KCS SERIES ASSEMBLY MANUAL

Rev: 02

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INDEX

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 parts of the system are concerned, it is sufficient to subdivide the different materials for a correct recycling by casting.

Identification data and product number

Example of label:

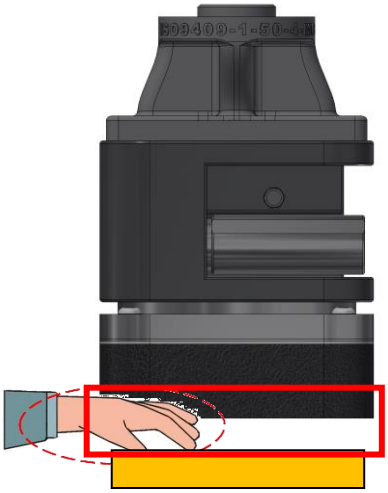
piab

Kenos Code: K-06-00083-00
Type model product: KCS.Q110.N301.110.FR6.SX422.X.X.50
Item no: 9936329
Foam spare part no: 9936294
Foam spare part MP no: -
Country of origin: ITALY -- 29/01/2019 --

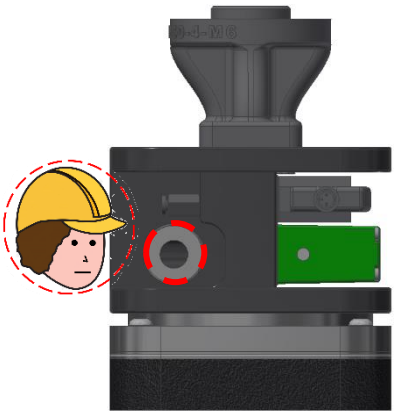
Each product is identified by a label on which the reference data of the same are indelibly marked.
For any communication with PIAB or service centers always quote these references.

2. DANGEROUS AREAS

Areas with danger of crushing



Areas with danger of air ejection



Notes for the final manufacturer of machinery

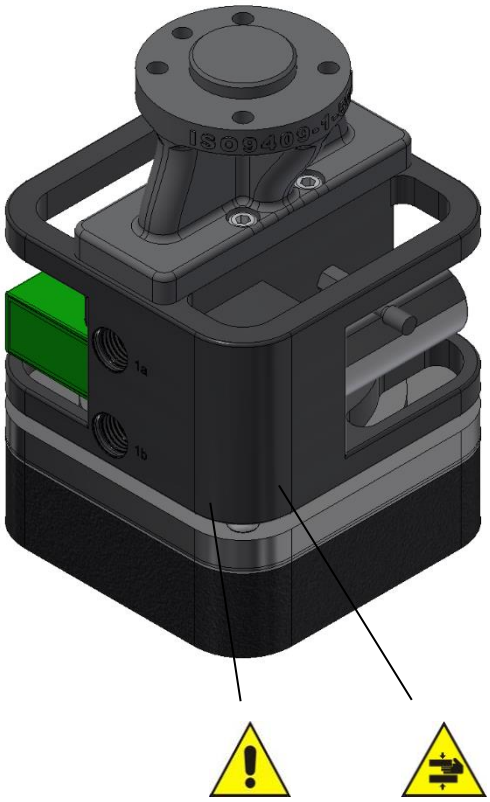
It is prohibited stopping or passing through the work area of the gripper module. In case of electrical or pneumatic supply failure, the load handled by the module is released.

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
	Generic manual: 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

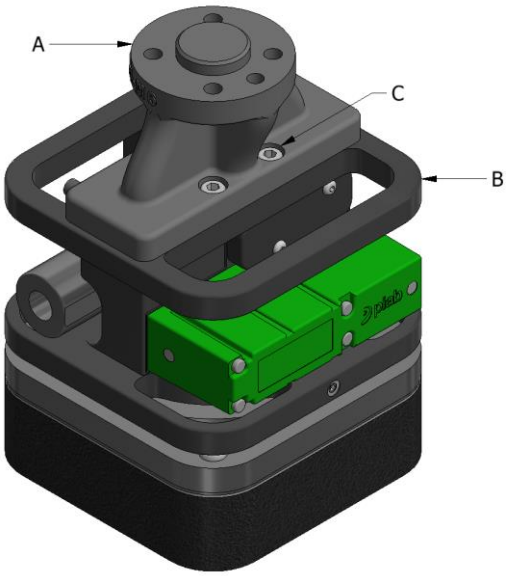
Essential Health and Safety Requirement	**Compliance**
1 ESSENTIAL SAFETY AND PROTECTION OF HEALTH	
1.1 General considerations	
1.1.1 definitions	√
1.1.2 Principles of safety integration	√
1.1.3 Materials and products	√
1.1.4 Lighting	
1.1.5 Design of machinery to facilitate its handling	√
1.1.6 Ergonomics	
1.1.7 Jobs	
1.1.8 Seats	
1.2.1 Safety and reliability of control systems	
1.2.2 Control devices	
1.2.3 Startup	
1.2.4 Shutdown	
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	
1.3 Measures of protection against mechanical hazards	
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	
1.4 Required characteristics of guards and protection devices	
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**
1.5 Risks due to other hazards	
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	
1.6 Maintenance	
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	√
1.7 Informations	
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 adapter system

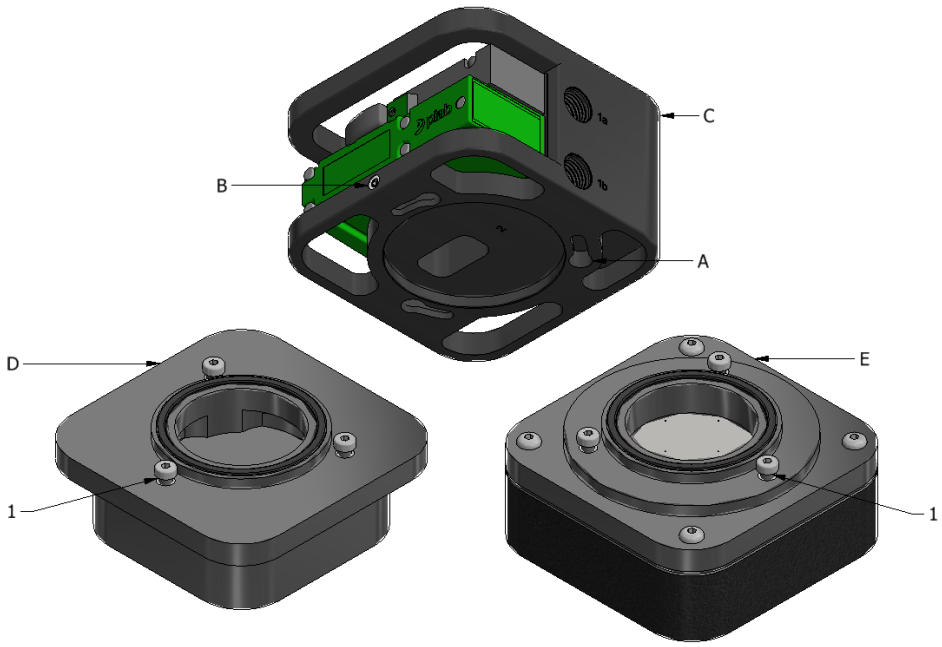
The pump unit is mounted on the special adapter system.



Pos.	Description
A	Special adapter system
B	Pump unit
C	Adapter fixing screws

b. Quick change system

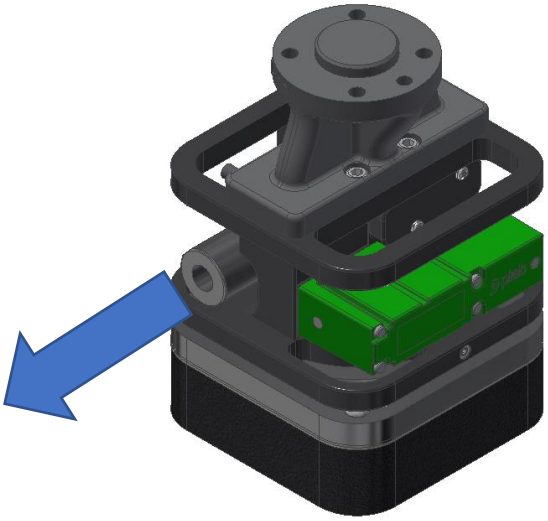
The pump unit and the gripper modules are connected by a quick change system.



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

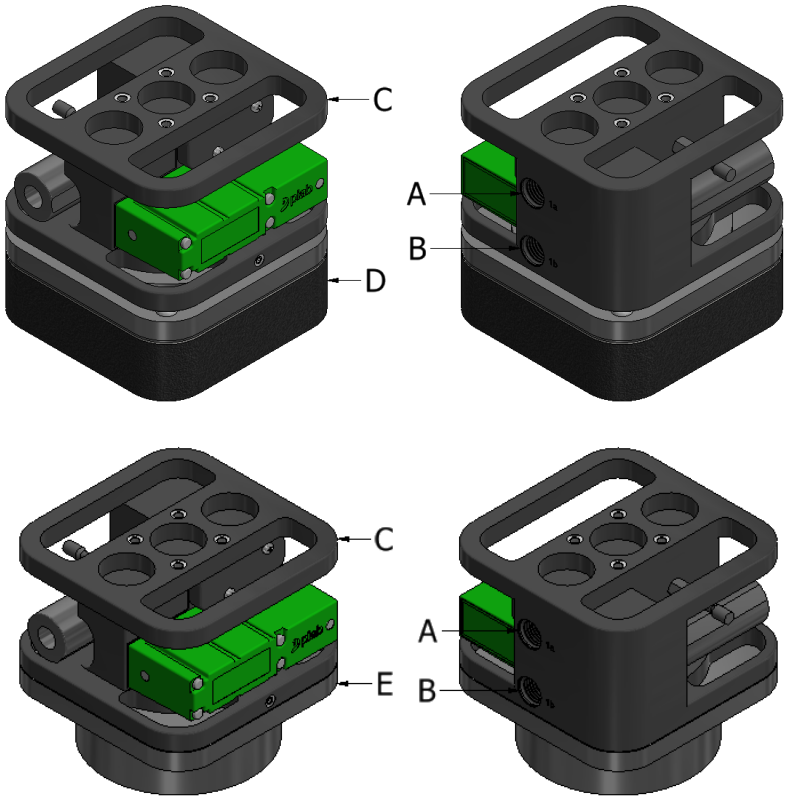
Pos.	Description
A	Quick change system
B	Metal threaded insert for quick change system locking
C	Pump unit
D	Bag cup unit
E	Foam gripper unit

c. Ejector exhaust



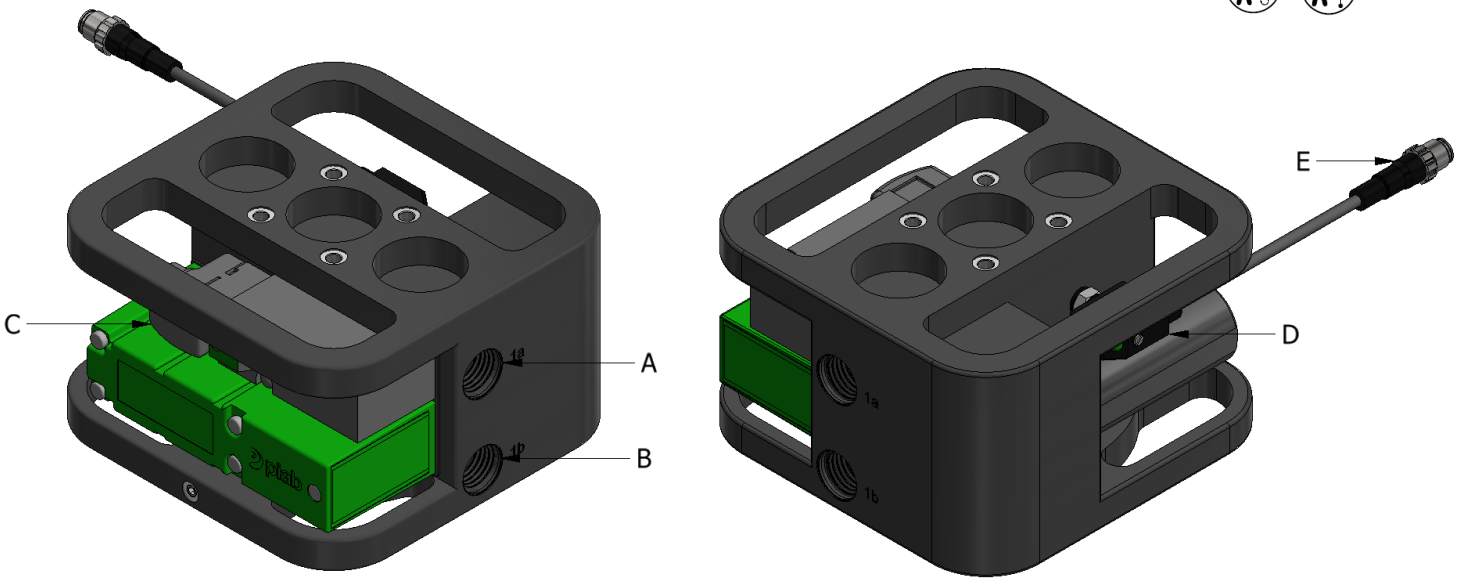
The blue arrows show the exhaust air flow, DO NOT COVER the silencer.

d. Pneumatic connection basic version



Pos.	Description
A	Compressed air connection G1/8" for vacuum (1a)
B	Compressed air connection G 1/8" for blow-off (1b) or vacuum monitoring
C	Pump unit
D	Foam gripper unit
E	Bag cup unit

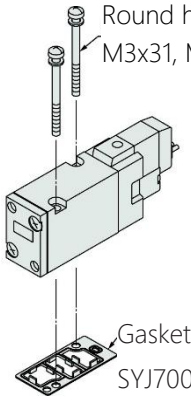
e. Connecting integrated solenoid valve (V1 / V3) with vacuum sensor version



Pos.	Description
A	Compressed air connection G 1/8" for solenoid valve
B	Compressed air connection G 1/8" for blow off or vacuum monitoring
C	Solenoid valve, vacuum, N.C. / N.O.
D	Vacuum sensor
E	Connector M8 3 pin male

Solenoid valves characteristics

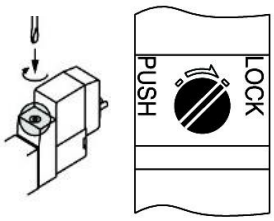
Fluid	Air
Operating pressure range (MPa/psi)	0.15-0.7/22-87
Operating temperature (°C/F)	-10 +50/14-122 without icing
Manual override	Push-locking slotted style
Lubrication	Not required
Impact/Vibration resistance (m/s^2)	150/30
Electrical connection	Connector M8 3 pole male
Coil rated voltage (Vcc)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



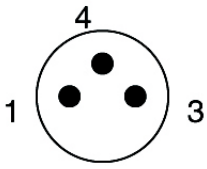
Push-turn slotted locking type (Type D)

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:

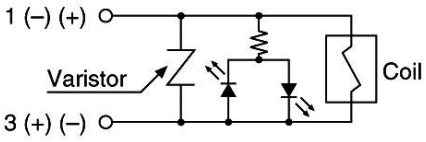


⚠ Caution, when operating the locking type D with a screw driver, turn it gently using a watchmakers screw driver. [Torque: Less than 0.1 Nm/ 0.07 lbf]



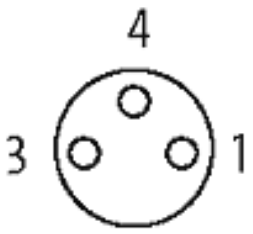
Solenoid valve side pin wiring diagram (for WA type)

With light/surge voltage suppressor (□ U)



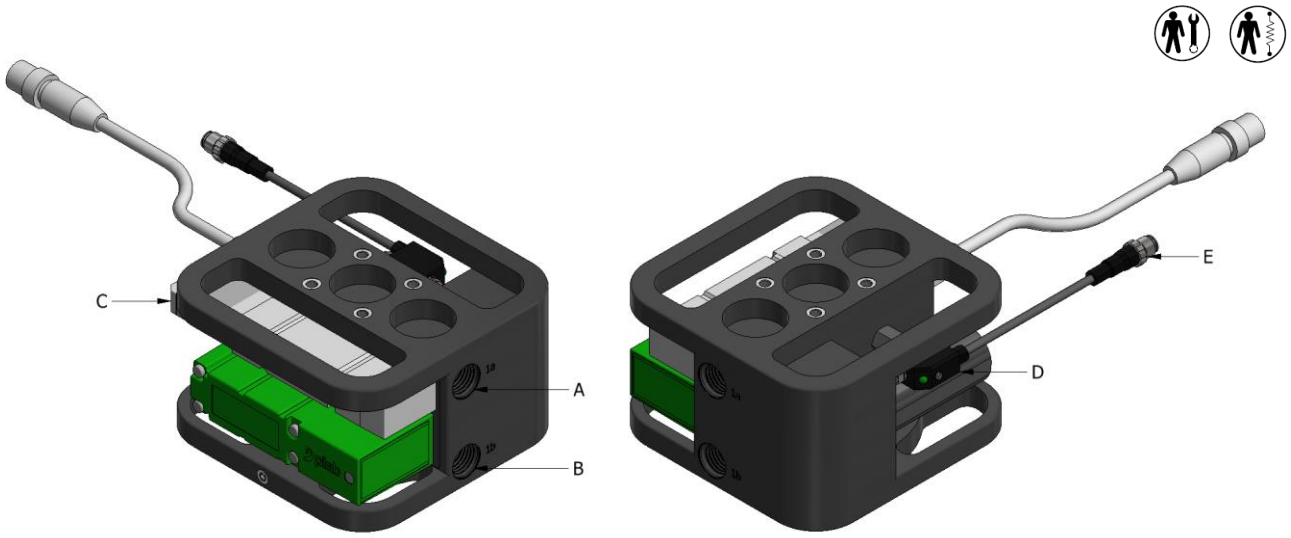
Specifications for solenoid valve connector

Number and section of conductors (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 (+)



► 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.
► Do not use a tool to mount the connector, as this may cause damage. Only tighten by hand. (0.4 to 0.6 Nm, (0.30 to 0.44 lbf))
► 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.

f. Connecting integrated solenoid valve (V2) with vacuum sensor version



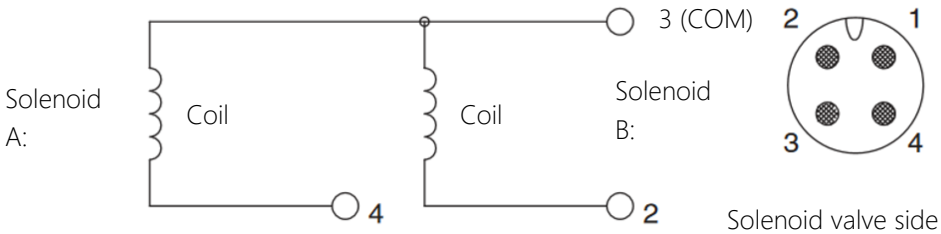
Pos.	Description
A	Compressed air connection G 1/8" for solenoid valve
B	Compressed air connection G 1/8" for blow off or vacuum monitoring
C	Solenoid valve, vacuum and blow-off N.C. / N.C.
D	Vacuum sensor
E	Connector M8 3 pin male

Solenoid valves characteristics

Fluid	Air
Operating pressure range (MPa/psi)	0.15-0.7/22-87psi
Operating temperature (°C/F)	-10 +50 / 14-122 without icing
Manual override	Non-locking push type
Lubrication	Not required
Impact/Vibration resistance (m/s^2)	150/30
Electrical connection	M12 4 pin waterproof connector, Male
Coil rated voltage (Vcc)	24
Allowable voltage	± 10% rated voltage
Current consumption (mA)	27
Surge voltage suppressor	Zener Diode
Indicator light	LED
Solenoid valve A	Vacuum
Solenoid valve B	Blow off

M12 Waterproof connector wiring specifications

4 pin connector M12 plug



Circuit diagram

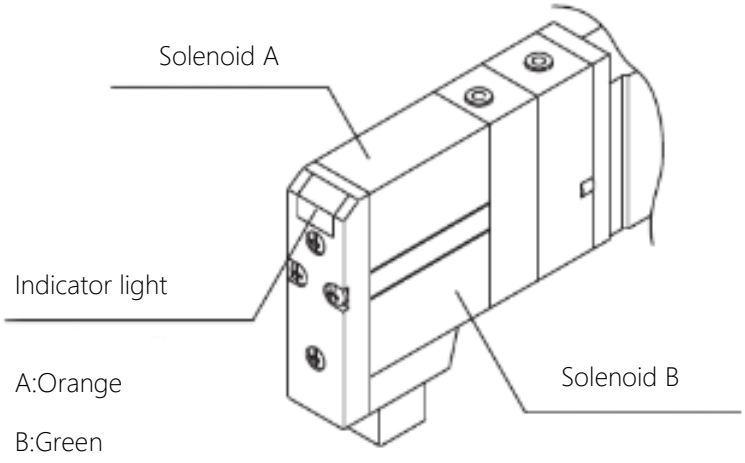
Solenoid valve side pin wiring diagram

Note: Solenoid valves have no polarity.

Connection destination (female side) connector cable

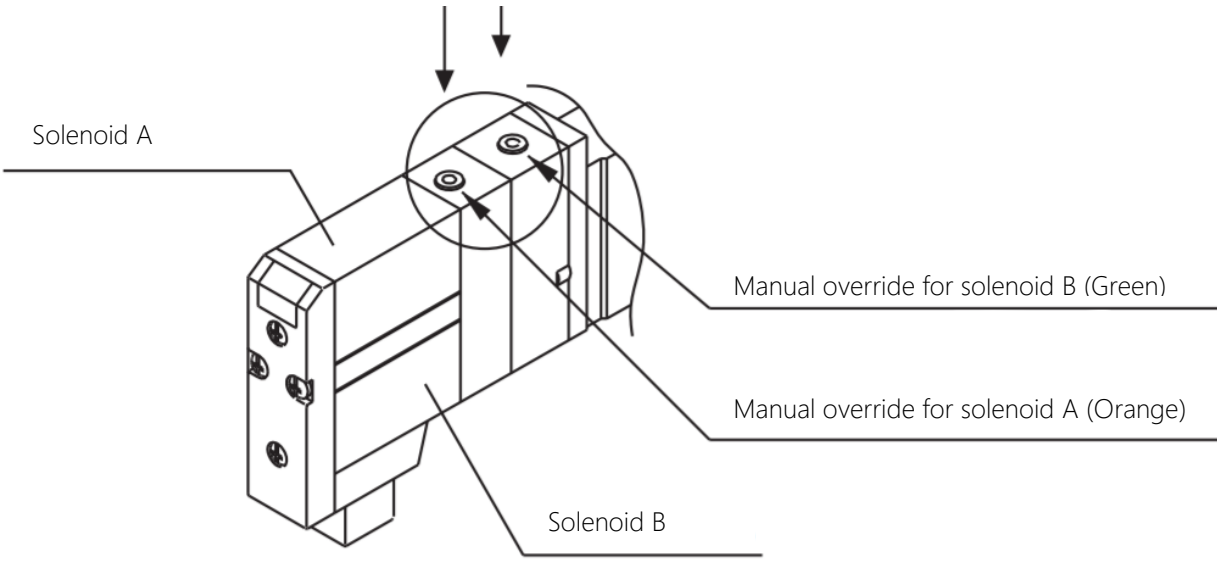
Connector Size	Pin	Manufacturer	Applicable series
M12	4	Correns Corporation	VA-4D
		OMRON Corporation	XS2
		Azbil Corporation	PA5-41
		Hirose Electric OMRON Corporation Ltd.	HR24
		DDK Ltd.	CM01-8DP4S

Note: This connector is a female connector for (1) relay output model and (2) single unit / sub-plate.



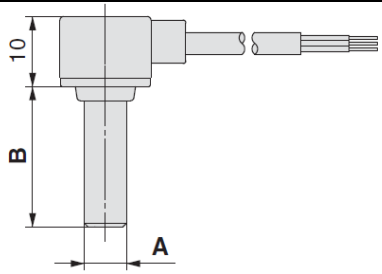
Caution

When equipped with indicator light and surge voltage suppressor, the light window turns orange when solenoid A is energized, and it turns green when solenoid B is energized.



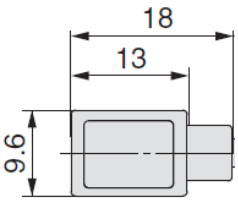
Specifications for vacuum sensor "MA" version

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
Electrical connection	Connector M8 3 pole male



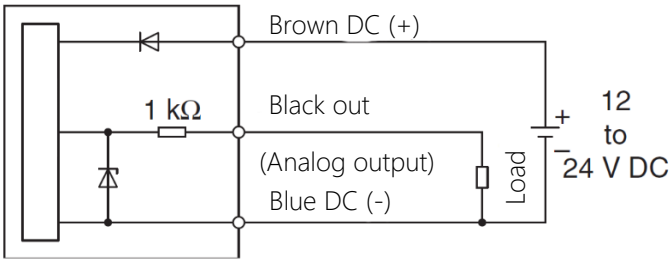
A = Ø 4 mm

B = 18 mm

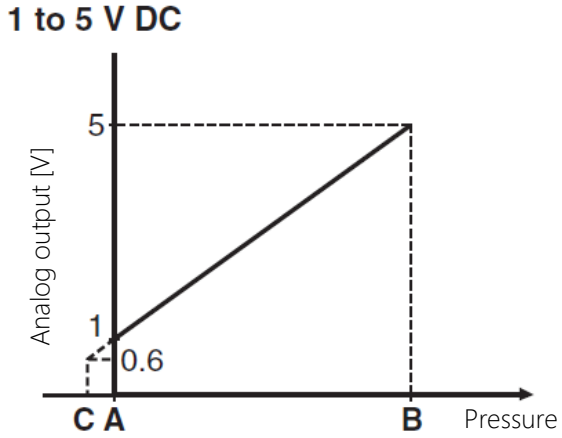


Specifications for vacuum sensor pipping

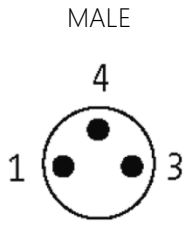
Port size	Ø 4 reducer
Case	PBT
Pressure sensing section	Silicon, O-ring: NBR
Max. curvature ray for flexing use	10 x external diameter
Case	PUR (UL/CSA)



Main circuit



M8 3 poles male connector:

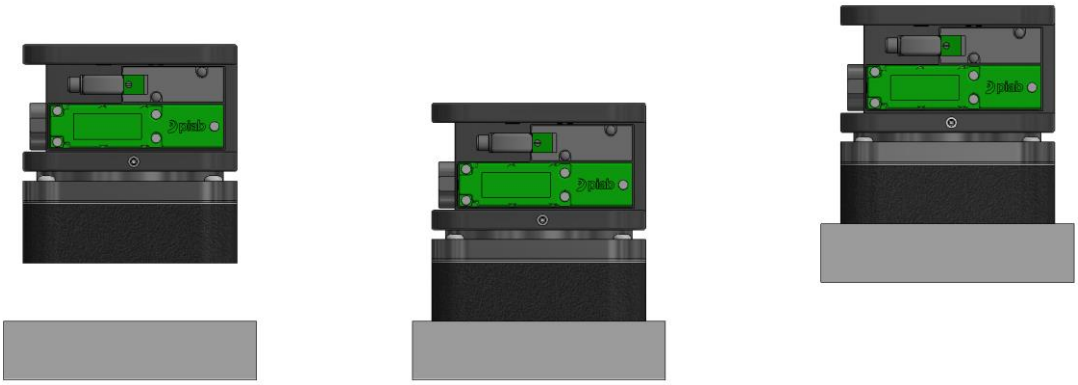


Connections:	
▶3	Blue (-)
▶4	Black
▶1	Brown (+)

6. WORKING CYCLE DETAILS

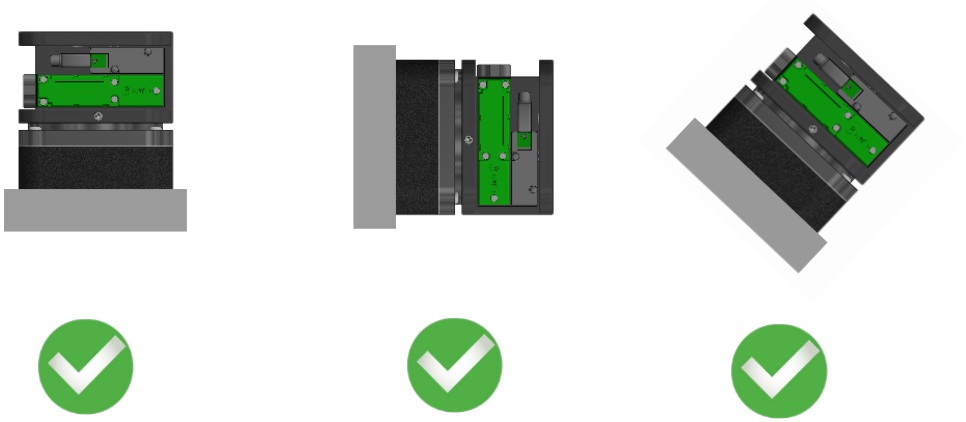
Working cycle details for Flow reduction and Bag cup version:

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.

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

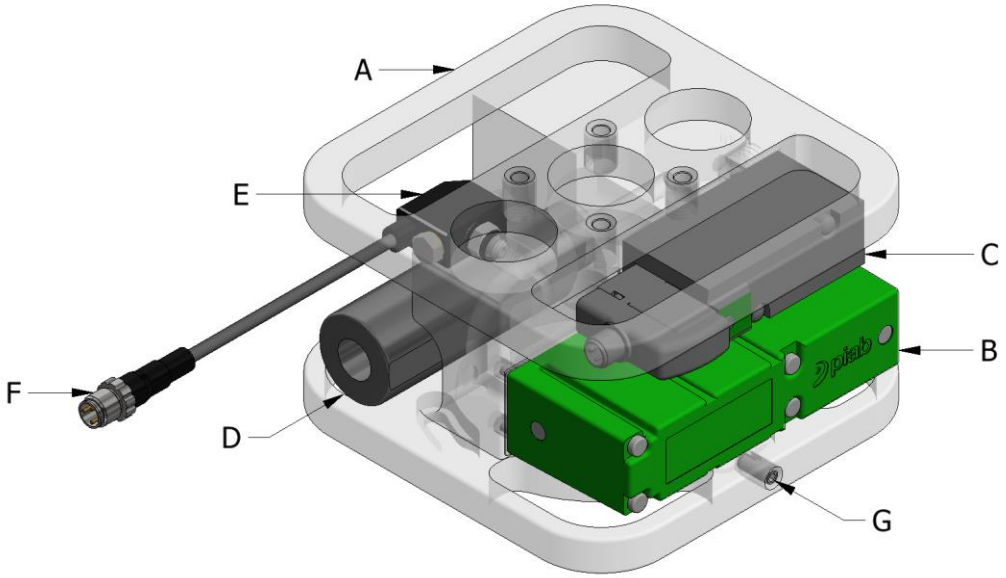


► Stopping or passing through the work area of the gripper module is prohibited, as in case of electrical or pneumatic supply failure, the load handled by the module is released.
► With the Flow reduction technology, the vacuum value in the gripper is the real vacuum level on the object, so in this case 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.

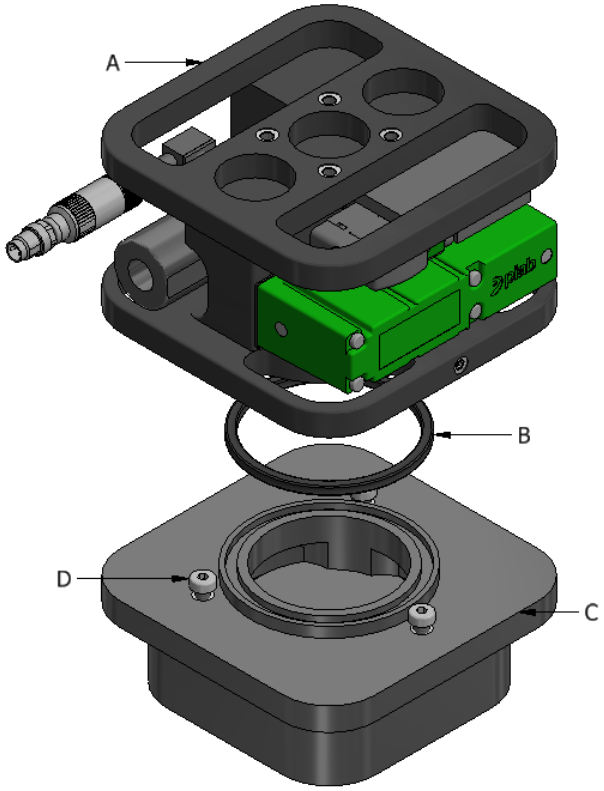
7. PARTS LIST

a. Pump unit parts list



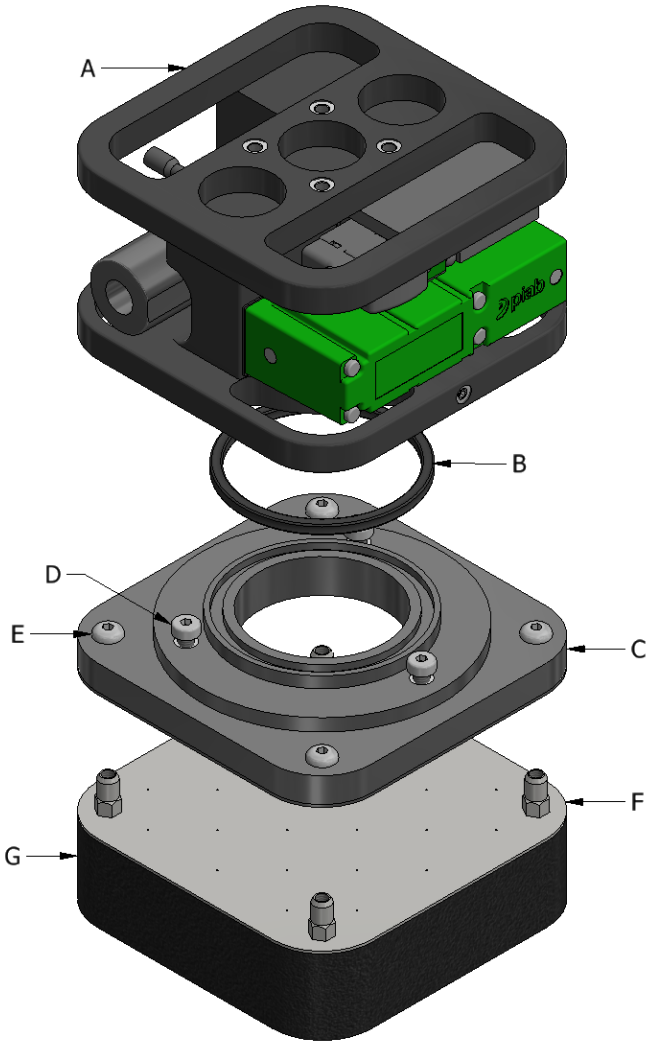
Pos.	Description
A	Plastic basic body
B	Ejector piCHIP SX42 or SX12
C	Solenoid valve
D	Silencer
E	Vacuum sensor
F	M8 3 pin male connector
G	Metal threaded insert for quick change system lock

b. Pump unit + Bag cup unit parts list



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

c. Pump unit + Foam gripper unit parts list

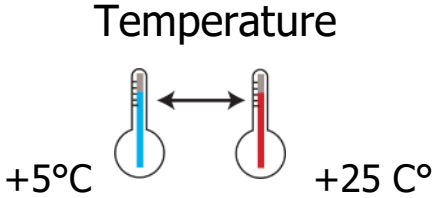


Pos.	Description
A	Pump unit
B	X-Ring
C	Foam gripper plastic body
D	Screw for connection to pump unit
E	Fixing Screws for technical foam with mounting plate
F	Mounting plate
G	Technical foam

8. MAINTENANCE

a. 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. 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 In a dry environment

b. 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 tightening's		•			
Check the foam	•				
Check supply air pressure		•			
Check the electrical connection			•		
Check the air connection		•			
Check the general condition					•
Clean gripper exterior				•	

9. PROBLEMS/SOLUTIONS

Problem	Possible cause	Solution
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 preliminary tests with original samples. We are available for running such tests.

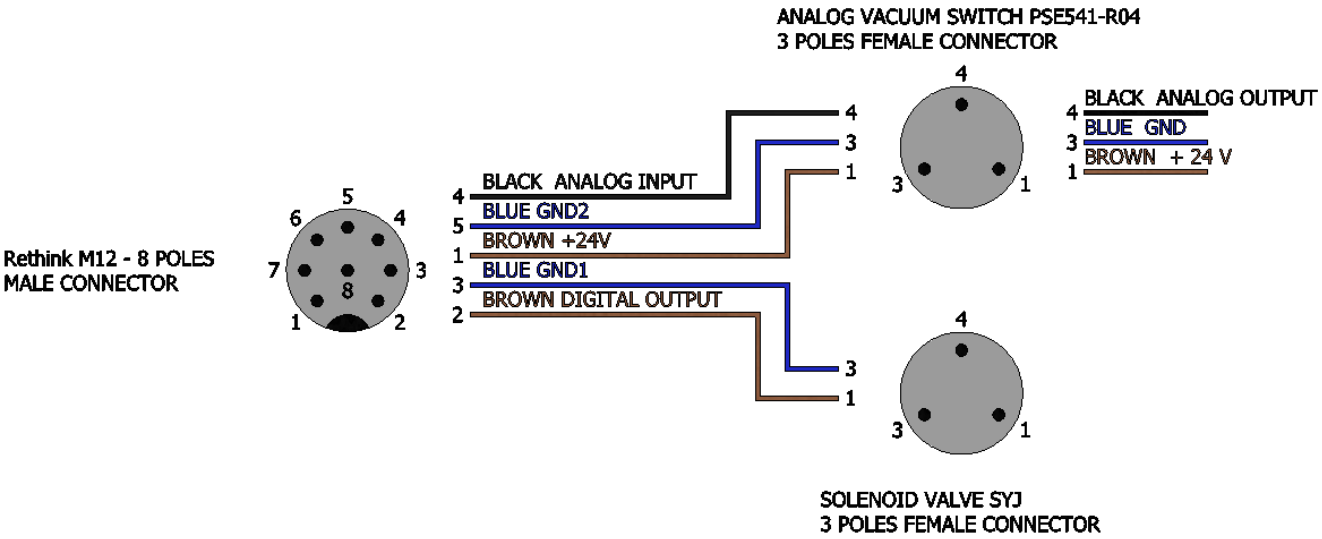
10. ACCESSORIES

a. Standard cable

Item n. PIAB	Description
0108141	Cable M8 3-pin female L=2m
0121817	Cable M12 4-pin female L=5m

b. Special cable Rethink

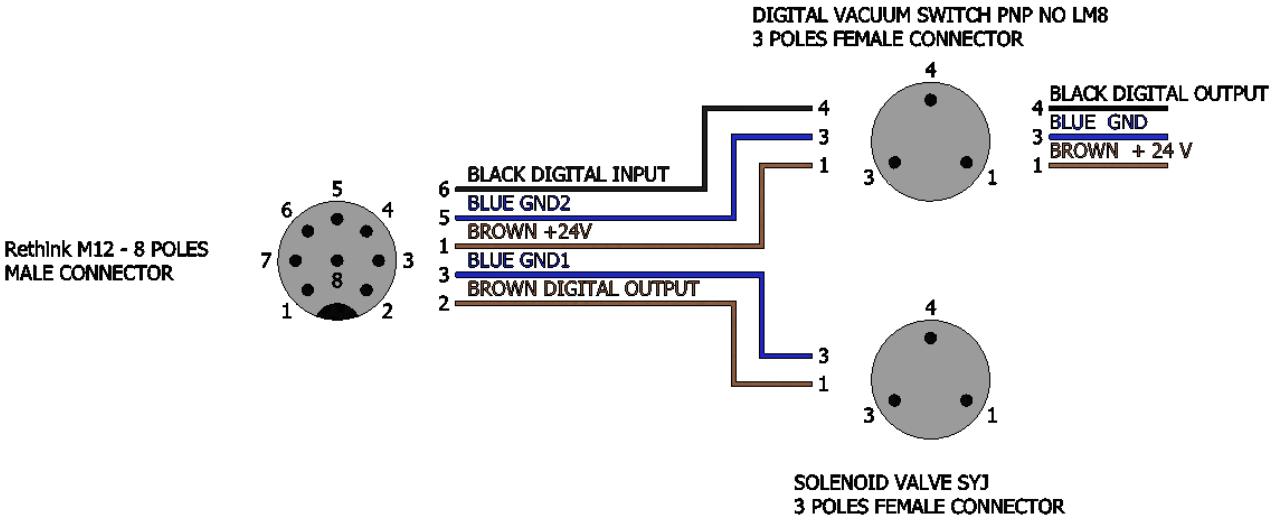
Y cable RTH-KCS M12 8p V1/V3-MA 250mm



Cable specification

Item n. PIAB	Description	Cable color	Function
0212286	Y cable RTH-KCS M12 8p V1/V3-MA 250mm	Yellow	Monitoring connection
		Black	Solenoid valve connection

Y cable RTH-KCS M12 8p V1/V3-MD 250mm

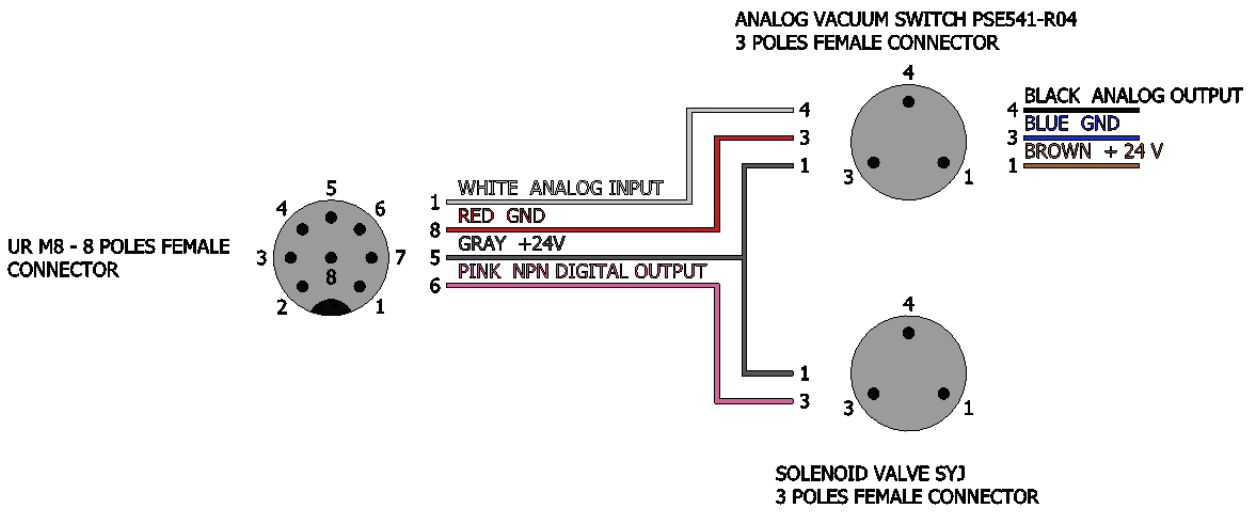


Cable specification

Item n. PIAB	Description	Cable color	Function
0212287	Y cable RTH-KCS M12 8p V1/V3-MD 250mm	Yellow	Monitoring connection
		Black	Solenoid valve connection

c. Special cable UR

Y cable UR-KCS M8 8p V1/V3-MA 250mm



Item n. PIAB	Description
0212281	Y cable UR-KCS M8 8p V1/V3-MA 250mm

11. TECHNICAL DATA

a. Air consumption

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 cartridges 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 cartridges inside)

b. Pneumatic technical documentation

Descriprtion	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

Descriprtion	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

c. Air specifications

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

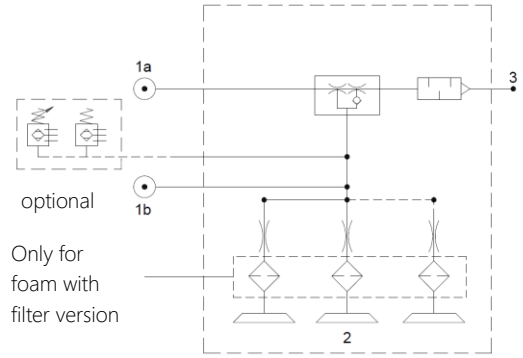
d. Temperature specifications

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

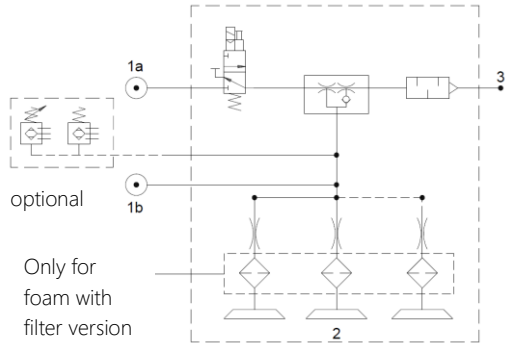
12. PNEUMATIC DIAGRAM

a. KCS.Q110.NXXX.FR SERIES PNEUMATIC DIAGRAM

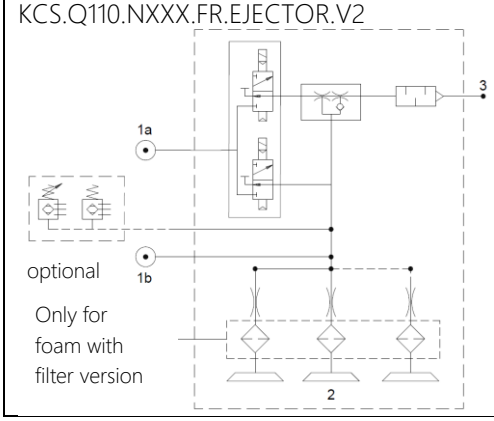
KCS.Q110.NXXX.FR.EJECTOR.BASE



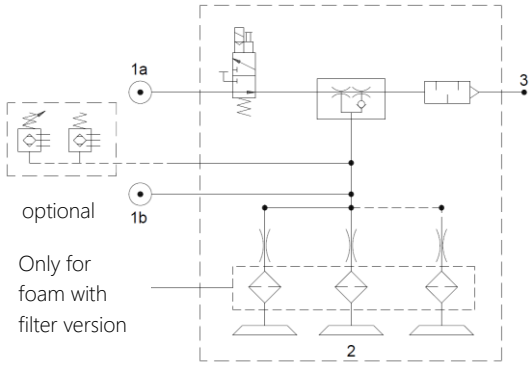
KCS.Q110.NXXX.FR.EJECTOR.V1



KCS.Q110.NXXX.FR.EJECTOR.V2



KCS.Q110.NXXX.FR.EJECTOR.V3



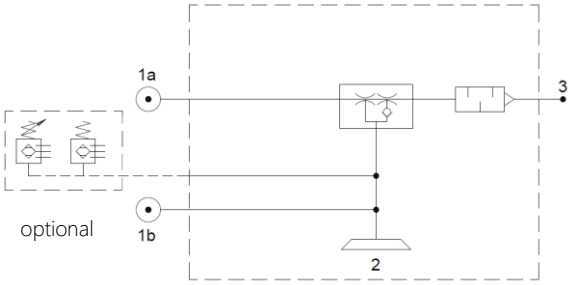
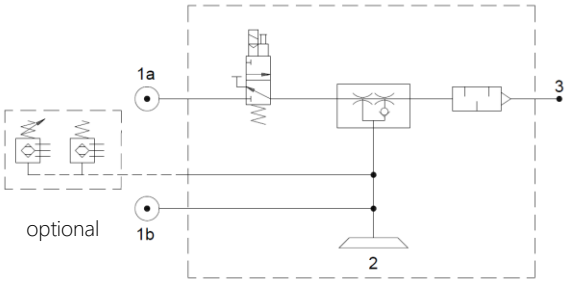
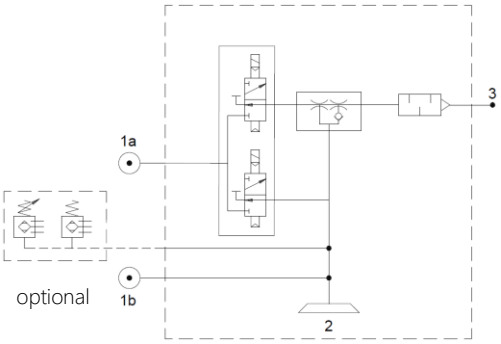
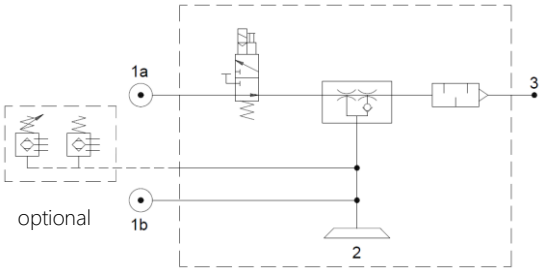
1a = PRESSURE AIR SUPPLY FOR VACUUM

1b = PRESSURE AIR SUPPLY FOR BLOW OFF

2 = VACUUM

3 = EXHAUST

b. KCS.Q110.BCX SERIES PNEUMATIC DIAGRAM

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

13. SPARE PARTS

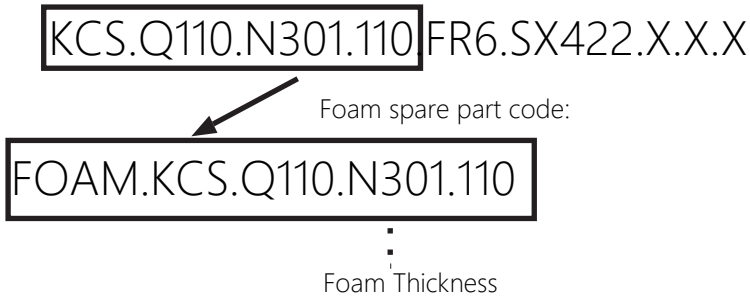
a. Single spare parts list

Item n. PIAB	Descriprtion
0205575	COAX® cartridge SX12
0205724	COAX® cartridge SX42
0205356	KCS- Ejector gasket
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 228 56,74 x 3,53

b. Foam spare parts

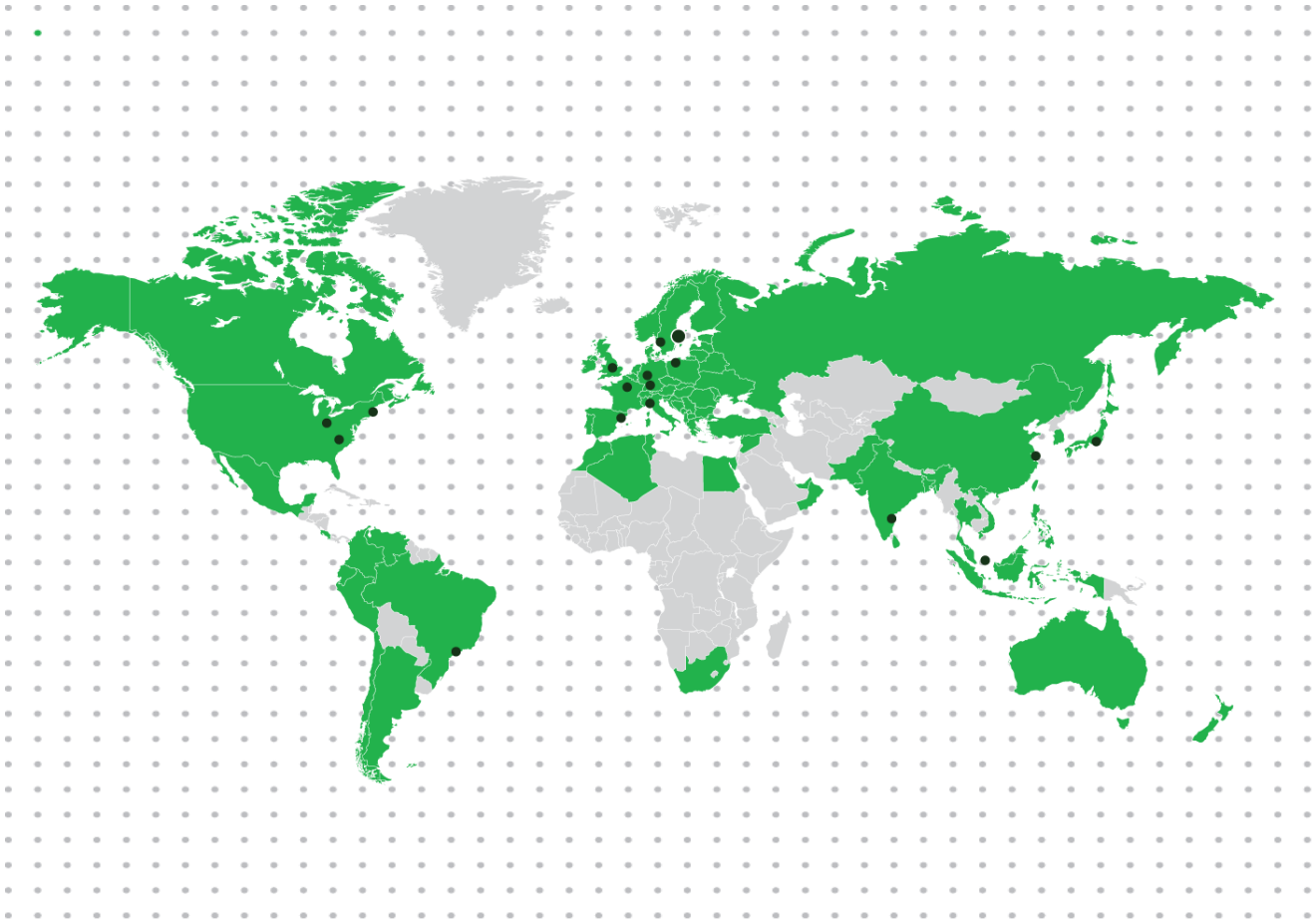
If you are unsure which spare part you need, please check the part code of your configured KCS product, the first part of the product code is reused in the foam spare part code, when you put "FOAM" in front, see below.

KCS product code:



14. WARRANTIES

- The Seller gives its Customers a one-year warranty from the receipt of the Products, accessories, control devices end 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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