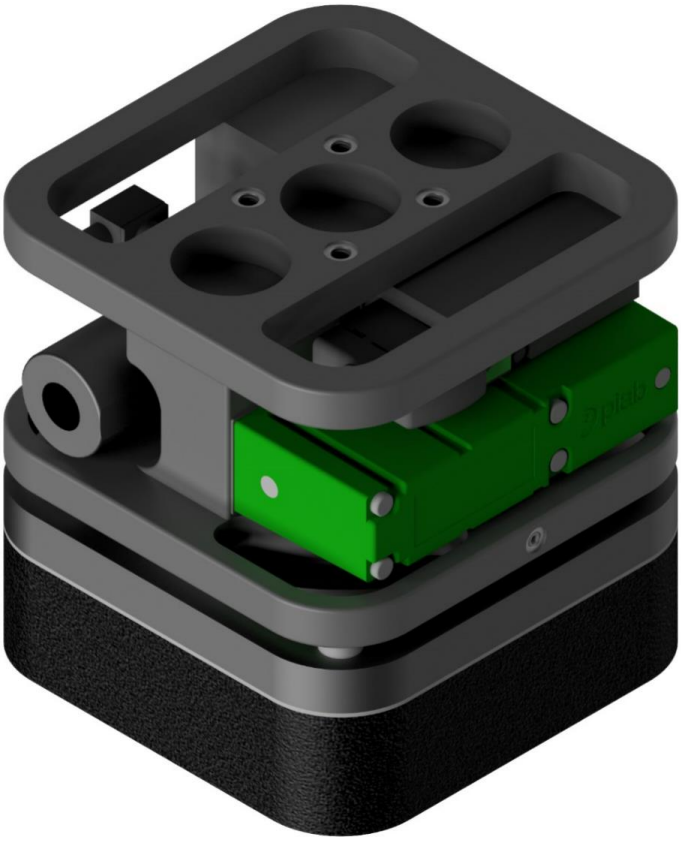
MANUAL

KCS



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piab

English

CONTENTS

Safety instructions

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, prevents 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.
Consider restarting the machine after an emergency stop and machine downtime in order to avoid the risk of injury to persons and/or damage to the system.
The products in this manual are designed for implementation in industrial systems; therefore, they should not be used under application conditions different from those specified.
Never look and / or insert the hands in any cavities, holes or openings (for example: the air discharge, the openings/holes under the foam, etc.)

Pneumatic supply and connection

The supply pressure should not exceed the recommended one of 7 bar.
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 contained in the Installation and Commissioning section, 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.

Environment

Do not use the component in direct contact with corrosive gases, chemical products, water or vapor. For use in environments with droplets or splashes of water, oil, etc., provide suitable protective covers. Do not use the component in explosive atmospheres.
Do not use in environments subject to strong vibrations and/or impact.
Provide suitable protection in case the component is exposed to direct sunlight. Do not ex- pose to sources of heat.

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 incoming 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.
- Position the equipment with the gripping elements upwards or on one side and well protected.

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.

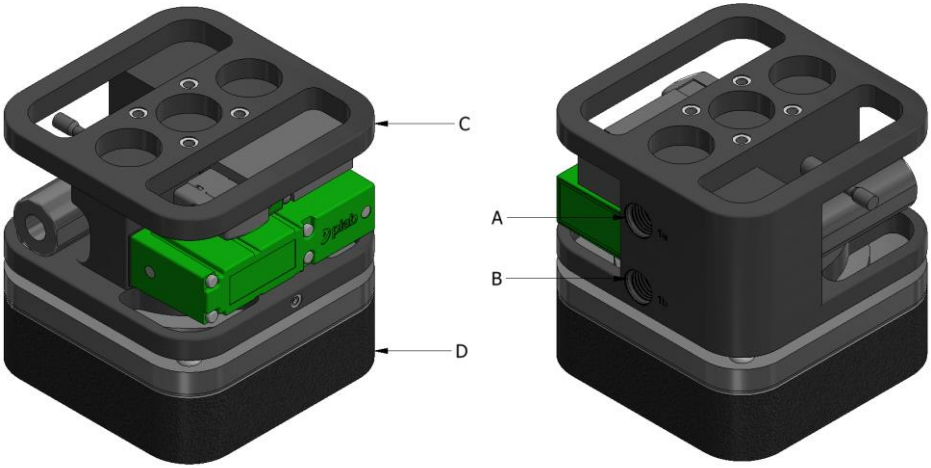
Where non-reusable and / or deemed RAEE "waste" such as electrical and electronic equipment are not to be given in urban waste collection bins. As far as the metal mass of the

machine is concerned, the division between the steel parts and those in other metals or alloys is sufficient for a correct sending to recycling by casting.

Failure to comply with the above rules may cause malfunctions, damage, injury, including with serious consequences.

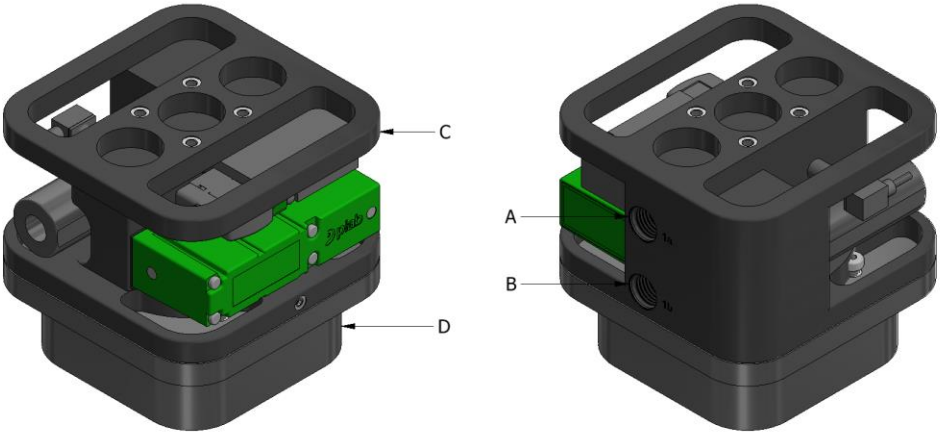
Overview

Part list with flow reduction version



Pos.	Description
A	Pneumatic supply G 1/8” connection
B	Blow-off G 1/8” connection
C	Pump unit
D	Flow reduction module with technical foam

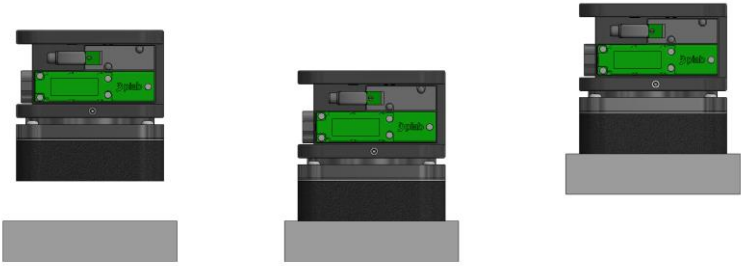
Part list with bag cup version



Pos.	Description
A	Pneumatic supply G 1/8” connection
B	Blow-off G 1/8” connection
C	Pump unit
D	Bag cup module

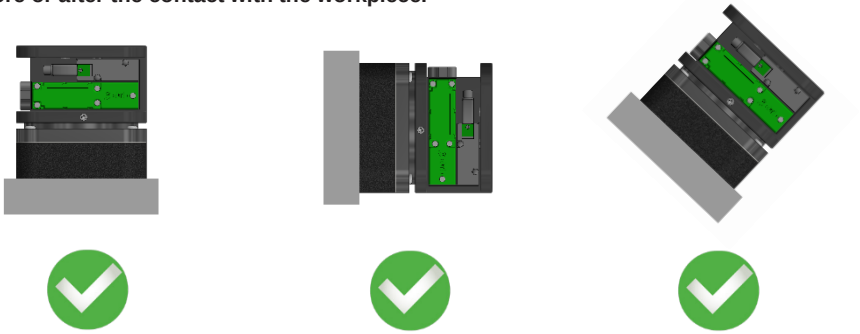
Work cycle details for Flow reduction and Bag cup version

The working cycle for a KCS gripping module follows the steps showed in the bellow:



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

N.B. In this case, the activation for vacuum can be done before or after the contact with the workpiece.



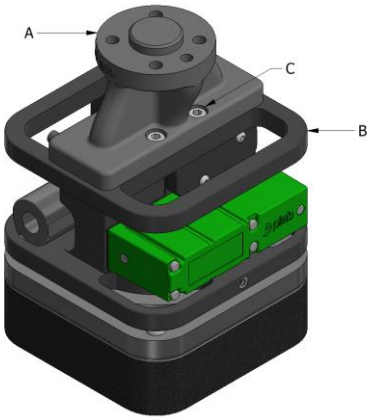
- ► Stopping or passing through the work area of the gripper module is prohibited, as in case of electrical or pneumatic supply failure, the load handled by the module is released.
- ► The vacuum value in the gripper is influenced by the degree of coverage of the gripper. Higher is the degree of coverage, higher is the vacuum level measured. So in this case the vacuum switch can be used to check the grip.

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

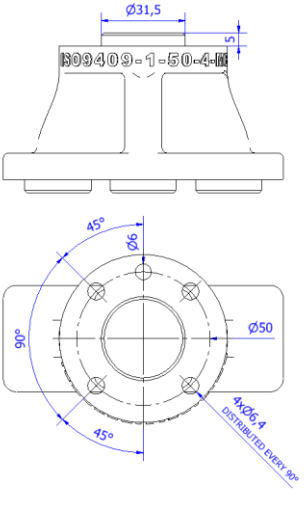
Installation

Mounting on the adapter system

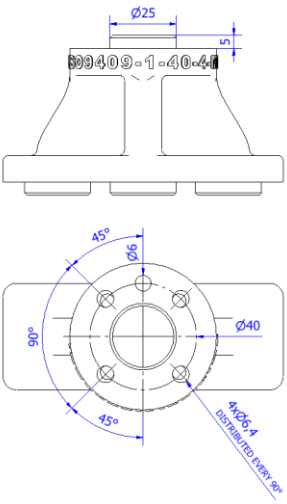
The pump unit is mounted on the special adapter system.



Pos.	Description
A	Special adapter system
B	Pump unit
C	Hole for ISO 4762 M5x12mm screw



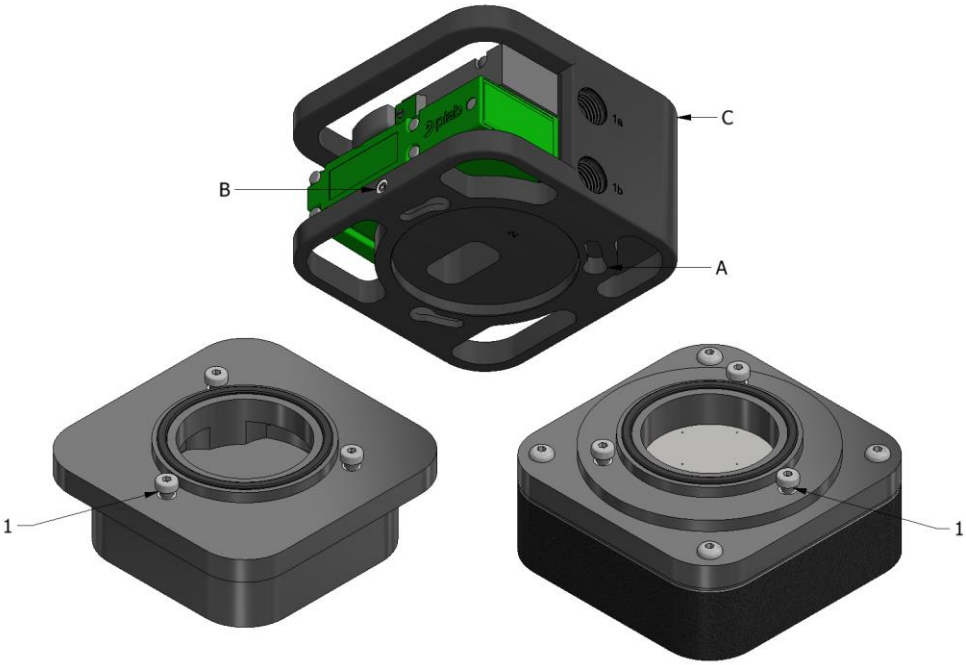
Adapter ISO9409-1-50-4-M6



Adapter ISO9409-1-40-4-M6

Quick change system

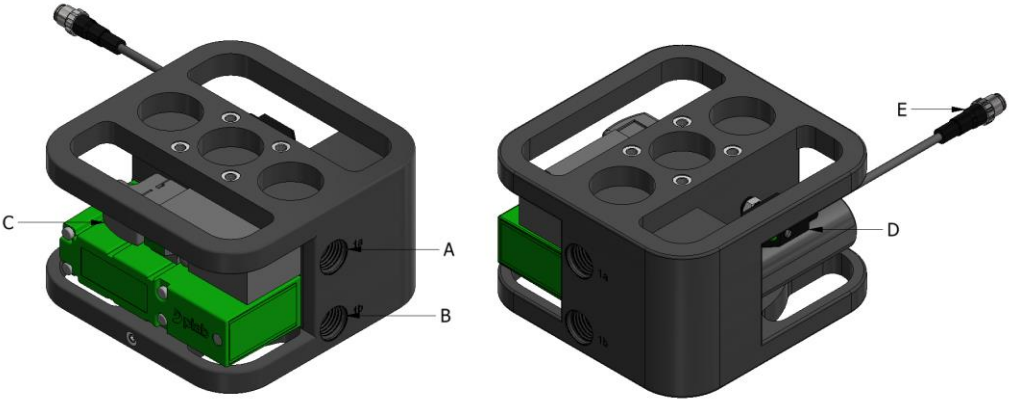
The pump unit and the gripper modules are connected by a quick change system.



Attention: the point 1 need to be aligned with the indication B.

Pos.	Description
A	Quick change system
B	Metal threaded insert for quick change system locking
C	Pump unit
D	Bag cup module
E	Flow reduction module

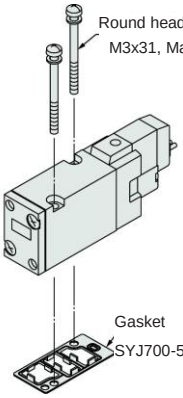
Connecting integrated solenoid valve (EV)



Pos.	Description
A	Connection G 1/8” compressed air for pneumatic supply
B	Connection G 1/8” compressed air for blow off
C	Solenoid valve, vacuum, N.C.
D	Vacuum sensor
E	Connector M8 3 pole male

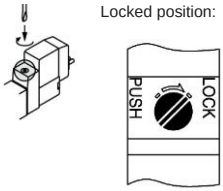
Specifications for solenoid valves

Fluid	**Air**
Operating pressure range (MPa/psi)	0.15-0.7/22-87psi
Operating temperature (°C/F)	-10 +50/14-122
Manual override	Push-locking slotted style
Lubrication	Not required
Impact/Vibration resistance (m/s²)	150/30
Electrical connection	Connector M8 3 pole
Coil rated voltage (Vcc)	24
Allowable voltage	± 10% rated voltage
Current consumption (mA)	17
Surge voltage suppressor	Diode
Indicator light	LED

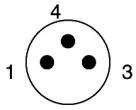


Push-turn slotted locking type (Type D)
While pressing, turn in the direction of the arrow. If it is not turned, it can be opened in the same way as the non-locking type.

Locked position:

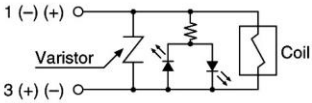


⚠ Caution, when operating the locking type D with a screw driver, turn it gently using a watchmakers screw driver.
[Torque: Less than 0.1 Nm/ 0.07 lbf]



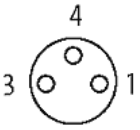
Solenoid valve side pin wiring diagram (for WA type)

With light/surge voltage suppressor (□ U)



Specifications for solenoid valve connector

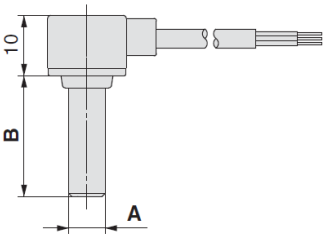
Number and section of conductors (mm²)	**3x0.25**
Safety classification	IP 67
External diameter mm/in	4.1 /0.16
Max. curvature ray for flexing use	10 x external diameter
Case	PUR (UL/CSA)
Connections:	
► 3	Blue (-)
► 4	Black
► 1	Brown (+)



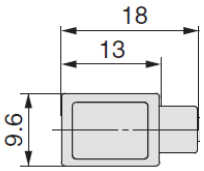
- ► **1.** M8 connector has an indication of IP65 (enclosure) that give protection to dust and water. Take note, however, that the product is not designed to be used in contact with water.
- ► **2.** Do not use a tool to mount the connector, as this may cause damage. Only tighten by hand. (0.4 to 0.6 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.
- ► Torque couple of mounting screw M3: 0.8 Nm (0.59 lbf). Put attention at the direction of mounting for electro valve and seal.

Specifications for vacuum sensor

Fluid	Air/Non-corrosive gas/Non-flammable gas
Rated pressure range	0 to –101 kPa
Extension analogue output range	10.1 to 0 kPa
Proof pressure	500 kPa
Power supply voltage	12 to 24 V DC 10 %, Ripple (p-p) 10 % or less (with reverse connection protection)
Current consumption	15 mA or less
Output specifications	Analogue output 1 to 5 V (within rated pressure range), 0.6 to 1 V (within extension analogue output range), Output impedance: Approx. 1 kΩ
Accuracy (Ambient temperature at 25 °C)	±2 % F.S. (within rated pressure range), ±5 % F.S. (within extension analogue output range)
Linearity	±0.4 % F.S.
Repeatability	±0.2 % F.S.
Power supply voltage effect	±0.8 % F.S.
Enclosure	IP40
Operating temperature range	Operating: 0 to 50 °C, Stored: –20 to 70 °C (No freezing or condensation)
Operating humidity range	Operating/Stored: 35 to 85 % RH (No condensation)
Withstand voltage	1000 V AC (in 50 / 60 Hz) for 1 minute between terminals and housing
Insulation resistance	50 MΩ or more (500 V DC measured via megohmmeter) between terminals and housing
Temperature characteristics	±2 % F.S. (25 °C reference)
Sensor cable	Oilproof heavy-duty vinyl cable (ellipse), 3 cores, 2.7 x 3.2, Conductor area: 0.15 mm^2, Insulator O.D.: 0.9 mm
Standards	CE, UL/CSA (E216656), RoHS

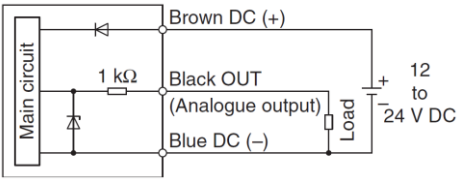


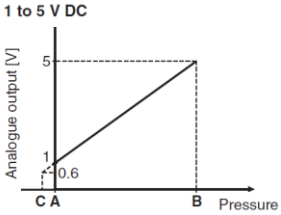
A = Ø 4 mm
B = 18 mm



Specifications for vacuum sensor pipping

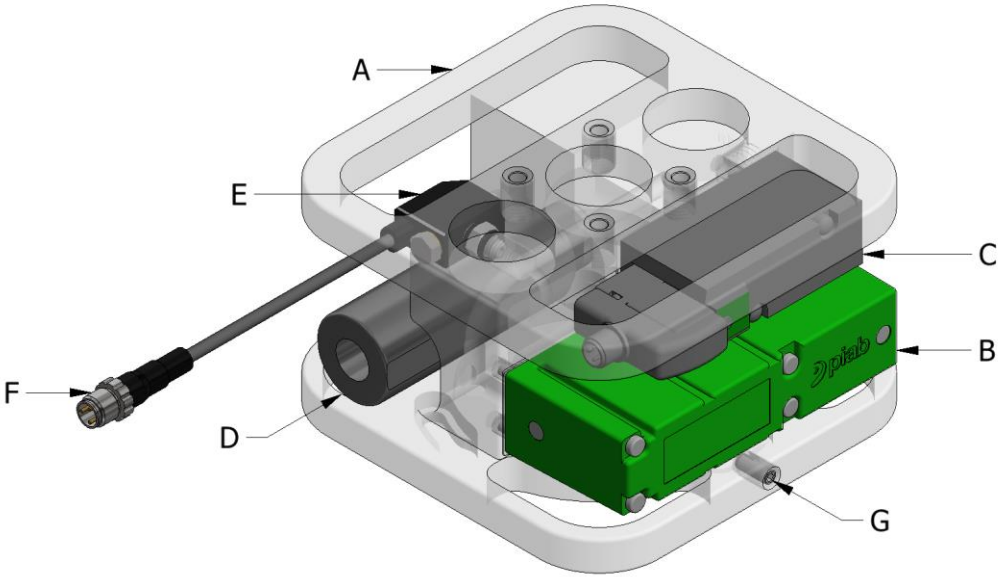
Port size	Ø 4 reducer
Case	PBT
Pressure sensing section	Silicon, O-ring: NBR
Max. curvature ray for flexing use	10 x external diameter
Case	PUR (UL/CSA)





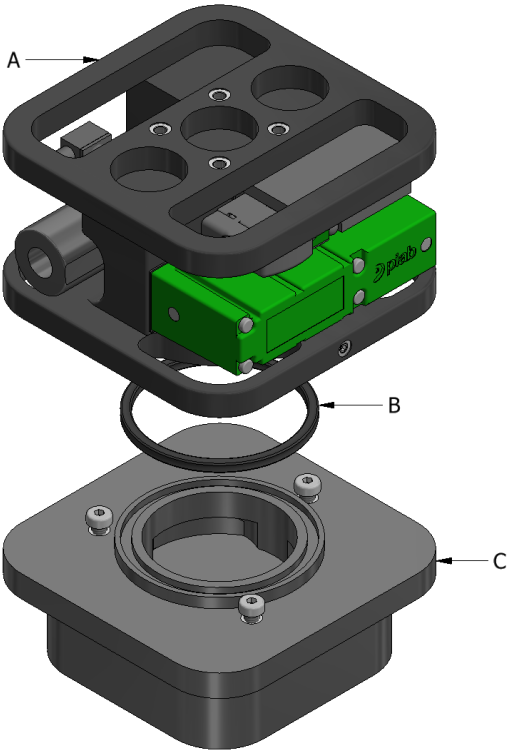
Parts diagram

Part diagram for pump unit



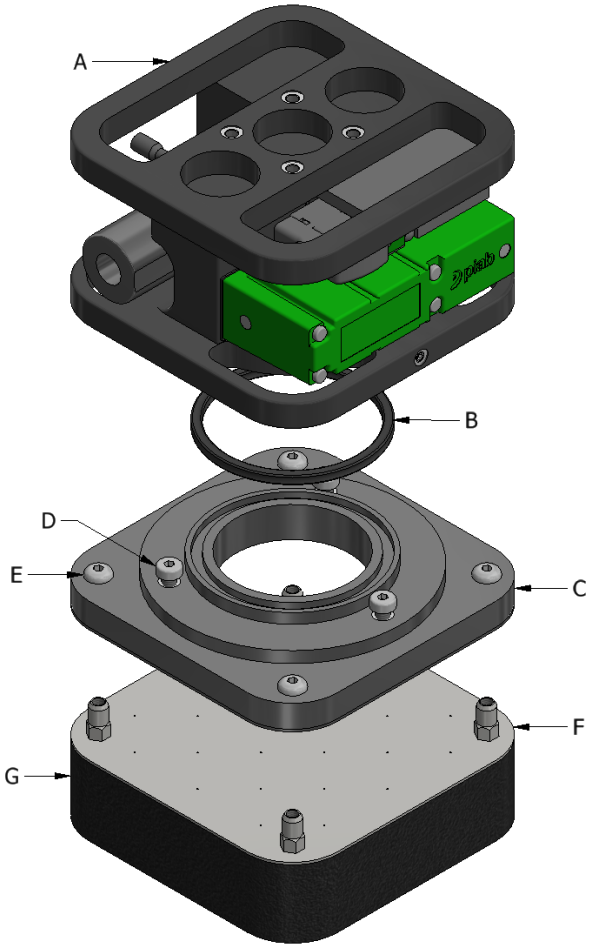
Pos.	Description
A	Plastic basic body
B	Ejector piCHIP SX422
C	Solenoid valve EV 3/2 N.C
D	Silencer
E	Vacuum sensor, analogue output 1 to 5 V connector Ø4 mm
F	M8 3 pole male connector
G	Metal threaded insert for quick change system lock

Part diagram for pump unit + Bag cup module



Pos.	Description
A	Pump unit
B	X-RING
C	Bag cup plastic body
D	Screw for connection to pump unit

Part diagram for pump unit + Flow reduction module



Pos.	Description
A	Pump unit
B	X-RING
C	Flow reduction module plastic body
D	Screw for connection to pump unit
E	Fixing Screws for technical foam with mounting plate
F	Technical foam with mounting plate
G	Technical foam

Maintenance

	- Remove the old foam. - Clean the metal plate from any adhesive and dust residues (e.g. with solvent) - Attention: Be careful that the holes are not blocked by any kind of residue, if they are, clean them.
	- Remove the silicon paper from the foam.
	- Align the holes on the metal plate and on the foam - Fix the new foam on metal plate
	- 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

Maintenance plan

	Daily	Weekly	Monthly	Every 6 months	Every 12 months
Check Max vacuum level of the ejector		•			
Check the micro holes			•		
Check the silencer			•		
Check tightenings				•	
Check the foam	•				
Check supply air pressure		•			
Check the electrical connection			•		
Check the air connection		•			
Check the general condition					•
Clean gripper exterior				•	

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	change the ejector version
	Dirty micro holes	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 (with filter version)	Clean
	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.

Technical data

Type	Air consumption at 0.5 MPa (Nl/s)
KCS.XXXX.SX421.XX.XXX.XXXXXX.XX	2.21 (1 cartridge inside)
KCS.XXXX.SX422.XX.XXX.XXXXXX.XX	4.42 (2 cartridge inside)

Type	Air consumption at 0.5 MPa (Nl/s)
KCS.XXXX.SX121.XX.XXX.XXXXXX.XX	0.72 (1 cartridge inside)
KCS.XXXX.SX122.XX.XXX.XXXXXX.XX	1.44 (2 cartridge inside)

Pneumatic technical information

Description	Unit	SX42-ejector with (1-2 cartridge)
Feed pressure, optimal	MPa	0.5
Max vacuum at opt. pressure	-kPa	90
Air consumption at opt. pressure / cartridge	Nl/s	2.21
Max vacuum flow at opt. pressure/ cartridge	Nl/s	3.46

Description	Unit	SX12-ejector with (1-2 cartridge)
Feed pressure, optimal	MPa	0.5
Max vacuum at opt. pressure	-kPa	85
Air consumption at opt. pressure / cartridge	Nl/s	0.72
Max vacuum flow at opt. pressure/ cartridge	Nl/s	1.22

Air

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

Temperature

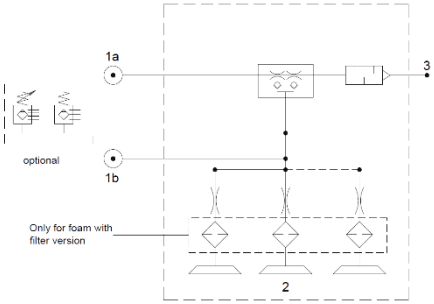
Description	
Operating temperature environment	0-50° (32-122F)
Operating temperature workpiece	0-50° (32-122F)

Specifications subject to change without notice

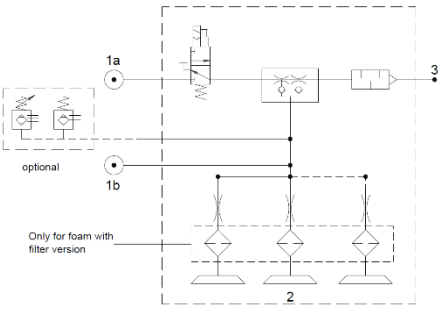
Pneumatic diagram

KCS.Q110.NXXX.FR SERIES PNEUMATIC SCHEME

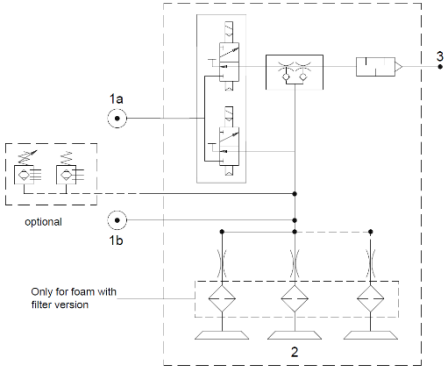
KCS.Q110.NXXX.FR.EJECTOR.BASE



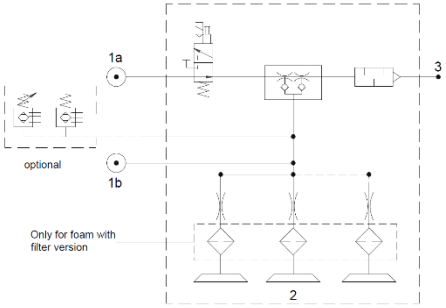
KCS.Q110.NXXX.FR.EJECTOR.V1



KCS.Q110.NXXX.FR.EJECTOR.V2



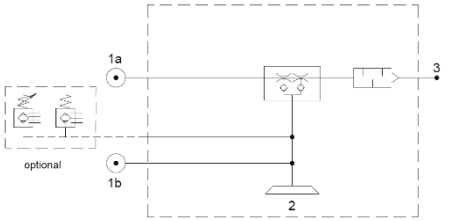
KCS.Q110.NXXX.FR.EJECTOR.V3



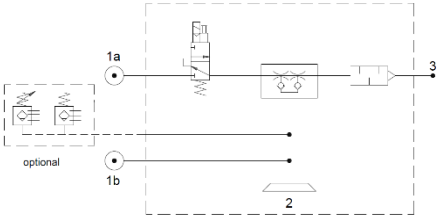
1a = PRESSURE AIR SUPPLY FOR VACUUM
1b = PRESSURE AIR SUPPLY FOR BLOW OFF
2 = VACUUM
3 = EXHAUST

KCS.Q110.BC SERIES PNEUMATIC SCHEME

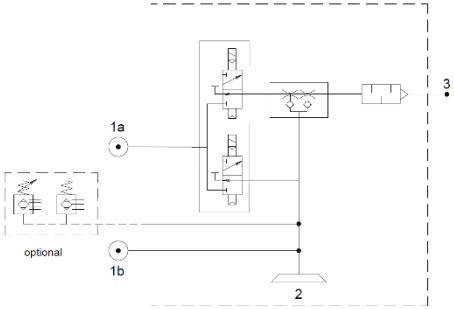
KCS.Q110.BC.EJECTOR.BASE



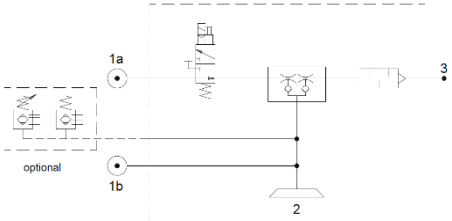
KCS.Q110.BC.EJECTOR.V1



KCS.Q110.BC.EJECTOR.V2



KCS.Q110.BC.EJECTOR.V3



1a = PRESSURE AIR SUPPLY FOR VACUUM
1b = PRESSURE AIR SUPPLY FOR BLOW OFF
2 = VACUUM
3 = EXHAUST

Spare parts

Art. No	Description
0211607	Ejector piCHIP SX121
0211608	Ejector piCHIP SX122
0211610	Ejector piCHIP SX421
0211612	Ejector piCHIP SX422
0211613	Vacuum sensor analogue output 1 to 5 V connector Ø4 mm
0107731	Vacuum switch, adjustable, PNP NO LM8
3216009	Silencer
0209259	Solenoid valve EV 3/2 N.C
0211614	Solenoid valve EV 2x3/2 N.C / N.C
0211305	Solenoid valve EV 3/2 N.O
0211615	X-ring NBR 56.74x 3,53

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