qualified technicians.
	Mechanical maintenance technician: qualified technician able to intervene on the mechanical parts to make the necessary adjustments, maintenance and repairs.
	Electric maintenance technician: qualified technician is proposed to all the electrical interventions of regulation, maintenance and repairs.

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

Essential Safety Requirements concerning machines, are contained in Annex I of the Machinery Directive 2006/42/EC. They are stringent and not modifiable but are still applicable only when they are relevant (i.e. when there is a danger).

ESSENTIAL SAFETY REQUIREMENTS (p.1)	CONFORMITY		
1 - Essential health and safety requirements	APL	CNF	AR PASS
1.1 - General consideration			
1.1.1 - Definitions	✓	✓	✓ Allowed
1.1.2 - Standard of safety integration	✓	✓	
1.1.3 - Materials and products	✓	✓	
1.1.4 - Lighting	⊗		
1.1.5 - Machine design for handling purposes	✓	✓	
1.1.6 - Ergonomics	⊗		
1.1.7 - Jobs	⊗		
1.1.8 - Seats	⊗		
1.2 - Control systems	APL	CNF	AR PASS
1.2.1 - Safety and reliability of control systems	⊗		
1.2.2 - Command devices	⊗		
1.2.3 - Starting	⊗		
1.2.4 - Stop			
1.2.4.1 - Normal shutdown	⊗		
1.2.4.2 - Operational shutdown	⊗		
1.2.4.3 - Emergency stop	⊗		
1.2.4.4 - Machine assembly	⊗		
1.2.5 - Selection of the control or operating mode	⊗		
1.2.6 - Failure of the power supply circuit	⊗		
1.3 - Protective measures against mechanical hazards	APL	CNF	AR PASS
1.3.1 - Risk of loss of stability	⊗		
1.3.2 - Risk of breakage during operation	✓	✓	✓ Allowed
1.3.3 - Risks due to falling or projection of objects	✓	⊗	
1.3.4 - Risks due to surfaces, edges or sharp corners	✓	✓	✓ Allowed
1.3.5 - Risks due to combined machines	⊗		
1.3.6 - Risks associated with changes in operating conditions	⊗		
1.3.7 - Risks due to moving elements	✓	⊗	⊗ Not Allowed
1.3.8 - Choice of protection against risks due to moving elements			
1.3.8.1 - Mobile transmission elements	⊗		
1.3.8.2 - Mobile elements that participate in the processing	✓	⊗	
1.3.9 - Risks of uncontrolled movements	⊗		
1.4 - Characteristics required for guards and protective equipment	APL	CNF	AR PASS
1.4.1 - General requirements	⊗	⊗	
1.4.2 - Particular requirements for guards			
1.4.2.1 - Fixed guards	⊗		
1.4.2.2 - Interlocked mobile guards	⊗		
1.4.2.3 - Adjustable guards that limit access	⊗		
1.4.3 - Particular requirements for protective devices	⊗		

ESSENTIAL SAFETY REQUIREMENTS (p.2)		CONFORMITY'		
1.5 - Risks due to other hazards	APL	CNF	AR PASS	
1.5.1 - Electricity	⊗			
1.5.2 - Static energy	⊗			
1.5.3 - Energy other than electricity	✓	⊗	⊗ Not Allowed	
1.5.4 - Assembly errors	✓	✓	✓ Allowed	
1.5.5 - Extreme temperatures	⊗			
1.5.6 - Fire	⊗			
1.5.7 - Explosion	⊗			
1.5.8 - Noise	✓	✓	✓ Allowed	
1.5.9 - Vibrations	⊗			
1.5.10 - Radiation	⊗			
1.5.11 - External radiation	⊗			
1.5.12 - Laser radiation	⊗			
1.5.13 - Emission of dangerous materials and substances	⊗			
1.5.14 - Risk of being trapped in the machine	⊗			
1.5.15 - Risks of slipping, tripping or falling	⊗			
1.5.16 - Lightning	⊗			
1.6 - Maintenance	APL	CNF	AR PASS	
1.6.1 - Machine maintenance	✓	✓		
1.6.2 - Access to workplaces and intervention points used for maintenance	⊗			
1.6.3 - Isolation from energy supply sources	⊗			
1.6.4 - Operator intervention	⊗			
1.6.5 - Cleaning of internal parts	✓	✓	✓ Allowed	
1.7 - Information	APL	CNF	AR PASS	
1.7.1 - Machine information and warnings				
1.7.1.1 - Information and information devices	✓	✓	✓ Allowed	
1.7.1.2 - Alarm devices	⊗			
1.7.2 - Warnings regarding residual risks	✓	✓		
1.7.3 - Marking of machines (fabricant internal label)	✓	✓		
1.7.4 - Instructions				
1.7.4.1 - General drafting principles	✓	✓		
1.7.4.2 - Contents of the instructions	✓	✓		
1.7.4.3 - Illustrative and promotional publications	⊗			

Status table

	Applicability	Conformity	AR Card Pass ⁽¹⁾
1	⊗ Not applicable	Not to be established	✓ Allowed
2	✓ Applicable	✓ Compliant	✓ Allowed
3	✓ Applicable	⊗ Not compliant	⊗ Not Allowed
4	✓ Applicable	⊗ Not established	⊗ Not Allowed
5	⊗ Not examined	Absent value	⊗ Not Allowed

⁽¹⁾ The meaning of "AR card pass" value is the value that indicates, according to the assessment carried out, if the VR card is subject to risk assessment and if the requirement being assessed is "regulatory compliant" (Compliance)

⁽²⁾ The AR PASS "Not Allowed" results indicate a potential risk that must be resolved by the Final Integrator Manufacturer who places the machine on the market

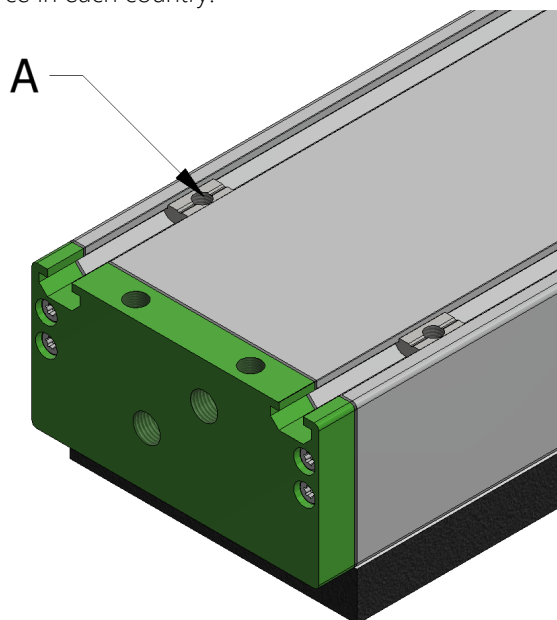
5. INSTALLATION FOR FOAM AND CUPS VERSIONS

a. Mounting on the handling system



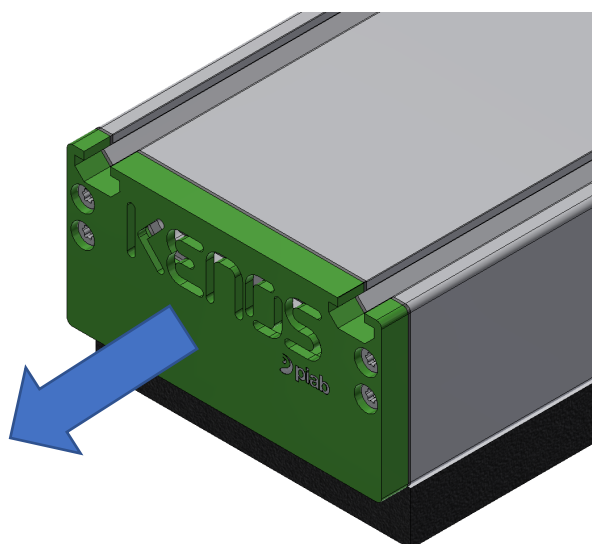
The gripping system is secured with the aid of slot nuts. Special slots for these nuts are provided in the basic body. The gripper can be mounted either directly, via a robot flange or via spring mountings. Information about the T-slot nuts are present in the section dedicated to the accessories.

It is suggested to use an appropriate tightening torque for the fixing bolts / screws according to the applications, type of screws and to the regulations in force in each country.

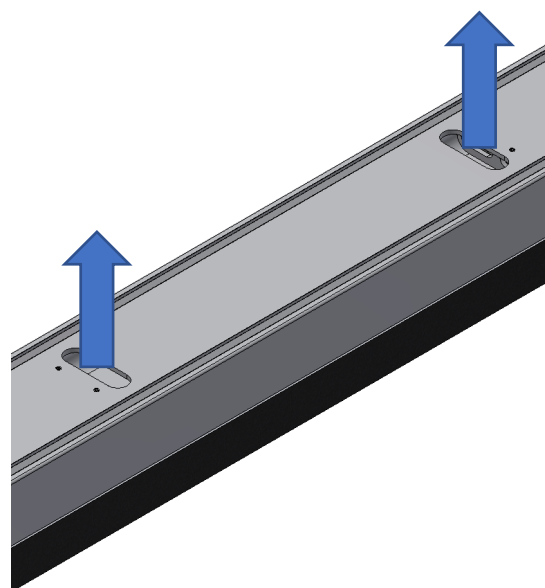


Pos.	Description
A	T-Slot Nut

b. Ejector exhaust



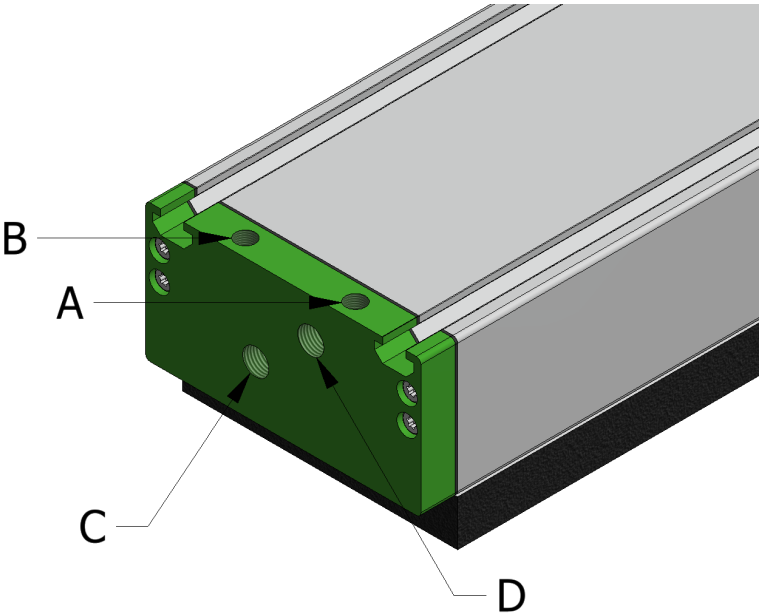
Single ejector version (S1÷S4)



Double ejector version (S6-S8)

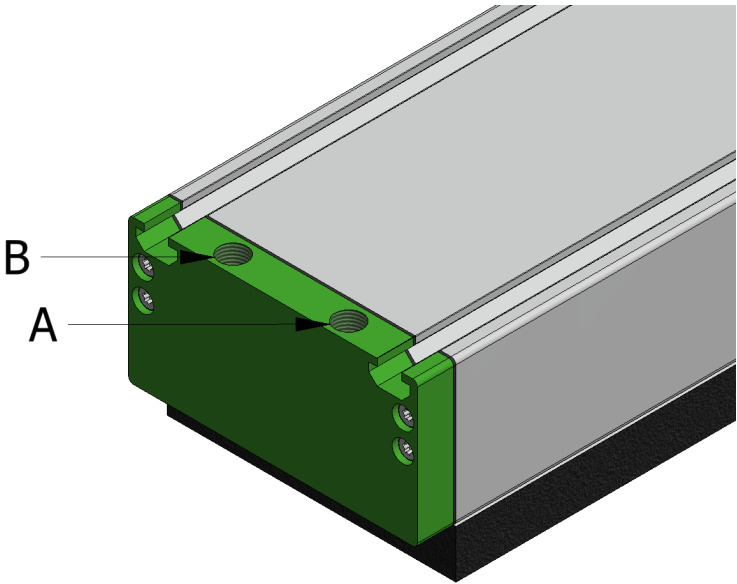
The blue arrows show the exhaust air flow, DO NOT COVER THE WRITTEN KENOS (Single ejector version) OR SLOTS (double ejector version).

c. Pneumatic connection basic version



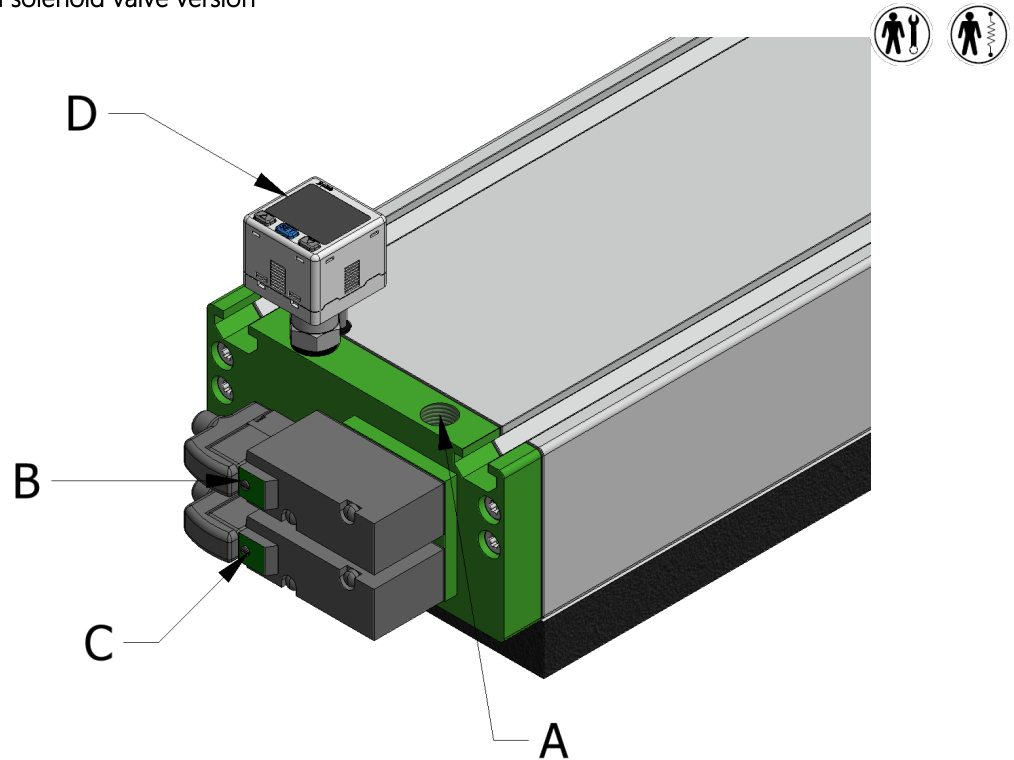
Pos.	Description
A	Connection G 1/8" for pressure monitoring
B	Connection G 1/8" for vacuum monitoring
C	Compressed air connection G 1/4" for blow-off
D	Compressed air connection G 1/4" for vacuum

d. Pneumatic Connection vertical version



Pos.	Description
A	Compressed air connection G 1/4" for vacuum
B	Compressed air connection G 1/4" for blow-off or vacuum monitoring

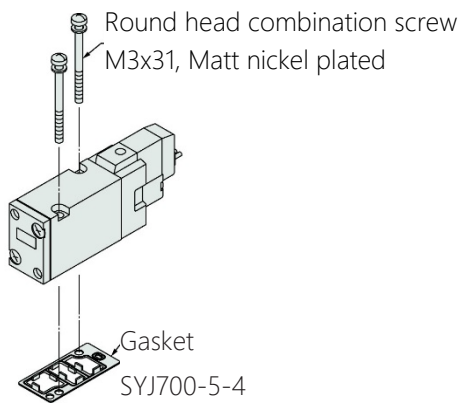
e. Connecting integrated solenoid valve version



Pos.	Description
A	Compressed air connection G 1/4" for solenoid valves
B	Solenoid valve, vacuum, N.C. or N.O.
C	Solenoid valve, blow-off, N.C.
D	Connection G 1/8" for vacuum monitoring for example with digital vacuum switch

Solenoid valves characteristics

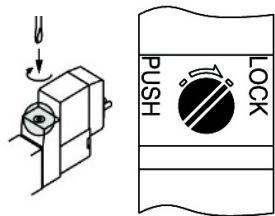
Fluid	Air
Operating pressure range (MPa/psi)	0.15-0.7/22-87
Operating temperature (°C/F)	-10 +50/14-122 without icing
Manual override	Push-locking slotted style
Lubrication	Not required
Impact/Vibration resistance (m/s ²)	150/30
Electrical connection	Connector M8 3 pole male
Coil rated voltage (Vcc)	24
Allowable voltage	± 10% rated voltage
Current consumption (mA)	17
Surge voltage suppressor	Diode
Indicator light	LED



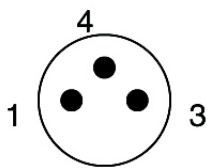
Push-turn slotted locking type (Type D)

While pressing, turn in the direction of the arrow.
If it is not turned, it can be opened in the same way as the non-locking type.

Locked position:

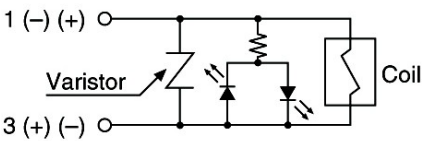


⚠ Caution, when operating the locking type D with a screw driver, turn it gently using a watchmakers screw driver. [Torque: Less than 0.1 Nm/ 0.07 lbf]



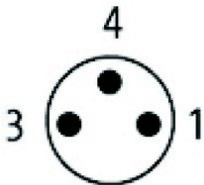
Solenoid valve side pin wiring diagram (for WA type)

With light/surge voltage suppressor (□ U)



Specifications for solenoid valve connector

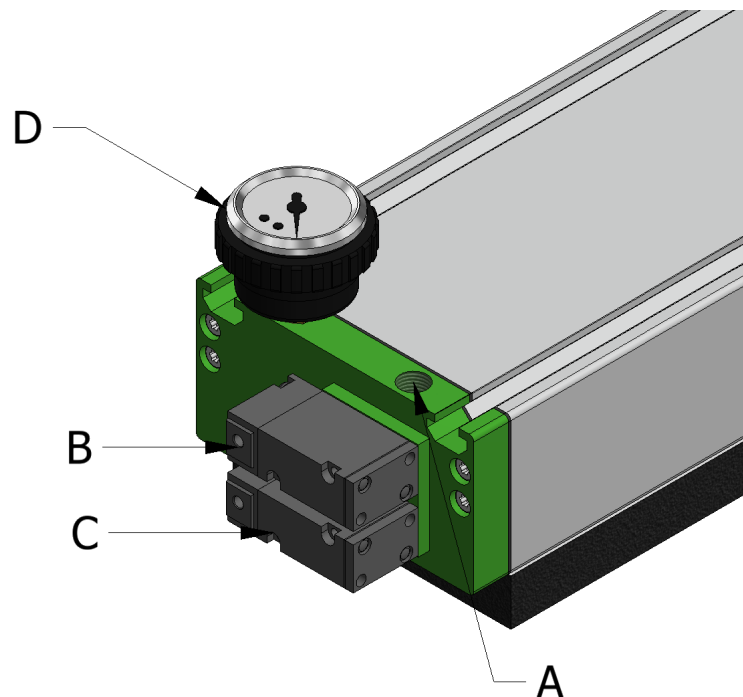
Number and section of conductors (mm ²)	3x0.25
Safety classification	IP 67
External diameter mm/in	4.1 /0.16
Max. curvature ray for flexing use	10 x external diameter
Case	PUR (UL/CSA)
Connections:	
▶ 3	Blue (-)
▶ 4	Black
▶ 1	Brown (+)





- 1. M8 connector has an indication of IP65 (enclosure) that give protection to dust and water. Take note, however, that the product isn't designed to be used in contact with water.
- 2. Do not use a tool to mount the connector, as this may cause damage. Only tighten by hand. (0.4 to 0.6 Nm, (.30 to .44 lbf))
- 3. The excessive stress on the cable connector will not be able to satisfy the IP65 rating. Please use caution and do not apply a stress of 30 N (6.74 lbf) or greater.
- 4. Torque couple of mounting screw M3: 0.8 Nm (0.59 lbf). Put attention at the direction of mounting for electro valve and seal.

f. Connecting integrated pneumatic valves version



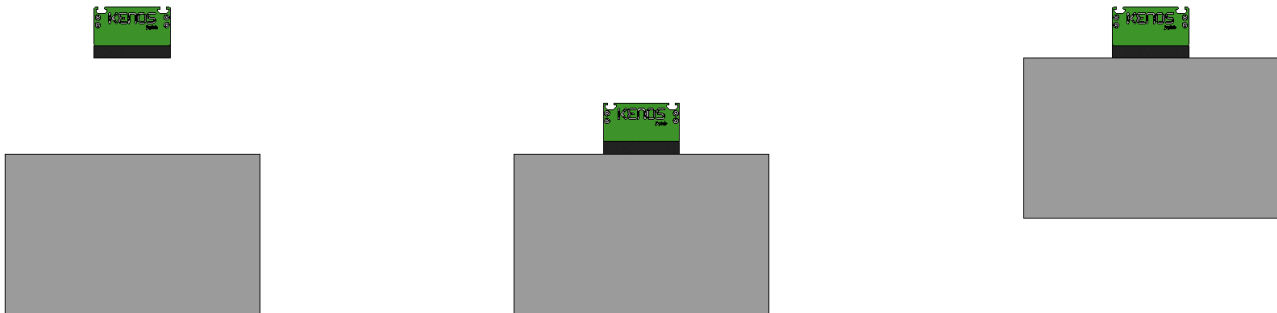
Pos.	Description
A	Compressed air connection G 1/4" for pneumatic valves
B	Pneumatic valve, vacuum, N.C. or N.O.
C	Pneumatic valve, blow-off, N.C.
D	Connection G 1/8" for vacuum monitoring for example with vacuum gauge

Pneumatic valves characteristics

Fluid	Air
Operating pressure range (MPa/psi)	0.15-0.7/22-87
Operating temperature (°C/F)	-10 +50/14-122 without icing
Manual override	Non lockable
Lubrication	Not required
Impact/Vibration resistance (m/s ²)	300/50
Mounting position	Universal
Pilot pressure range (MPa)	(0.4xP+0.1)-0.7 P: operating pressure range
Pilot port	M5

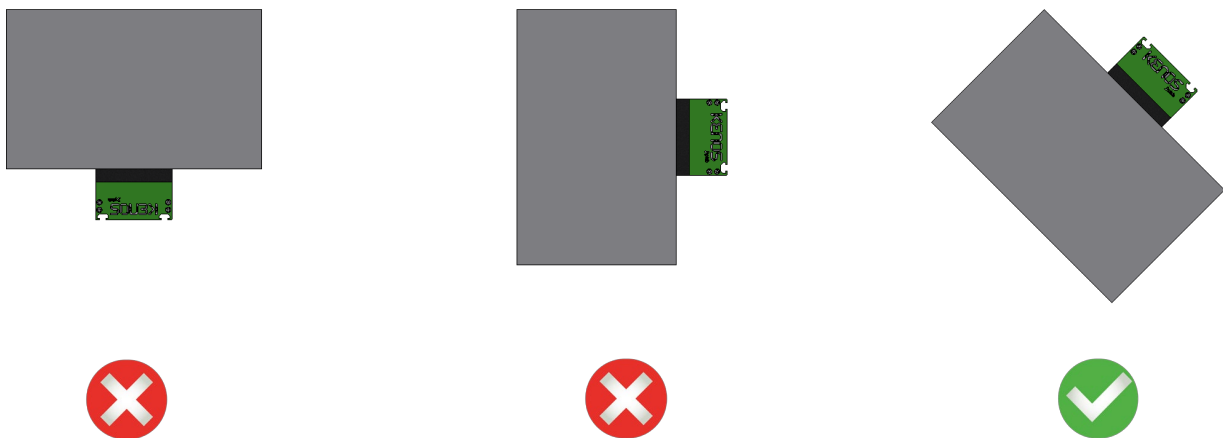
6. WORKING CYCLE DETAILS FOR FOAM VERSION

a. Check valve balls (CVL/CVM/CVH) version:



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 KVG is in contact with the workpiece, the workpiece will not be gripped because the check valves will be closed and not allowed the handling.

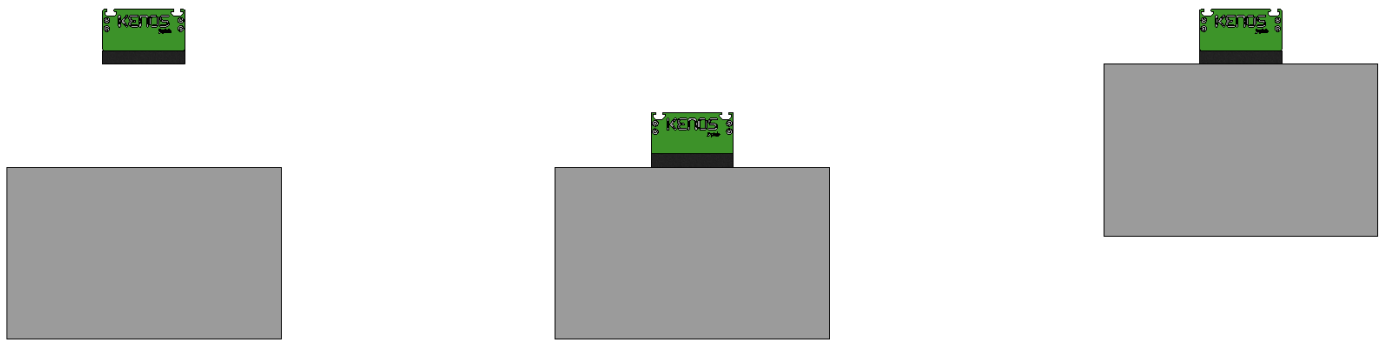


- The KVG CVL/CVM/CVH gripper module is designed for horizontal use; turning the module upside down by 180°, or vertical grips are not possible. Maximum tilt allowed is 45°.
- Stopping or passing through the work area of the gripper module is prohibited, as in case of electrical or pneumatic supply failure, the load handled by the module is released.
- The maximum vertical acceleration allowed is 5 m/s².
- Note that when check valves are present in the KVG module, the vacuum value you can measure through a vacuum switch cannot be used as indication for a safe grip of the object.

This because we are detecting the vacuum level inside the gripping module and, thanks to the acting of the CV, it will be high even when the object is not present (CV will close).

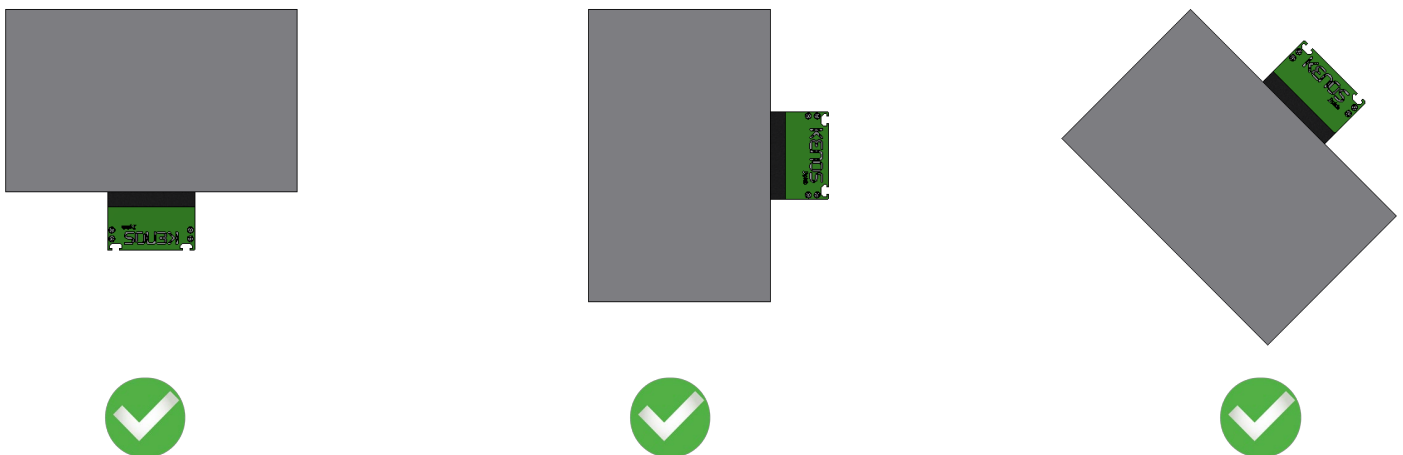


b. Flow reduction (FR5/FR6/FR8) version:



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 for fast cycle we suggest to activate vacuum before be in contact with the object.
3. Pick-up of object to handle.
4. Drop-off of object with removal of vacuum and blow-off if necessary.

Note: In this case the activation of vacuum can be done before or after the contact with the workpiece.

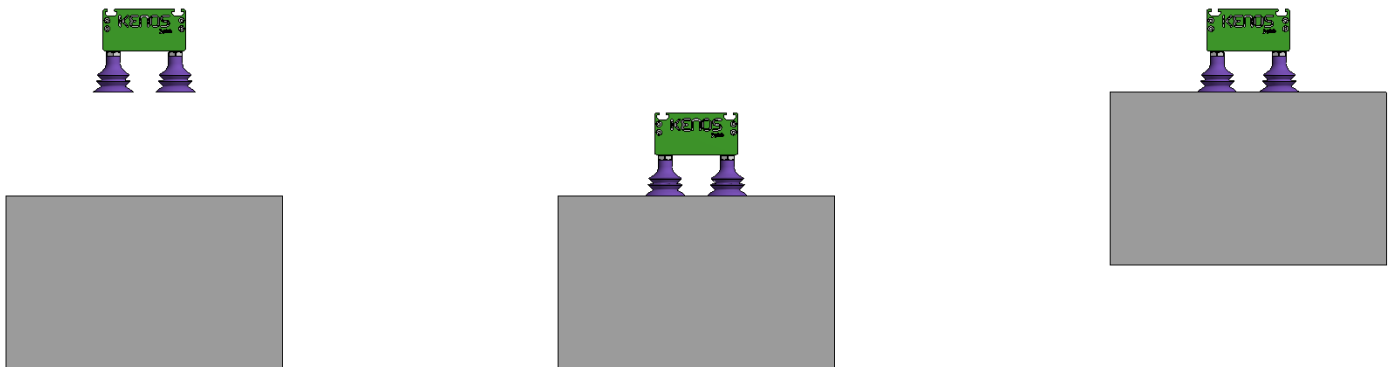


- Stopping or passing through the work area of the gripper module is prohibited, as in case of electrical or pneumatic supply failure, the load handled by the module is released.
- With the Flow reduction technology, the vacuum value in the gripper is the real vacuum level on the object, so in this case the vacuum switch can be used to check the grip. Take in consideration that the vacuum level is influenced by the degree of coverage on the gripper and the porosity of object.

Note: We recommend always running preliminary tests with original samples. We are able to perform these tests for you.

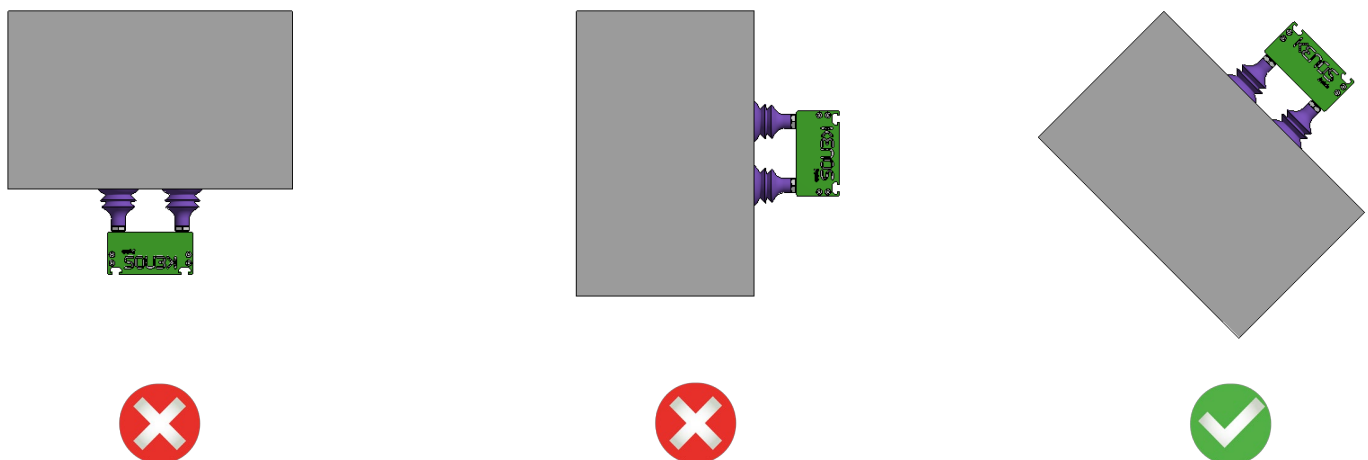
7. WORKING CYCLE DETAILS FOR CUPS VERSION

a. Check valve balls (CVL/CVM/CVH) version:



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.

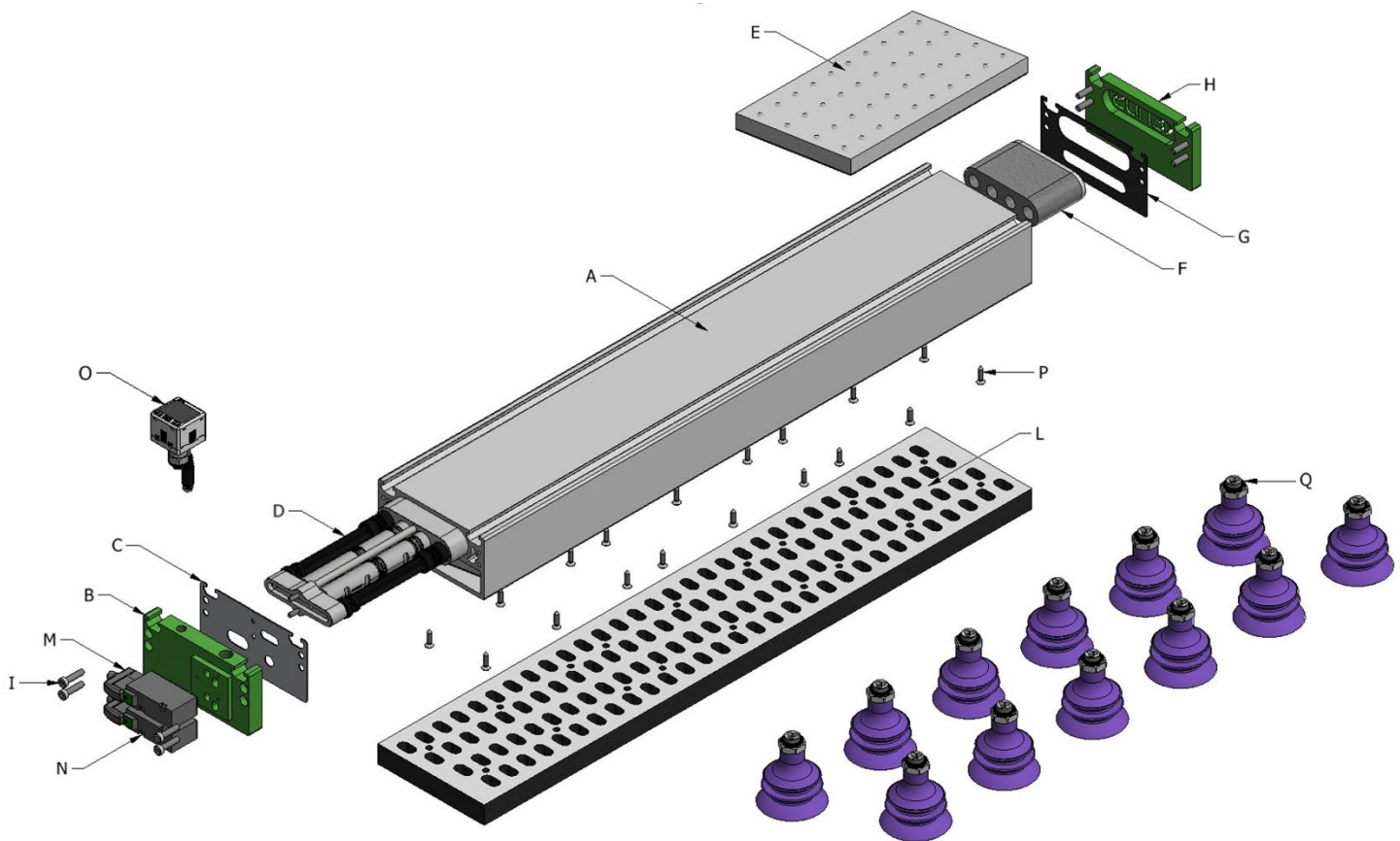
Note: If vacuum is activated before KVG is in contact with the workpiece, the workpiece will not be gripped because the check valves will be closed and not allowed the handling.



- The KVG with Suction Cups (CV) 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/s².
- Note that when check valves are present in the KVG module, the vacuum value you can measure through a vacuum switch cannot be used as indication for a safe grip of the object. This because we are detecting the vacuum level inside the gripping module and, thanks to the acting of the CV, it will be high even when the object is not present (CV will close).

8. PARTS LIST FOR FOAM AND CUPS VERSION

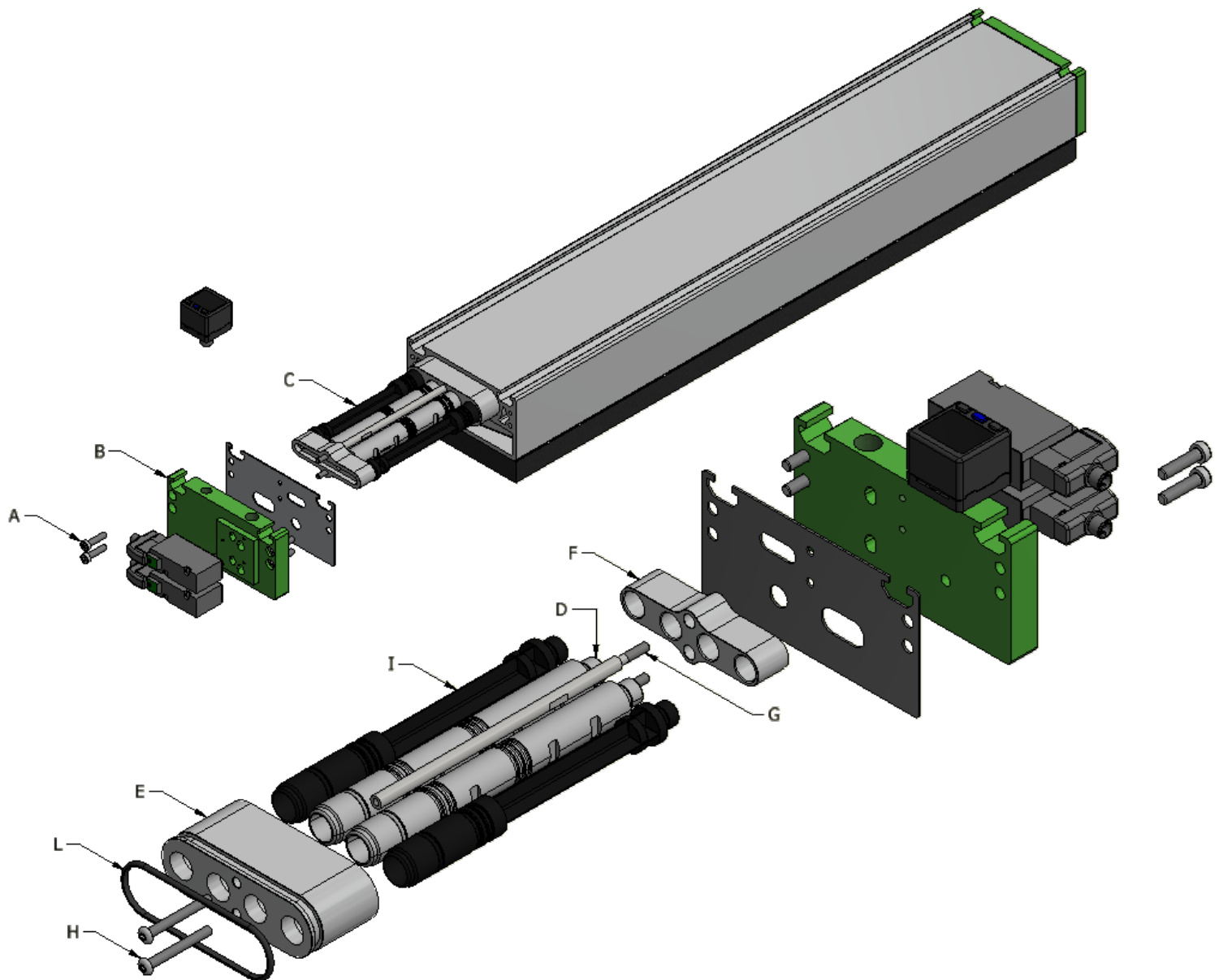
a. Gripper parts list



Pos.	Description
A	Basic body
B	Supply cover
C	Supply cover seal
D	Push in ejector
E	Check valves module
F	Silencer
G	Exhaust cover seal
H	Exhaust cover
I	Close cover screws
L	Technical foam
M	Solenoid valve Vacuum
N	Solenoid valve Blow-off
O	Vacuum switch
P	Check valves module fixing screws
Q	Suction Cups

1. Basic body is an extruded aluminum section and is available in different lengths.
2. Supply/exhaust cover are made of aluminum properly finished.
3. Technical foam is made of EPDM FOAM.
4. Push in ejector built of 1 or more multistage COAX® cartridge ejector. Air consumption 90NI/min each.
5. Solenoid valves 3/2 N.C. OR N.O. 24Vcc.
6. Digital vacuum switch 2 OUT digital, programmable, 24 Vcc.

b. Ejector Body for Foam and Cups version

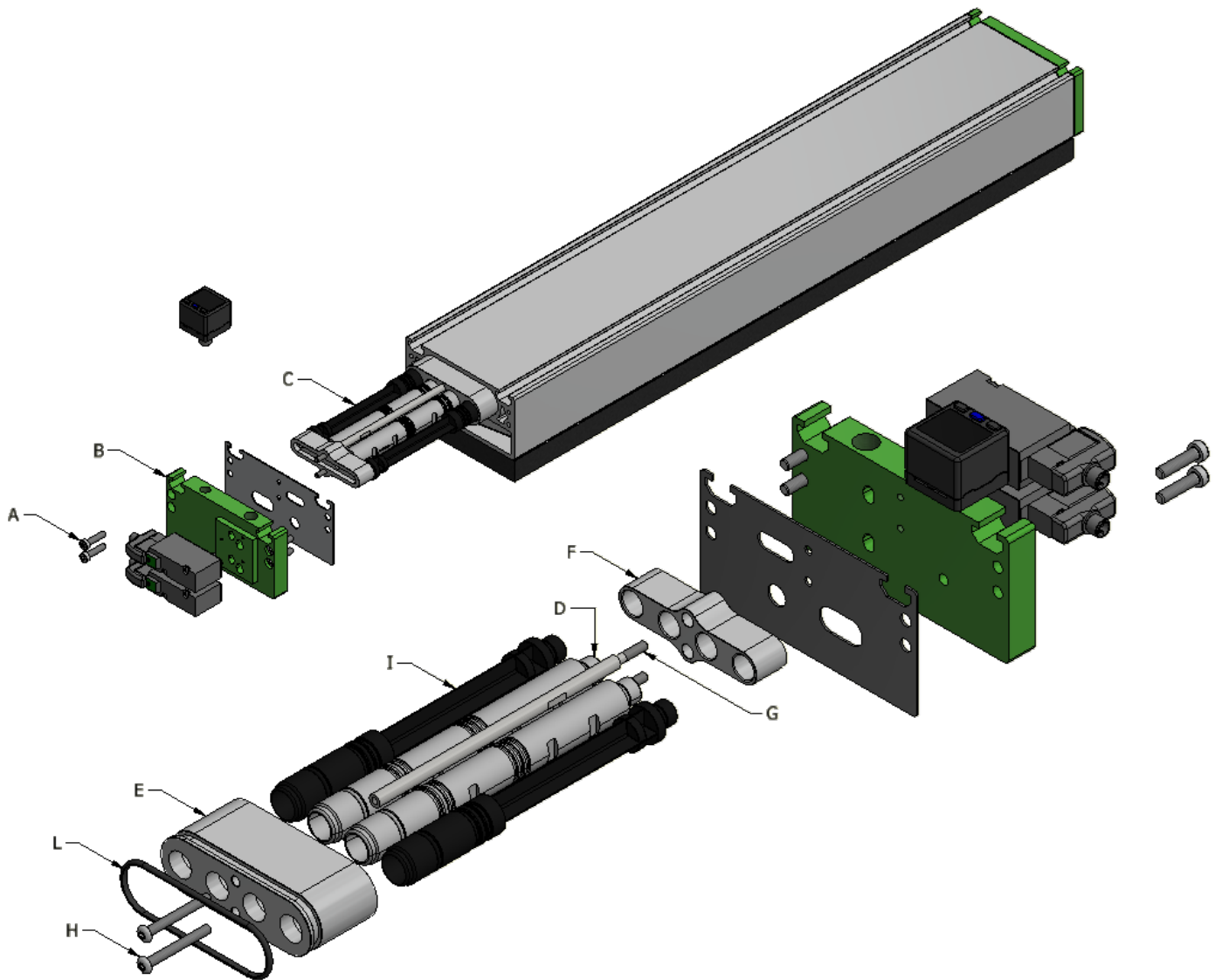


Pos.	Description
A	Cover closing screws
B	Supply cover
C	Push in ejector
D	Multistage COAX® cartridge
E	Posterior housing
F	Anterior housing
G	Tie-beam
H	Screws
I	Blind Cartridge for Midi COAX
L	O-ring



9. MAINTENANCE

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



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

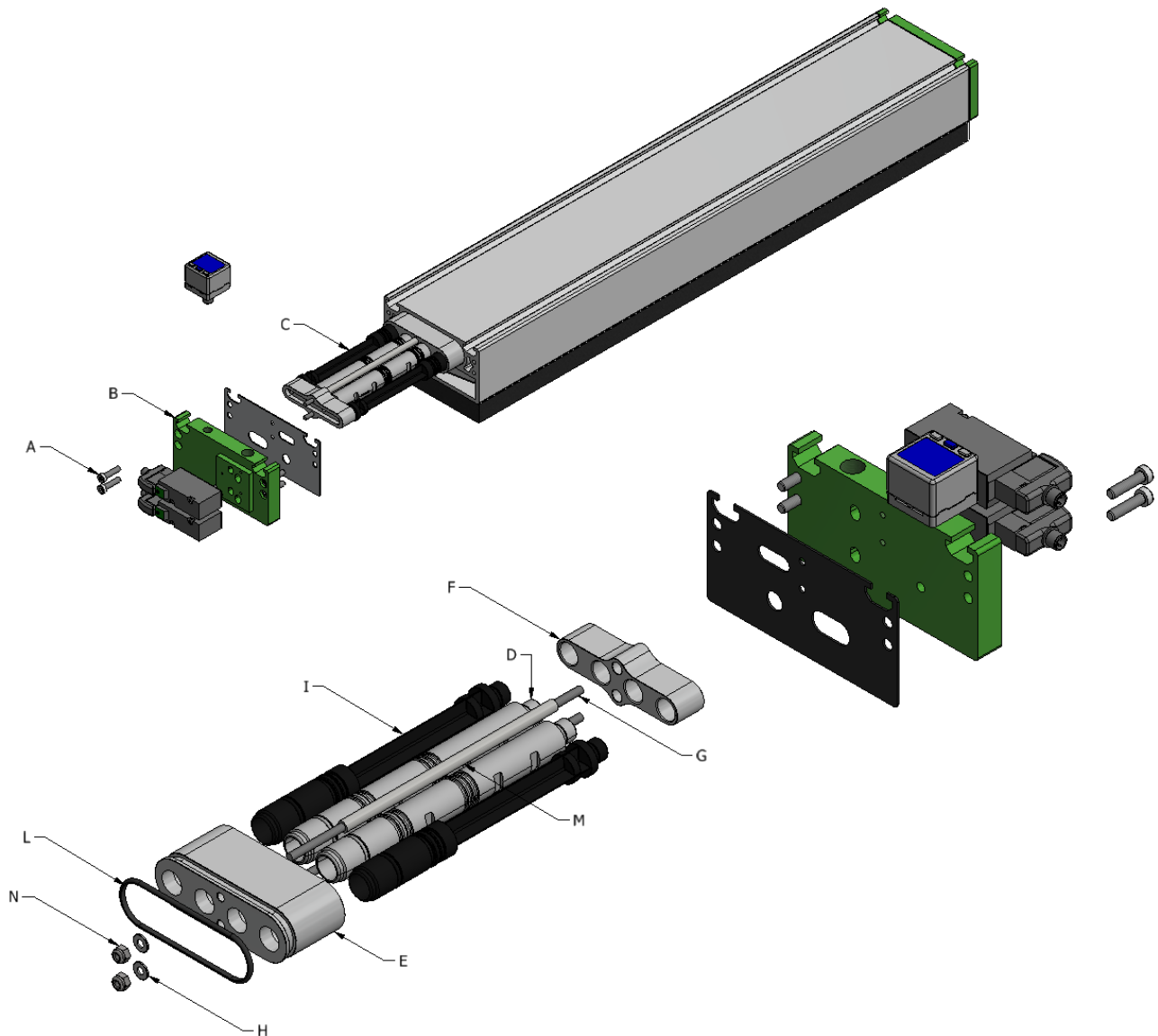
- ▶ Loosen A closing screws of the supply cover and extract the complex B+C.
- ▶ Blow and clean the ejectors with compressed air. Verify that the plastic body is intact.
- ▶ Check the condition of the O-ring L, in case of damage it has to be replaced.
- ▶ Push in the complex B+C and close with A screws.
- ▶ When re-inserting the ejector, be careful to not cut the O-ring L.

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:

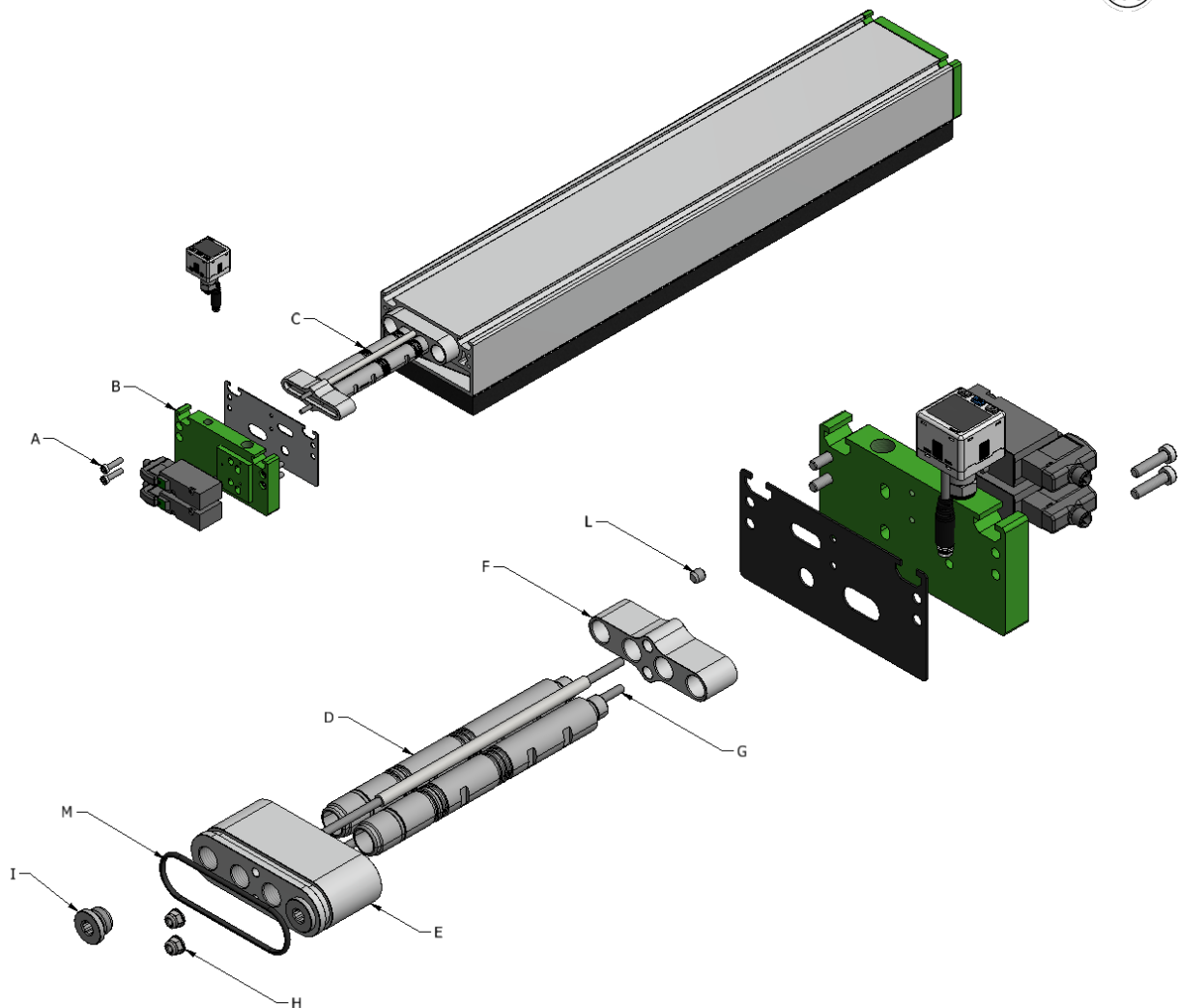
- Loosen A closing screws of the supply cover and extract the complex B+C.
- Blow and clean the ejectors with compressed air. Verify that the plastic body is intact.
- Check the condition of the O-ring L, in case of damage it has to be replaced.
- Push in the complex B+C and close with A screws.
- When re-inserting the ejector, be careful to not cut the O-ring L.

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:

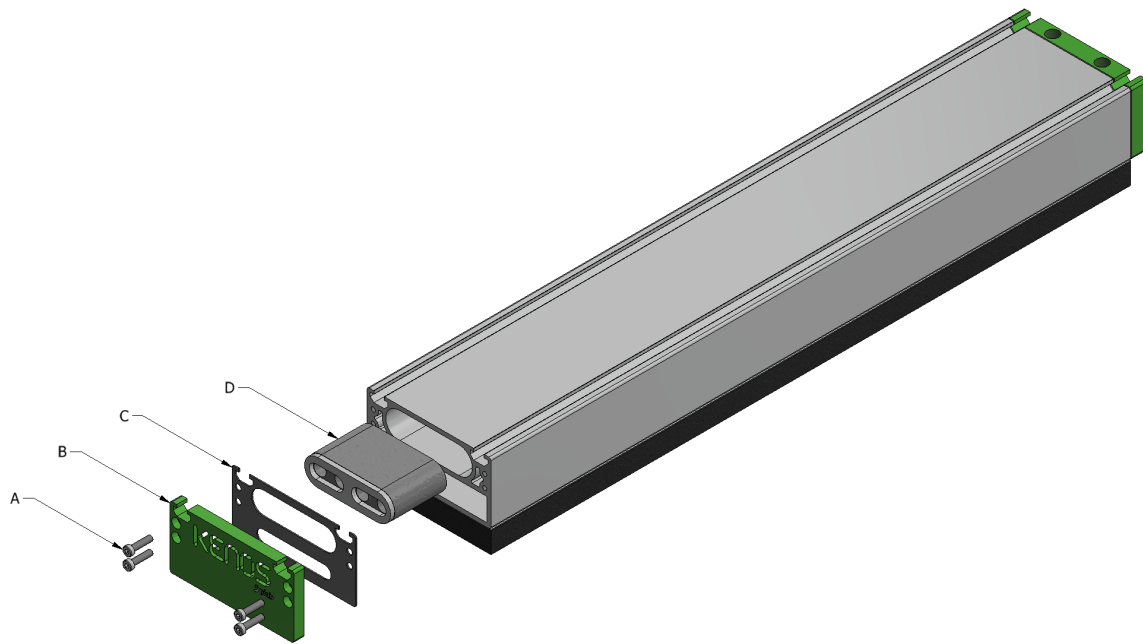
- ▶ Loosen A closing screws of the supply cover and extract the complex B+C.
- ▶ Blow and clean the ejectors with compressed air. Verify that the plastic body is intact.
- ▶ Check the condition of the O-ring M, in case of damage it has to be replaced.
- ▶ Push in the complex B+C and close with A screws.
- ▶ When re-inserting the ejector, be careful to not cut the O-ring L.

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 Accessories/spare parts section.

d. Silencer maintenance

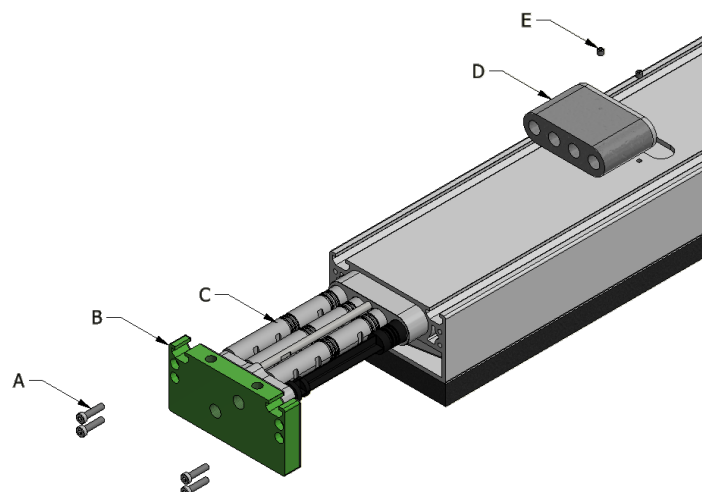


For the maintenance of the silencer follow these steps:

- ▶ 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.

With 6-8 cartridges:

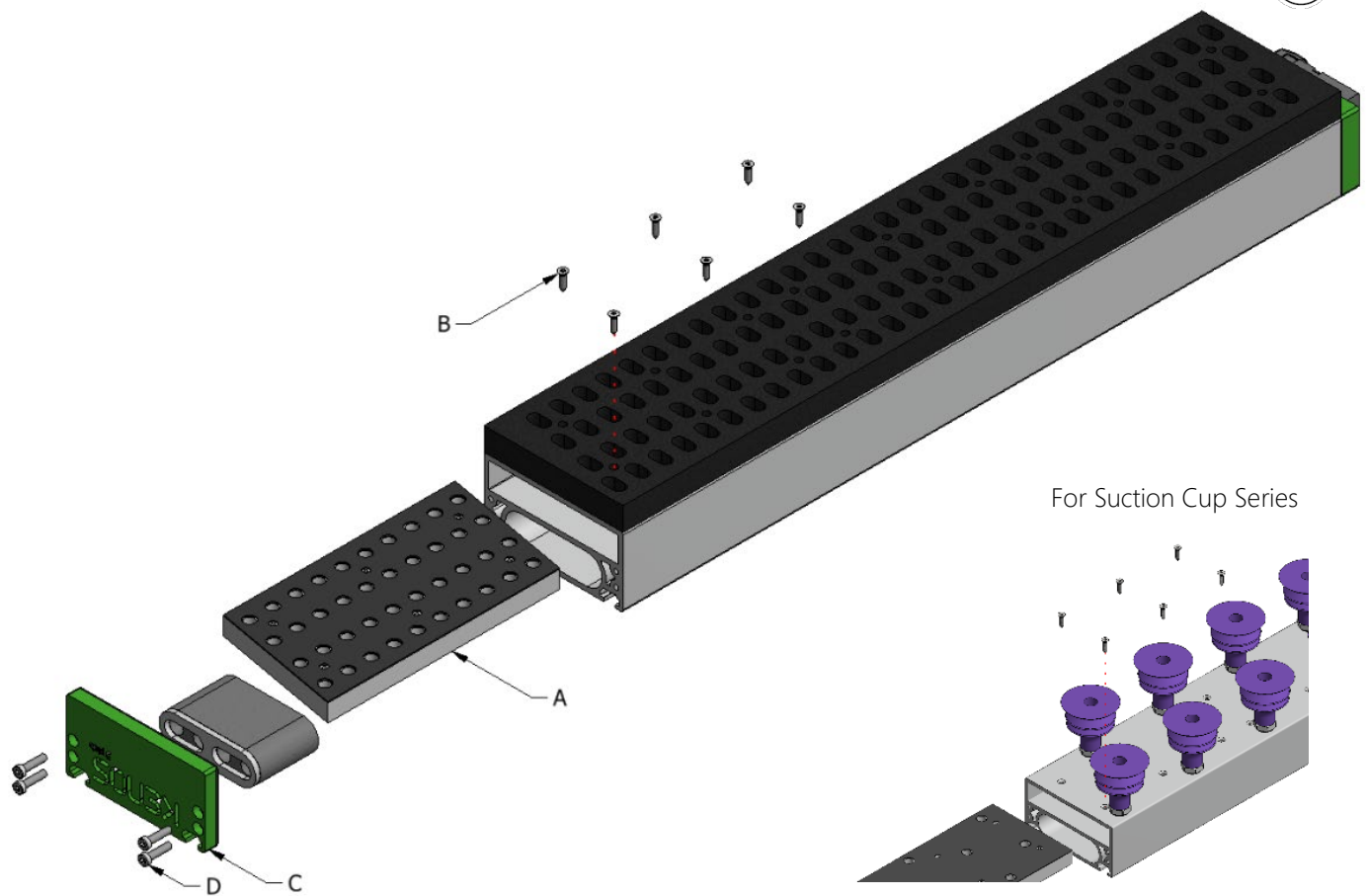


For the maintenance of the silencer follow these steps:

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

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

e. Check valves maintenance for foam and cups version



Pos.	Description
A	Check valves module
B	Fixing screws check valves module
C	Exhaust cover
D	Cover closing screws

Maintenance

To access the check valves module, in the case will be necessary to clean it, follow these steps:

IT IS ABSOLUTELY FORBIDDEN TO REMOVE THE CHECK VALVES MODULE WITHOUT FACING THE GRIPPER UPWARDS. This to prevent accidental fall of the spheres.

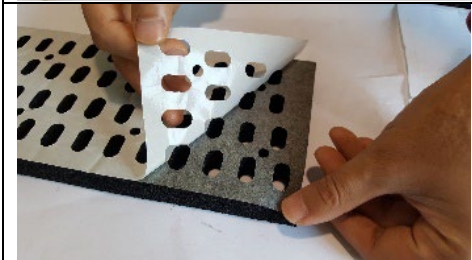
- ▶ Loosen D screws and take down the cover C
- ▶ Loosen B screws
- ▶ Extract check valves module A
- ▶ Clean the check valve module A with compressed air.
- ▶ Follow back the same steps to assemble the gripping system.

Note: With foam step 6, you need to remove the foam from the aluminum profile before unscrew the screws.

f. Foam maintenance



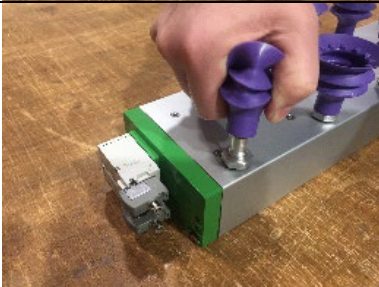
The foam that builds the gripping surface can be damaged during normal use. The medium lifetime depends on many factors: nature of the handled objects, quality of the gripping surface, work conditions, cycle times, etc.

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

g. Suction Cups Maintenance



Suction Cups 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.

	Turn the profile upwards to secure the spheres in the valve bases.
	in case of replacement of the suction cup, just remove the old suction cup from the nipple and put a new one.
	if the nipple is damaged, unscrew it without damaging the other parts of the gripper and replace the new one.
	Make sure that all the nipples are properly secured to profile.
	Attention: Do not turn the gripper until all nipples have been mounted. this to prevent accidental fall of the spheres.
To store the cups:	Temperature (5 °C to 25 °C) Not under the light Be free of tension No dust chemical protected In a dry environment

h. Maintenance plan

	Daily	Weekly	Monthly	Every 6 months	Every 12 months
Check Max vacuum level of the ejector		•			
Check the check valves / FR			•		
Check the silencer			•		
Check tightening				•	
Check the foam / suction cups	•				
Check supply air pressure		•			
Check the electrical connection			•		
Check the air connection		•			
Check the general condition					•
Clean gripper exterior				•	

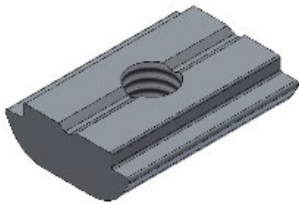
10. PROBLEMS/SOLUTIONS

Problem	Possible reason	Solutions
Insufficient vacuum level or vacuum achieved too slowly	Operating pressure too low	Increase the pressure
	Internal diameter of pressure hose too small	Use hoses with larger internal diameter
	Damaged sealing	Check and replace if necessary
	Leak in pressure hose	Check hoses
	Dirty ejector	Clean
Object not gripped	Low vacuum level	See above
	Insufficient suction capacity	Insert one more cartridge ejector
	Dirty check valves	Clean
	Lift is too fast	Slow down lift, avoid acceleration peaks
	Pieces not suitable for lift with this system	Replace grip solution
	Occluded foam filter	Replace foam with filter
	Occluded silencer	Replace silencer
	Occluded micro holes	Clean
Foam/suction cups wear very quickly	The system is not correctly 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.

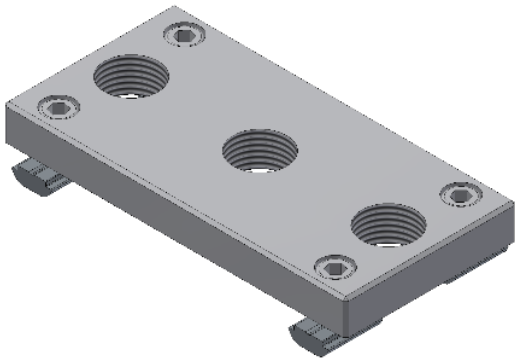
11. ACCESSORIES

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

12. TECHNICAL DATA

a. Air consumption

Type	Air consumption at 6 bar (NI/s)/ 87.0 psi (scfm)
KVG.XXX.120.XXXX.XXX.S1.XX.XX	1.75 / 3.71
KVG.XXX.120.XXXX.XXX.S2.XX.XX	3.5 / 7.42
KVG.XXX.120.XXXX.XXX.S3.XX.XX	5.25 / 11.12
KVG.XXX.120.XXXX.XXX.S4.XX.XX	7.0 / 14.83
KVG.XXX.120.XXXX.XXX.S6.XX.XX	10.5 / 22.25
KVG.XXX.120.XXXX.XXX.S8.XX.XX	14 / 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

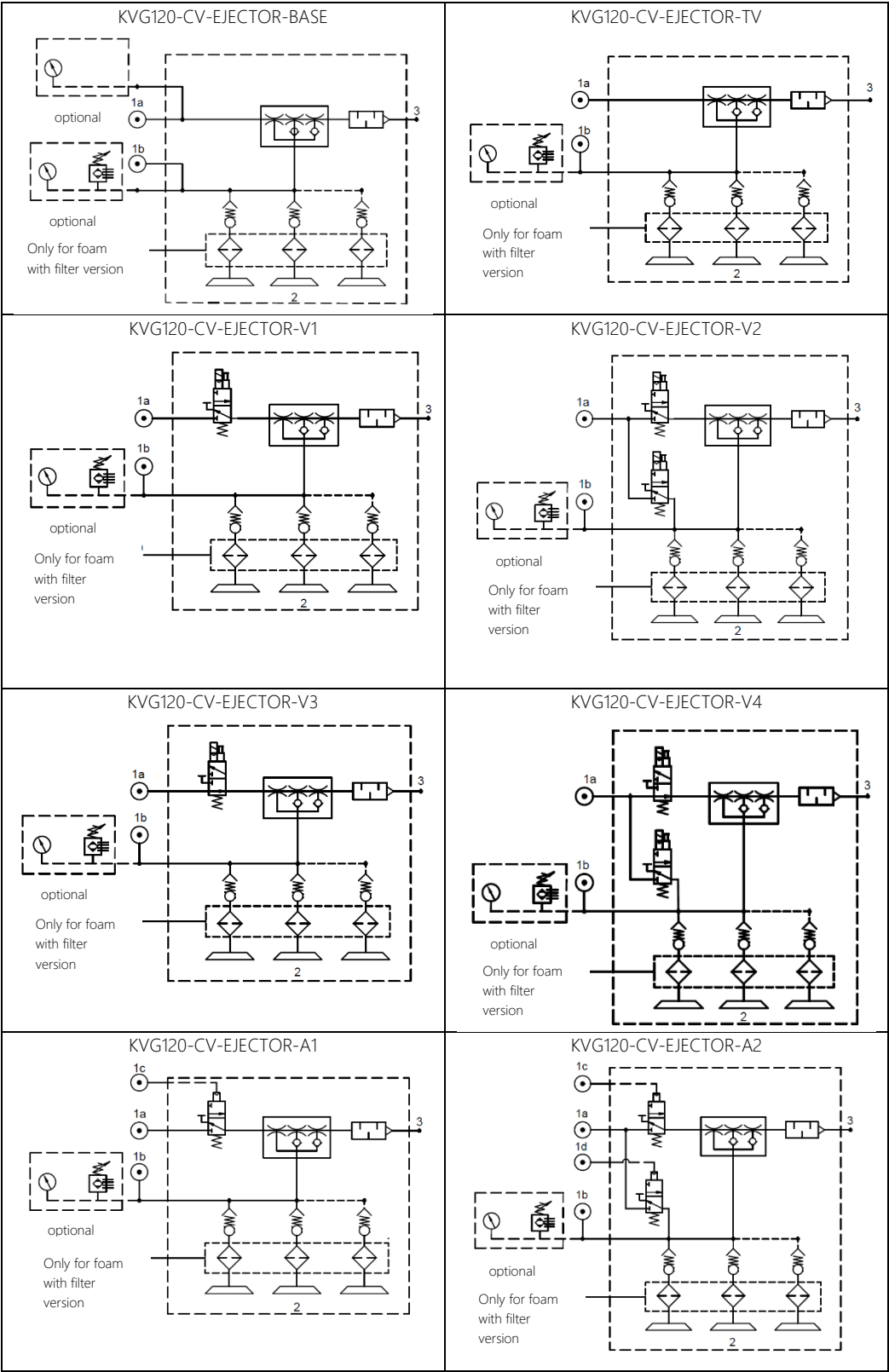
Description	
Supply air connection size	8mm internal diameter by up to 2 meters (6.5ft)
Air quality	DIN ISO 8573-1 class 4

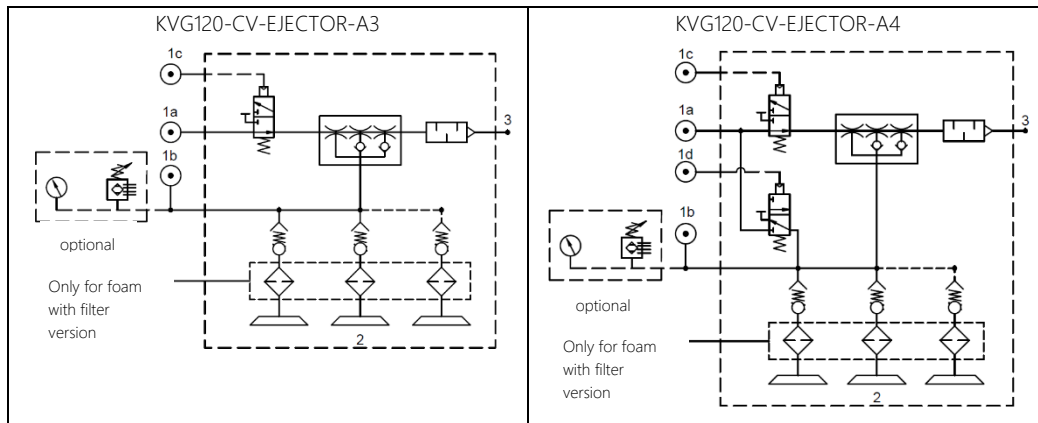
d. Temperature

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

13. PNEUMATIC DIAGRAM

a. KVG120- CV WITH FOAM AND CUPS SERIES PNEUMATIC DIAGRAMS





1a = PRESSURE AIR SUPPLY FOR VACUUM

1b = PRESSURE AIR SUPPLY FOR BLOW OFF

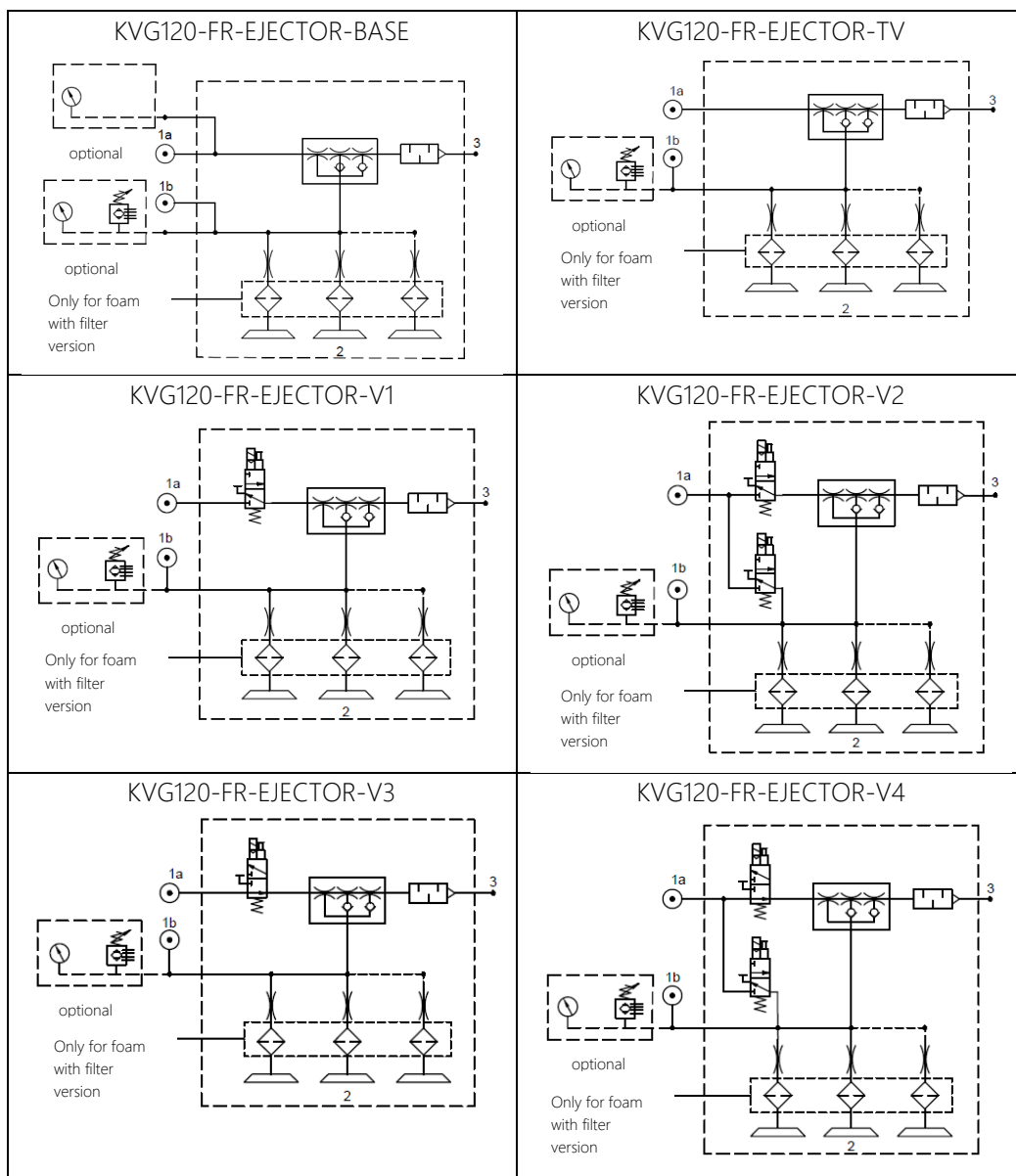
1c = PRESSURE AIR FOR PNEUMATIC VALVE CONTROL (VACUUM)

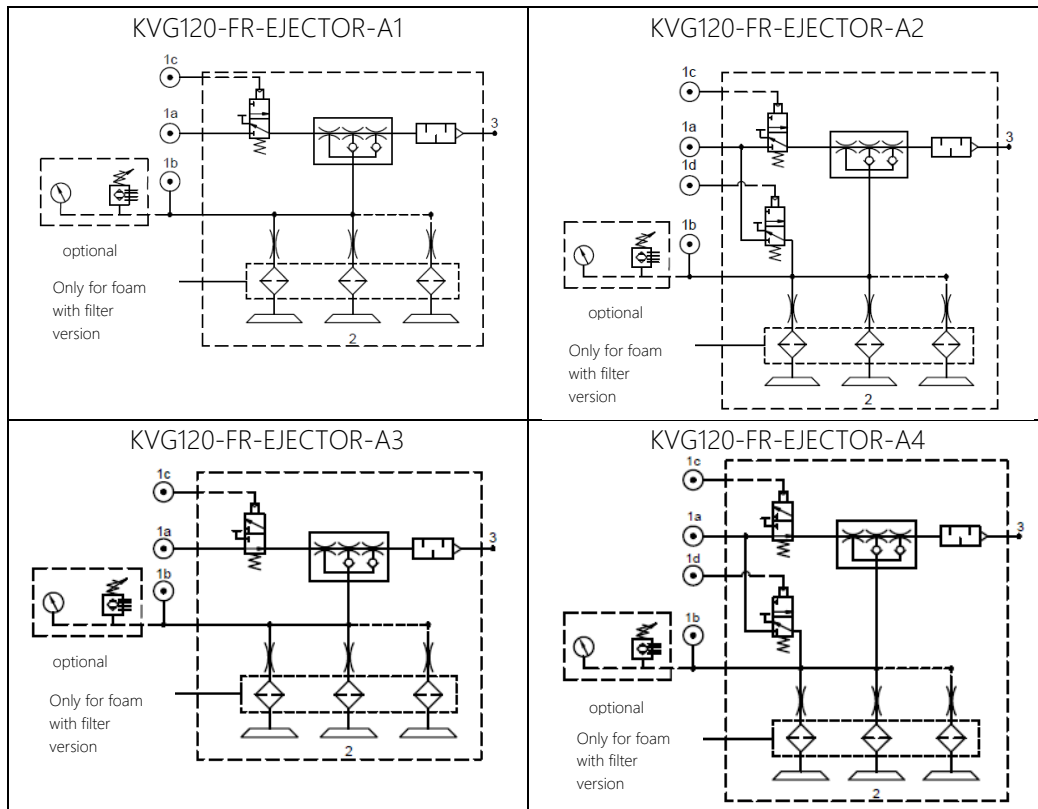
1d = PRESSURE AIR FOR PNEUMATIC VALVE CONTROL (BLOW OFF)

2= VACUUM FOR EJECTOR VERSION

3 = EXHAUST

b. KVG120-FR SERIES PNEUMATIC DIAGRAMS





1a = PRESSURE AIR SUPPLY FOR VACUUM

1b = PRESSURE AIR SUPPLY FOR BLOW OFF

1c = PRESSURE AIR FOR PNEUMATIC VALVE CONTROL (VACUUM)

1d = PRESSURE AIR FOR PNEUMATIC VALVE CONTROL (BLOW OFF)

2 = VACUUM FOR EJECTOR VERSION

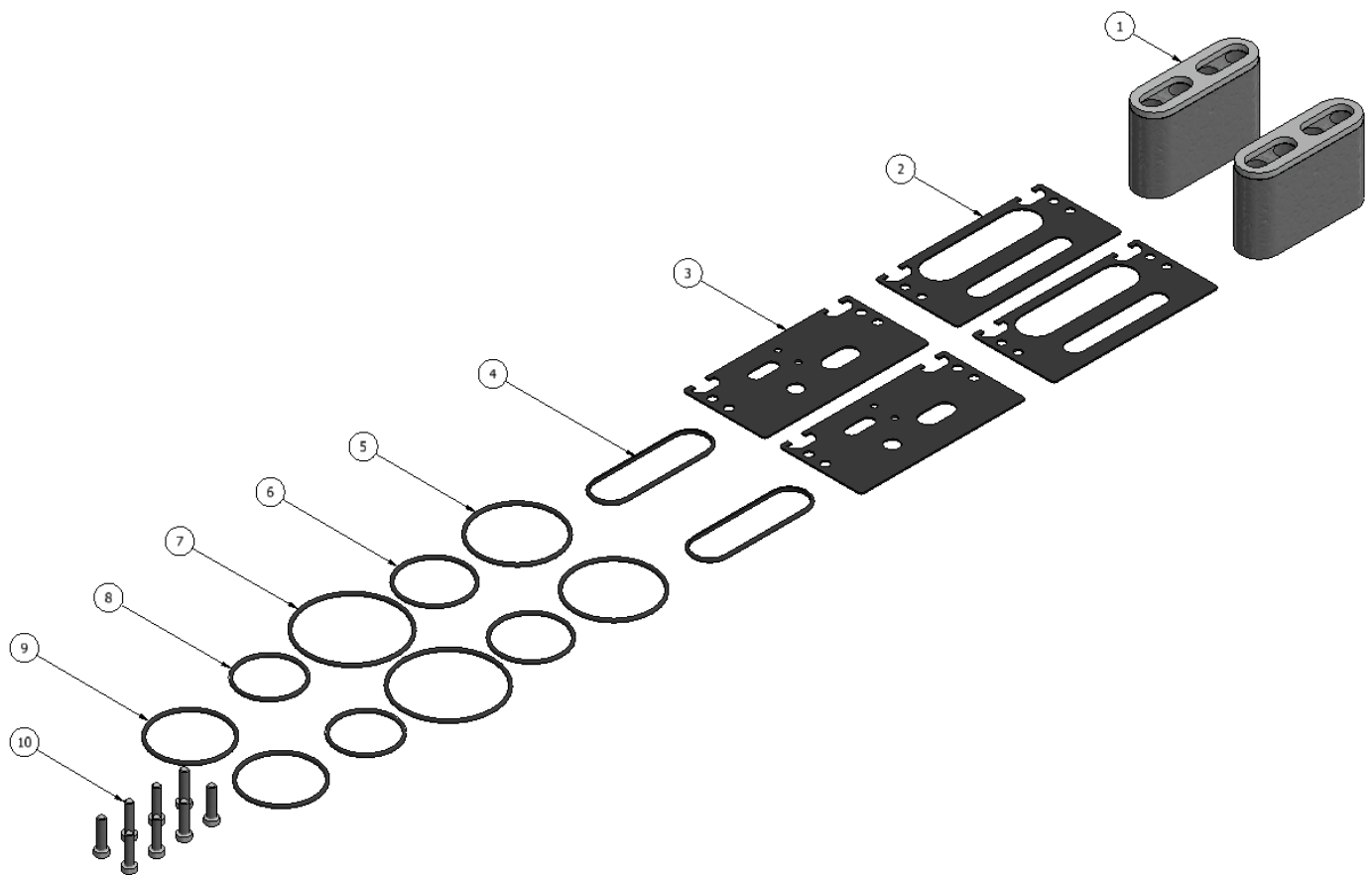
3 = EXHAUST

14. SPARE PARTS

a. Single spare parts list

Item N. PIAB	Description
3101602	Vacuum gauge 100 -kPa, with nut / -30 inHg
3101603	Pressure gauge w. nut 1 MPa/140 psi, With teflon ring
0107053	COAX® cartridge MIDI Si32-3
0112527	Blind Cartridge for Midi COAX
0212040	Vacuum switch 3-color digital display M8
0211305	Solenoid valve EV 3/2 N.O
0209259	Solenoid valve EV 3/2 N.C
0211307	Pneumatic valve EV 3/2 N.O
0211306	Pneumatic valve EV 3/2 N.C
0205192	Suction cup B35XP Polyurethane 60
0205002	Suction cup B35XP Polyurethane 30/60
0205200	Suction cup B52XP Polyurethane 60
0205007	Suction cup B52XP Polyurethane 30/60
0107477	Suction cup BX35P, Polyurethane 60
0106292	Suction cup BX35P, Polyurethane 30/60
0107381	Suction cup BX52P Polyurethane 60
0104529	Suction cup BX52P Polyurethane 30/60
0202115	Suction cup VL60BX
0211420	NIP-BX35-TRI-KVG
0211422	NIP-BX52-TRI-KVG
0211423	NIP-VL60BX-TRI-KVG

b. Spare parts kit KVG120-60



Item N. PIAB	Description
0211080	Spare parts kit KVG120-60
	8x Cover screw KVG120-60-ISO 14580 – M5 x 20 (10)
	2x O-ring NBR 62x2 (7)
	2x O-ring NBR 46x2 (9)
	2x O-ring NBR 38x2 (8)
	2x O-ring NBR 42x2 (6)
	2x O-ring NBR 53x2 (5)
	2x OR3212-53,64X2,62-NBR70 (4)
	2x Exhaust cover seal KVG120-60 (2)
	2x Supply cover seal KVG120-60 (3)
	2x Silencer KVG120-60 (1)

c. Foam spare parts

There are three different types of foam spare part available; Step1, Step 2 and Step 6. If you are unsure which type you have please check the part code of your configured KVG product, the first part of the code is the foam spare part code, when you put "FOAM" in front, see below.

KVG product code:

KVG.400.120.N201.CVL.S2.X.X



Foam spare part code:

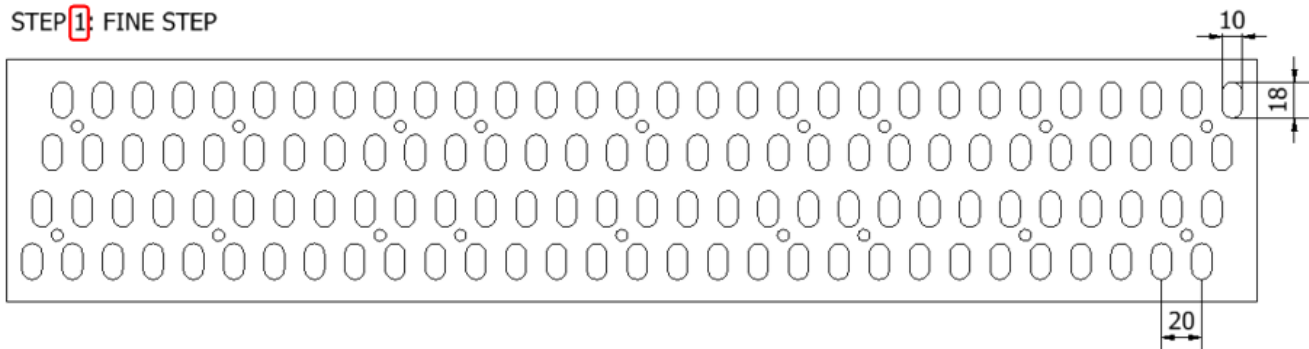
FOAM.KVG.400.120.N201

Step selection, see alternatives below.

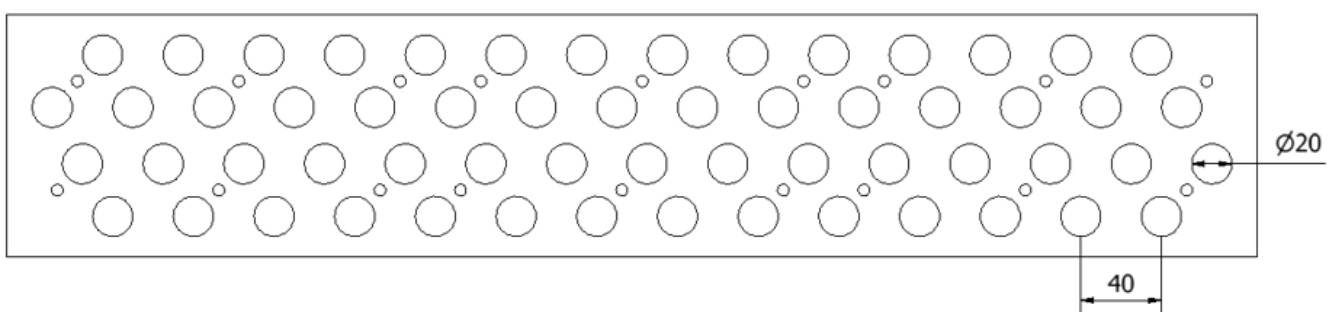
Foam thickness

Filter selection:
-(0) without filter
-(1) with filter

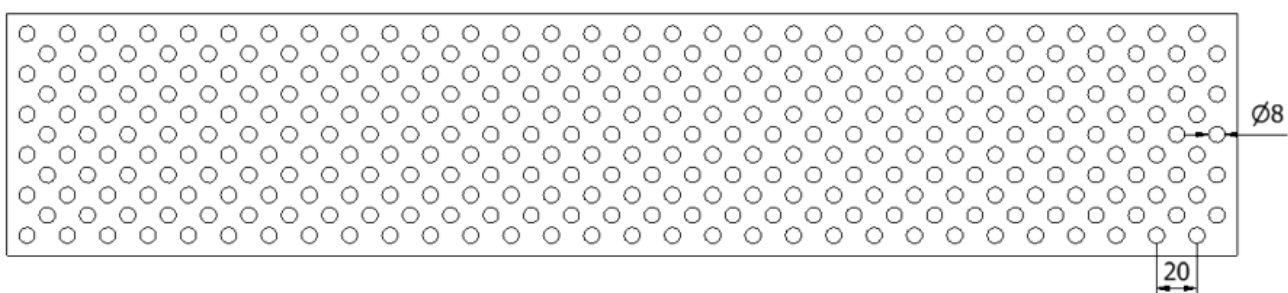
STEP 1: FINE STEP



STEP 2: MEDIUM STEP



STEP 6: EXTRA FINE STEP



d. Suction cup spare parts

There are three different steps for suction cups available; Step for cups 35, Step for cups 52 and Step for cups 60. If you are unsure which type you have please check the part code of your configured KVG product.

KVG product code:

KVG.600.120.**B35XP**.CV.S4.X.X



Suction Cup spare part code:

B35XP Poliurethane 30/60

Cups material:

B35XP60 = Poliurethane 60

B35XP = Poliurethane 30/60

Cup diameters:

Ø 35 mm

Ø 52 mm

N°. Bellows:

B35XP = 1 ½ bellows

BX35P = 2 ½ bellows

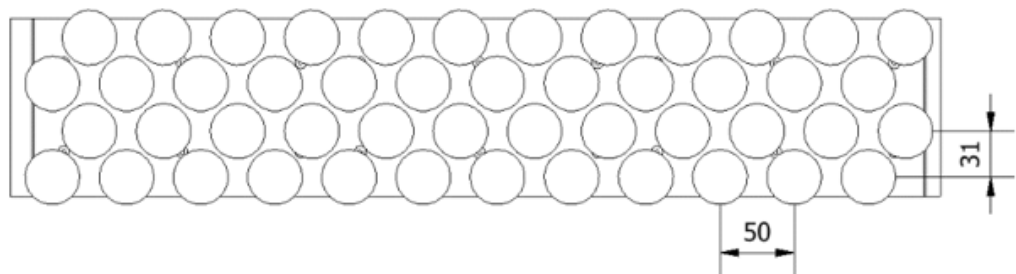
For VL60BX Version = TPE-U

For VL60BX Version:

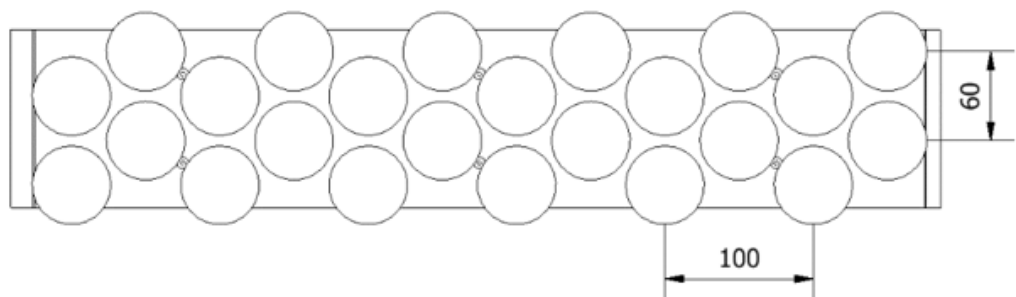
Ø 60 mm

For VL60BX Version = 2 ½ bellows

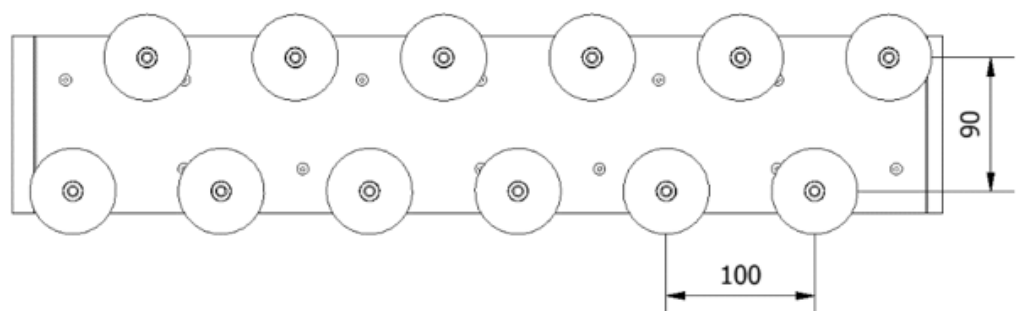
Step for Cups 35:



Step for Cups 52:

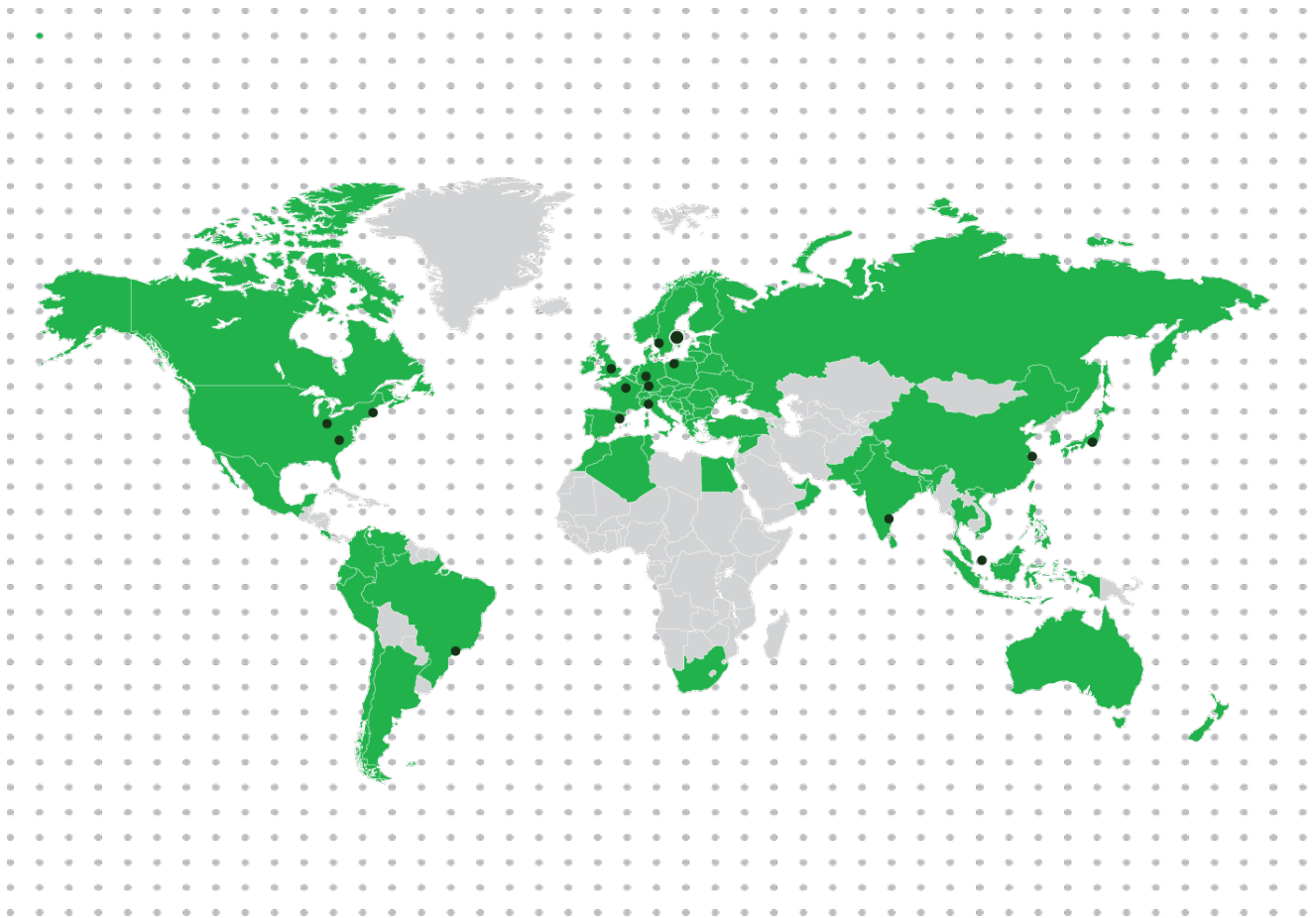


Step for Cups 60:



15. 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, sealing's, 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.



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