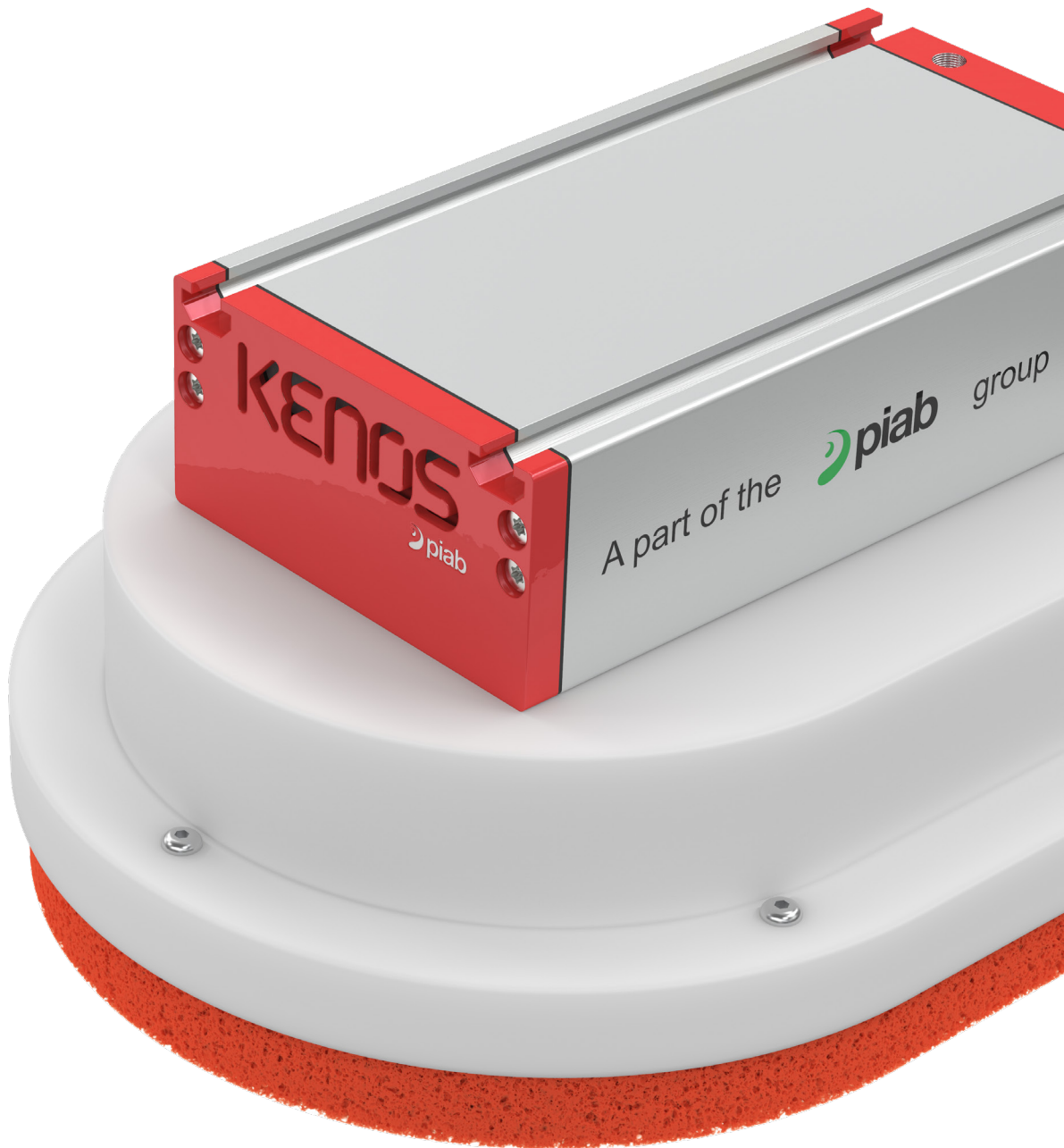


Manual

KSG Series

Kenos[®] Sack Gripper



KENOS



This manual is available in the following languages at piab.com:



Chinese



English



French



German



Italian



Japanese



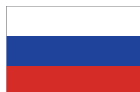
Korean



Polish



Portuguese



Russian



Spanish



Swedish

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1. Introduction to the manual

1.1 Revision history

September 2021 Revision 07 published

1.2 About the manual

- The responsible party for the production site must ensure that this manual will be read and understood.
- The section on safety should be studied extra carefully.
- The manual should be stored on a known and easily accessible place, which can be digital.
- Carefully study the applicable parts of the manual before performing service and maintenance of the equipment.

1.3 Safety signs used in the manual

Take note of all warning, mandatory and other signs in this manual. They have the following meaning:

1.3.1 Warning signs

	Warning! Breach of this information may result in death or serious injury!
	Warning! Vacuum force
	Warning! Exhaust
	Warning! Unrestricted exhaust
	Warning! Risk of crushing or entrapment of upper limbs

1.3.2 Mandatory signs

	Note! Information that needs extra attention!
	Wear eye protection
	Wear ear protection

1.3.3 Other signs

	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 for all the electrical interventions of regulation, maintenance and repairs.

1.4 Target group

This manual, especially the section about safety, shall be read by all staff who will perform any type of work with the product or equipment:

- Operating personnel
- Service and maintenance personnel
- Cleaning staff (cleaning of equipment and the area around it)

2. Safety instruction

2.1 General safety

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

The correct use of the pneumatic equipment within a system is the responsibility of the system designer or person responsible for the technical specifications.

The machine owner will certify the final commissioning according to the regulations in force for each individual country.

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 *explosion* of closed containers, and vacuum may lead to the *implosion* of closed containers.

Consider the possibility of pressure drops in the pneumatic supply line. Provide for a safety system that prevents the risk of load being released, in order to prevent personnel injury or machine damages.

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

Consider the emergency stop when designing the system.



Warning!
Vacuum force



Warning!
The discharge air has a high output speed. Do not obstruct the discharge of the gripper module.

2.2 Safe usage

It is up to the manufacturer of machinery to assess and convey the Personal Protective Equipment (PPE) needed by the operators or other personnel accessing to the work area.



Wear ear protection

The vacuum generator, even if silenced, makes noise: if necessary, wear suitable protection.



Wear eye 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.

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.



Warning!

- 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 insert hands in cavities, holes or openings, for example air discharge, openings or holes under the foam etc.



Warning!

- Never look into in cavities, holes or openings, for example air discharge, openings or holes under the foam etc.
- 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.

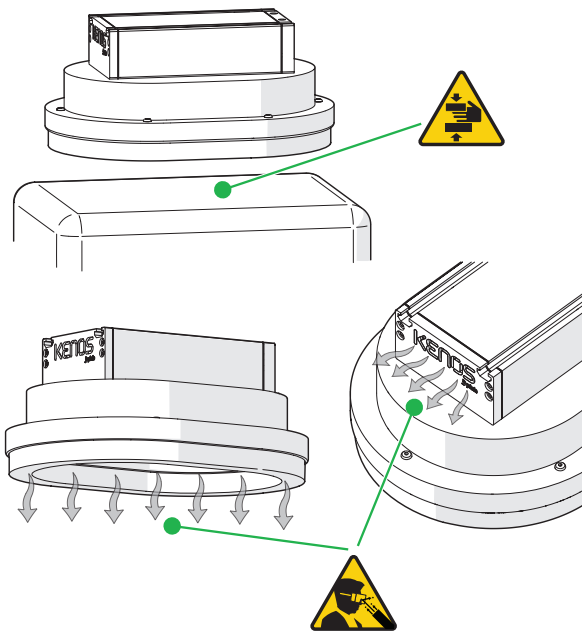


Figure 1 Areas of the KSG unit with warning signs.

2.2.1 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 and disassembly of the components, cut off voltage and pressure. Install and maintain the components only after thoroughly reading and understanding this manual.

2.2.2 Starting and operating

The final evaluation of the safety systems to be applied for starting up the product, after the assembly, is the task of the final manufacturer of machinery.

It is up to the final manufacturer of machinery to report the Personal Protective Equipment (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.

2.2.3 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.

2.2.4 Safety instructions



Warning!

The supply pressure should not exceed the recommended value of 7 bar (102 psi).

Handle the components with care.

During installation and maintenance, cut off voltage and pressure.

Follow the installation and commissioning instructions.

Modifying the components is prohibited. Handle the components with care.

Cleaning the environment and place of use is recommended.

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

2.2.5 Storage

For a correct storage of the product and its spare parts, avoid outdoor areas, areas exposed to the elements, direct sunlight and areas with excessive humidity. The environment must be sufficiently clean, arrange the system so that it has a stable base of support and make sure that there is no risk of unexpected movements.

2.3 Intended use

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

2.4 Misuse

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.

3. Introduction to KSG gripping system

3.1 Manufacturer

Piab AB
P.O. Box 4501
SE-18304 TÄBY
SWEDEN

3.1.1 Identification data

Each system is identified by a label with identification information, which is attached to the product.



Figure 2 Example of identification label.



Figure 3 Identification label attached to a KSG gripper.

For any communication with Piab AB or service centers always refer to the label information.

3.2 Compliance

Piab's vacuum gripping system KSG series is in conformity with:

- DIRECTIVE 2006/42/CE of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC.
- REACH (EC 1907/2006).



Note!

If the vacuum gripping system will be integrated and installed in another main system, a risk analysis needs to be carried out for the system as a whole.

For more information see *Appendix 1 - Essential Health and Safety Requirements - applied and respected (R.E.S.S.)*.

3.3 Overview and list of parts

3.3.1 Gripper, ejector version

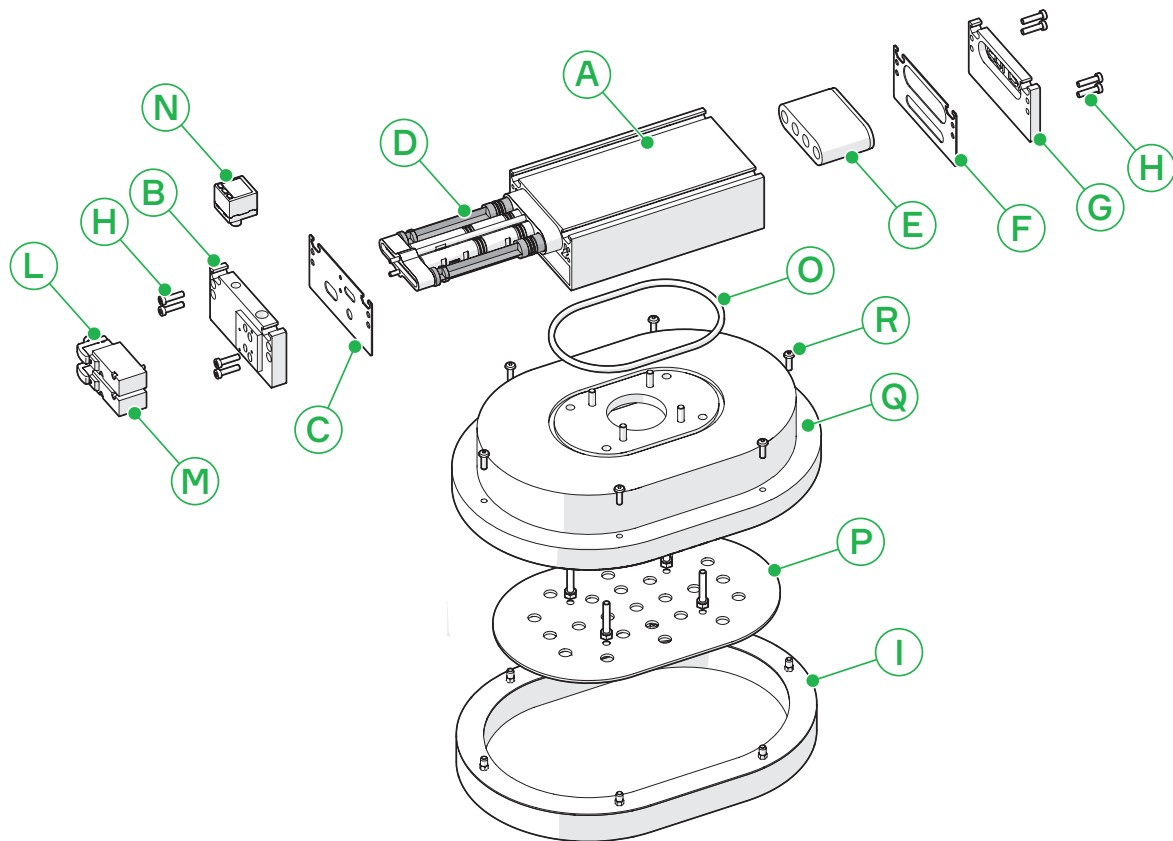


Figure 4 Gripper (ejector version)

- | | |
|-------------------------------------|--|
| (A) Basic body | (Q) Plastic body |
| (B) Supply cover | (R) Fixing screws for gripping seal |
| (C) Supply cover seal | |
| (D) Push in ejector | |
| (E) Silencer | |
| (F) Exhaust cover seal | |
| (G) Exhaust cover | |
| (H) Close cover screws | |
| (I) Gripping seal | |
| (L) Solenoid valve, vacuum | |
| (M) Solenoid valve, blow-off | |
| (N) Vacuum switch | |
| (O) Sealing cord | |
| (P) Adjustable metal plate | |

Features:

- Basic body is an extruded aluminum section.
- Supply/exhaust cover are made of aluminium properly finished.
- Gripping seal is made of natural rubber or aluminium.
- Push in ejector built of ONE or more multistage COAX® cartridge ejector. Air consumption 90 NI/min, each.
- Solenoid valves 3/2 NC or NO 24V DC.
- Digital vacuum switch 2 OUT digital, programmable, 24V DC.

3.3.2 Ejector body

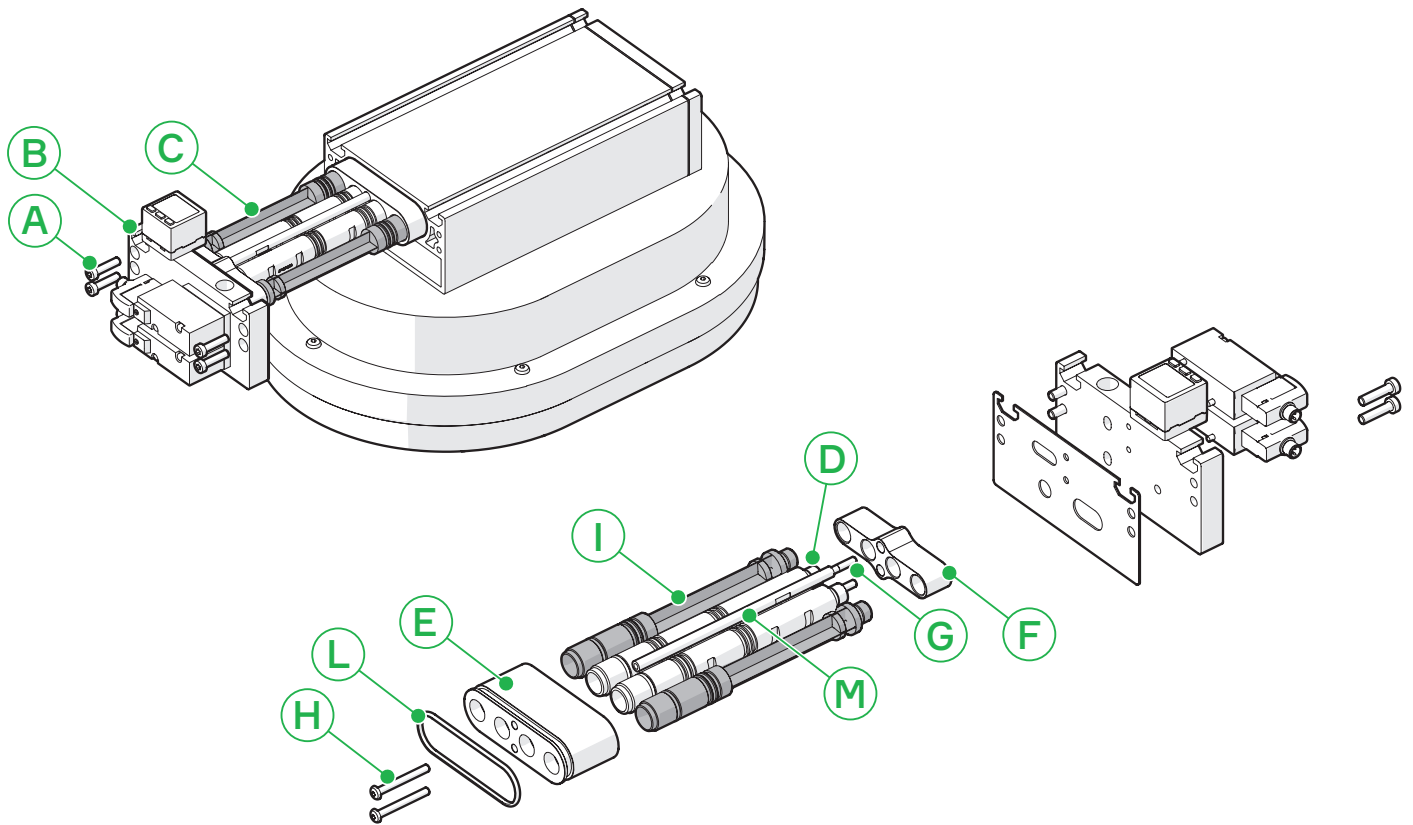


Figure 5 *Ejector body*

- 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

3.3.3 Gripper, BL version

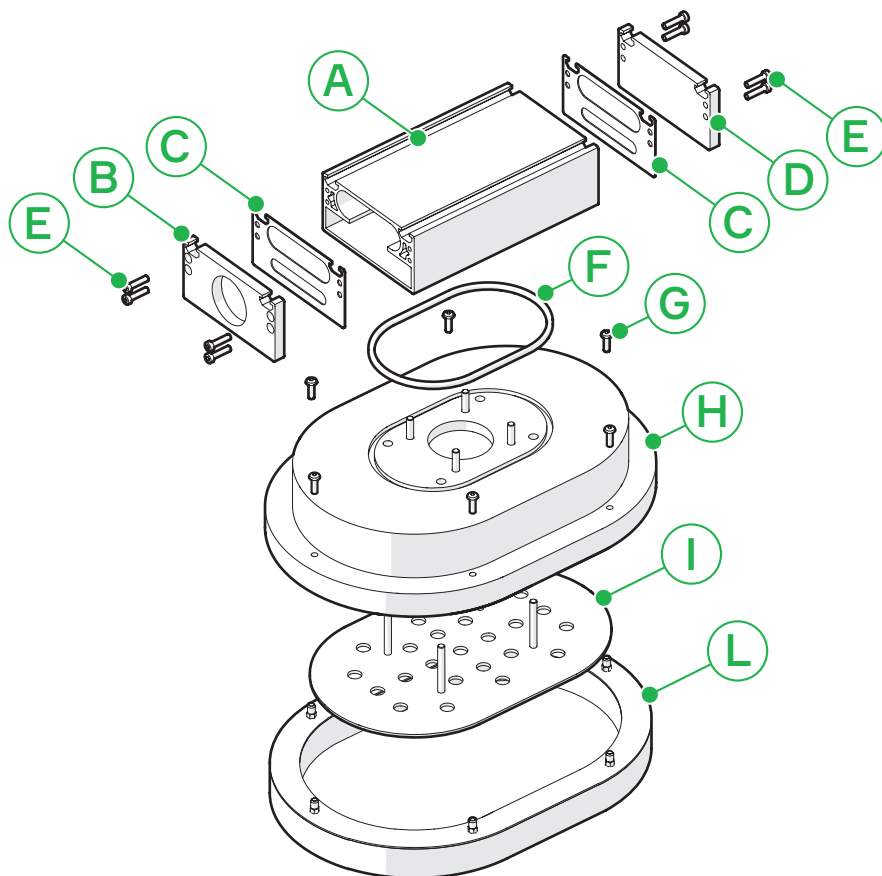


Figure 6 *Gripper (BL version)*

- A** Basic body
- B** Blower connection cover
- C** Exhaust cover seal
- D** Close cover
- E** Close cover screws
- F** Sealing cord
- G** Fixing screws for gripping seal
- H** Plastic body
- I** Adjustable metal plate
- L** Gripping seal

Features:

- Basic body is an extruded aluminium section.
- Blower/close covers are made of aluminium properly finished.
- Gripping seal is made of natural rubber or aluminium.

4. Technical data

4.1 Air consumption

Product/Customer code	Unit	Air consumption at 6 bar / 87.0 psi
KSG.X.XXX-XXX.XX.S2.XX.XX	NI/s [scfm]	3.5 [7.42]
KSG.X.XXX-XXX.XX.S3.XX.XX	NI/s [scfm]	5.25 [11.12]
KSG.X.XXX-XXX.XX.S4.XX.XX	NI/s [scfm]	7.0 [14.83]
KSG.X.XXX-XXX.XX.S5.XX.XX	NI/s [scfm]	8.75 [18.55]
KSG.X.XXX-XXX.XX.S6.XX.XX	NI/s [scfm]	10.5 [22.26]
KSG.X.XXX-XXX.XX.S7.XX.XX	NI/s [scfm]	12.25 [25.97]
KSG.X.XXX-XXX.XX.S8.XX.XX	NI/s [scfm]	14.0 [29.68]

4.2 Pneumatic technical information

Description	Unit	COAX® Si32-3 MIDI-cartridge (2-8 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]

4.3 Air

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

4.4 Temperature

Description	Unit	Value
Operating temperature environment	°C [°F]	0-50 [32-122]
Operating temperature workpiece	°C [°F]	0-50 [32-122]

5. Installation



Warning!

- 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.
- Handle the components with care.
- Modifying the components is prohibited.
- The electrical and pneumatic connections should be permanently connected to the component.
- Carefully follow the electrical wiring instructions, paying close attention to avoiding the short-circuiting of loads.
- 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.
- Compressed air may be dangerous if used by unskilled personnel. Assembling should be carried out by experienced and specially trained personnel.
- For fastening and supplying, solely use the bores and methods provided by the manufacturer.

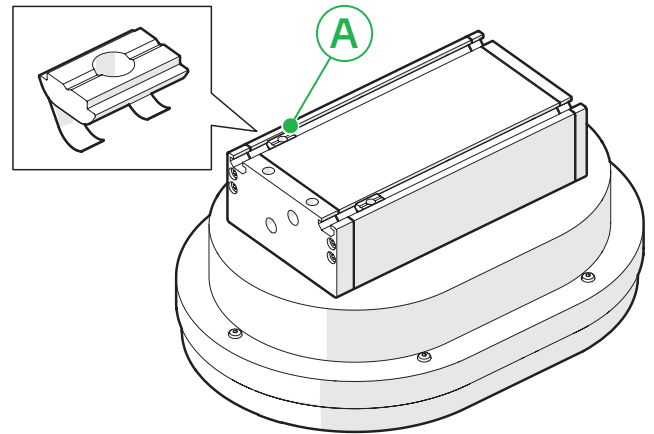


Figure 7 T-slot nuts secure the gripping system.

A T-slot nut

5.2 Mounting on a UR robot

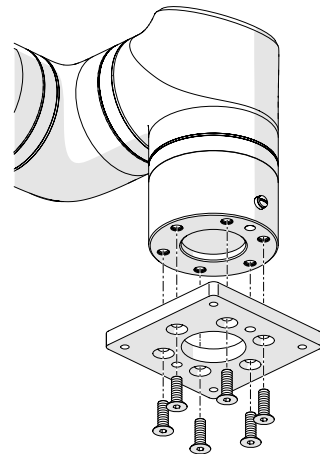


Figure 8 Attach the KSG mounting plate to the flange of the UR robot wrist with 6x M8 x 25 mm Hex socket countersunk screws.

5.1 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 is found in the Accessories section.

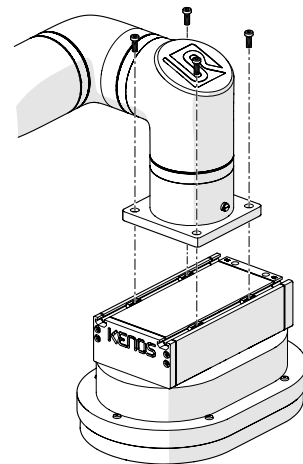


Figure 9 Attach the KSG mounting plate to the slot nuts on the KSG gripper with 4x M6 x 16 mm screws.

5.3 Ejector exhaust

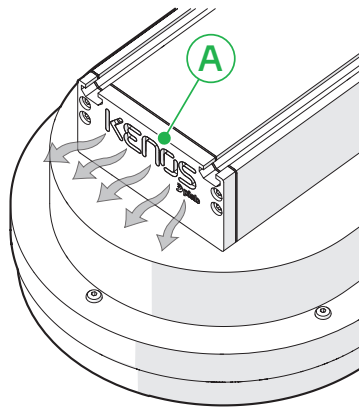


Figure 10 Ejector exhaust.

- (A)** Inline ejector exhaust - do not cover. The aspirated air escapes from the exhaust cover through the Kenos logo.



Warning!

Ejector exhausts need to be uncovered/unhindered. The aspirated air escapes from the exhaust cover through the KENOS logo - Do not cover!

5.4 Pneumatic connection basic version

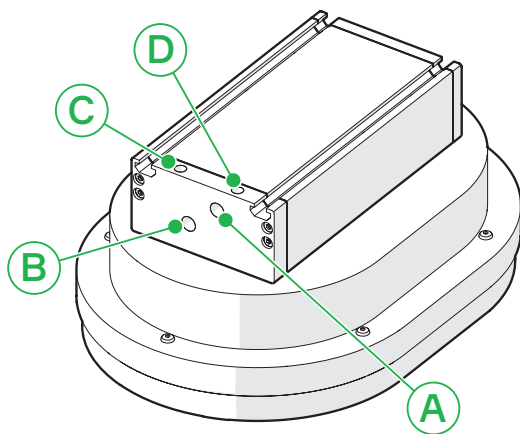


Figure 11 Basic ejector version with single row.

- (A)** Compressed air connection G 1/4" for vacuum
- (B)** Compressed air connection G 1/4" for blow-off
- (C)** Connection G 1/8" for vacuum monitoring
- (D)** Connection G 1/8" for pressure monitoring

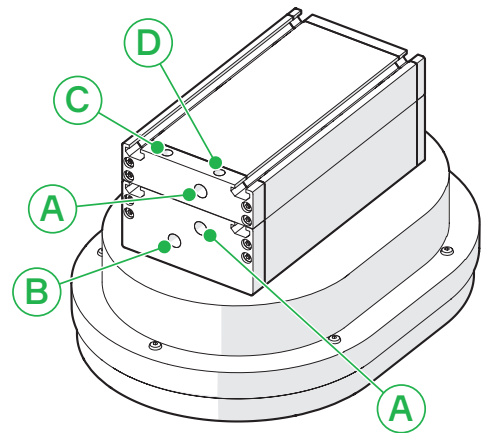


Figure 12 Basic ejector version with double rows.

5.5 Pneumatic connection vertical version

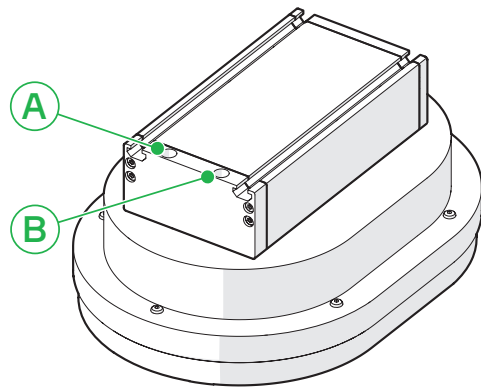


Figure 13 Vertical ejector version.

- (A)** Compressed air connection G 1/4" for blow-off or vacuum monitoring
- (B)** Compressed air connection G 1/4" for vacuum

5.6 Connection integrated solenoid valve version

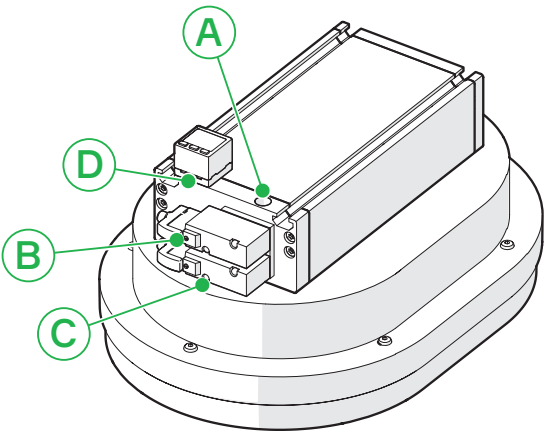


Figure 14 Connections on gripper with integrated solenoid valves.

- A** Compressed air connection G 1/4" for solenoid valves
- B** Solenoid valve. vacuum, NC or NO
- C** Solenoid valve, blow-off, NC
- D** Connection G 1/8" for vacuum monitoring, e.g. digital vacuum switch (as depicted).

5.6.1 Solenoid valves characteristics

Description	Unit	Value
Fluid	-	Air
Operating pressure range	MPa [psi]	0.15-0.7 [22-87]
Operating temperature range	°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	-	M8 3 pole male connector
Coil rated voltage	V DC	24
Allowable voltage	-	± 10% of the rated voltage
Current consumption	mA	17

Description	Unit	Value
Surge voltage suppressor	-	Diode
Indicator light	-	LED

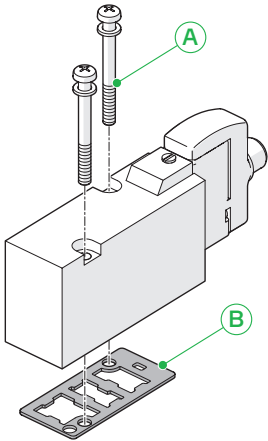


Figure 15 Round head combination screw M3x31 matt nickel plated. Gasket SYJ700-5-4.

- A** Round head combination screw M3x31 matt nickel plated
- B** Gasket SYJ700-5-4

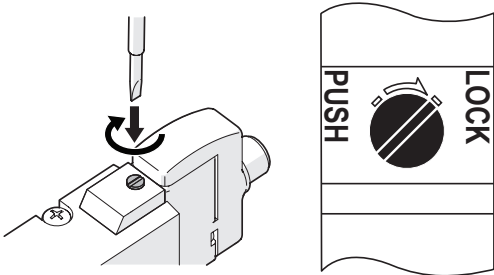


Figure 16 Push-turn slotted locking type.

Push-turn slotted locking type. While pressing, turn with a screwdriver in the direction indicated in the figure to lock it. Do not exceed the maximum torque 0.1 Nm (0.07 lbf) when turning with the screwdriver.

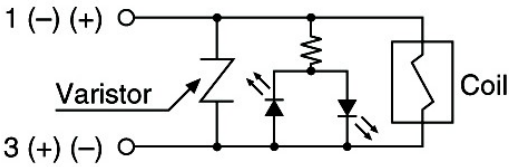


Figure 17 Electric schema of solenoid valve.

5.6.2 Solenoid valve connector specifications

Description	Value
Number and sections of conductors	3 x 0.25 mm²
Safety classification	IP 67
External diameter	4.1 mm [0.16"]
Max. curvature ray for flexing use	10 x external diameter
Case	PUR (UL/CSA)
Pin no and wire color	1 : Brown (+)
	3 : Blue (-)
	4 : Black (Signal)

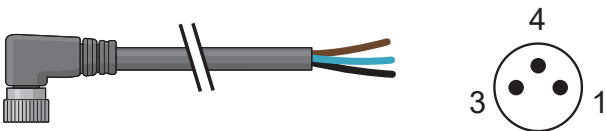


Figure 18 Solenoid valve connector with internal wires (left) and solenoid valve pin wiring diagram (right).



Warning!

- M8 connector has an indication of IP65 (enclosure) that gives protection against dust and water. Take note, however, that the product isn't 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, (.30 to .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). Pay attention to the direction of mounting for electro valve and seal.

5.7 Connection integrated pneumatic valves version

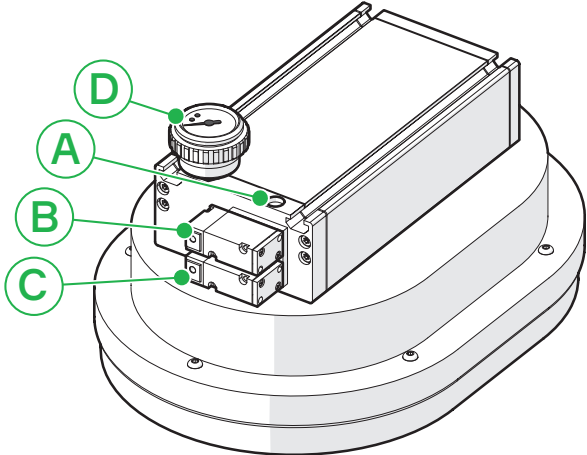


Figure 19 Integrated pneumatic valves.

- (A) Compressed air connection G1/4" for pneumatic valves
- (B) Pneumatic valve, vacuum, NC or NO
- (C) Pneumatic valve, blow-off, NC
- (D) Connection G1/8" for vacuum monitoring, e.g. with vacuum gauge

Description	Unit	Value
Fluid	-	Air
Operating pressure range	MPa [psi]	0.15-0.7 [22-87]
Operating temperature range	°C [°F]	-10 - 50 [14-122] without icing
Manual override	-	Non-lockable
Lubrication	-	Not required
Impact / Vibration resistance	m/s²	300 / 50
Mounting position	-	Universal
Pilot pressure range (P is the operating pressure range)	MPa [psi]	(0.4 x P + 0.1) -0.7
Pilot port	-	M5

5.8 Vacuum connection BL version

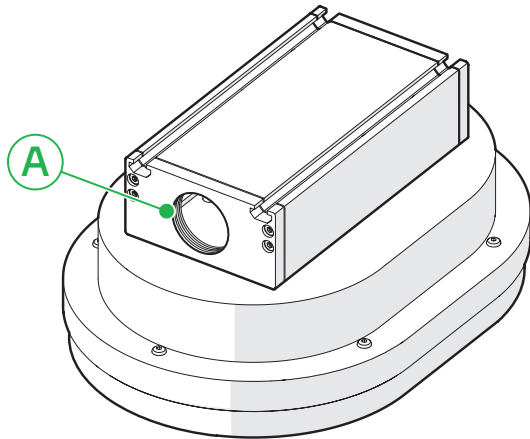


Figure 20 *BL version vacuum connection.*

A Vacuum connection G 1 1/2"

5.9 Metal grid adjustment

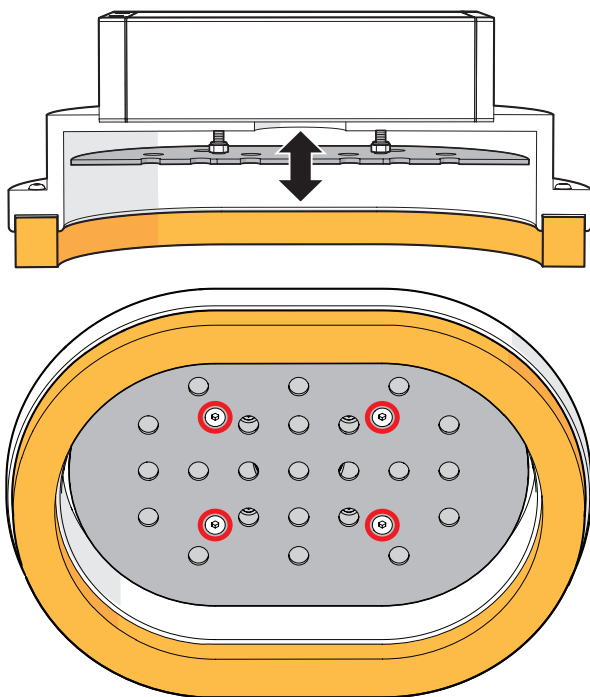


Figure 21 *Metal grid.*

The metal grid is adjustable, the height depends by the products that you need to handle. To adjust the height of the grid, use the four highlighted screws. The screws must be regulated all together, 3 turns at a time each.

5.10 Software installation

See the separate manual for Piab's URCap for PolyScope X for how to install and use Piab's software plugin for UR robots.

6. Pneumatic diagrams

Pneumatic diagram legends:

- 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
- 3 Exhaust
- * Optional piece of equipment

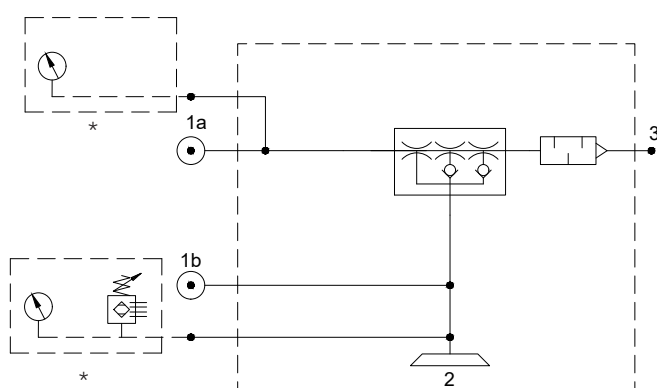


Figure 22 KSG Ejector Base.

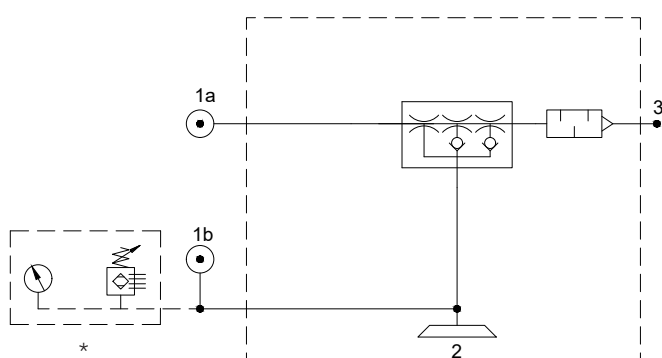


Figure 23 KSG Ejector TV.

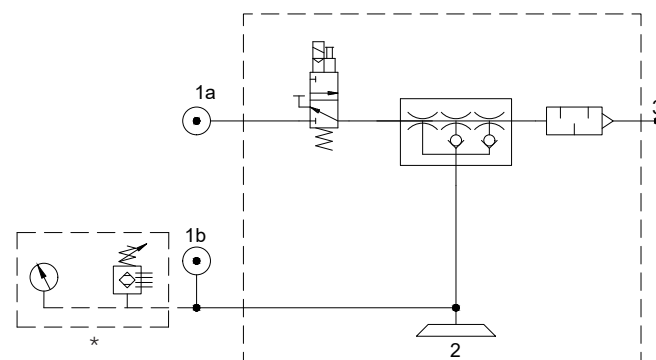


Figure 24 KSG Ejector V1.

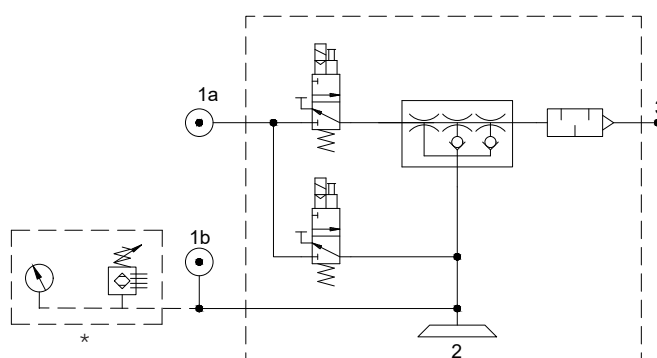


Figure 25 KSG Ejector V2.

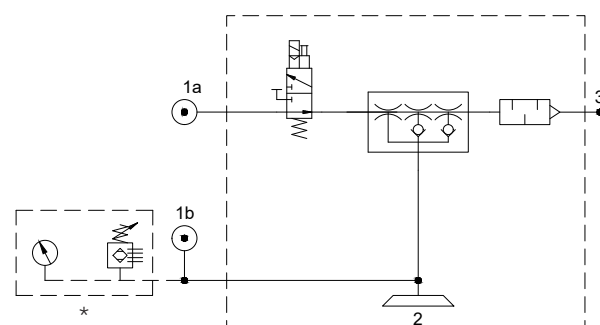


Figure 26 KSG Ejector V3.

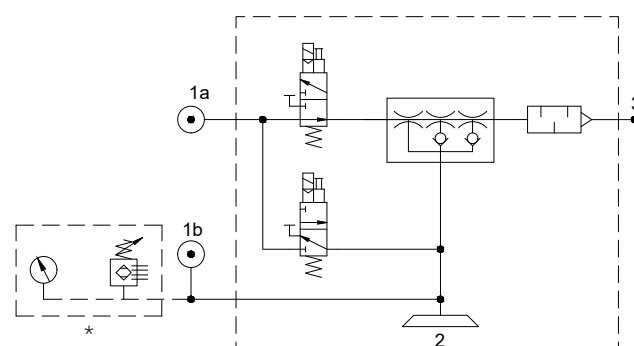


Figure 27 KSG Ejector V4.

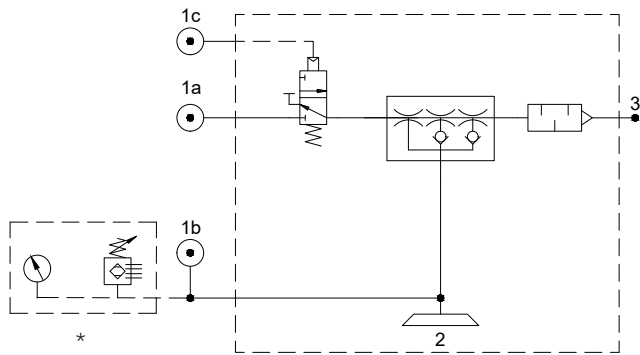


Figure 28 KSG Ejector A1.

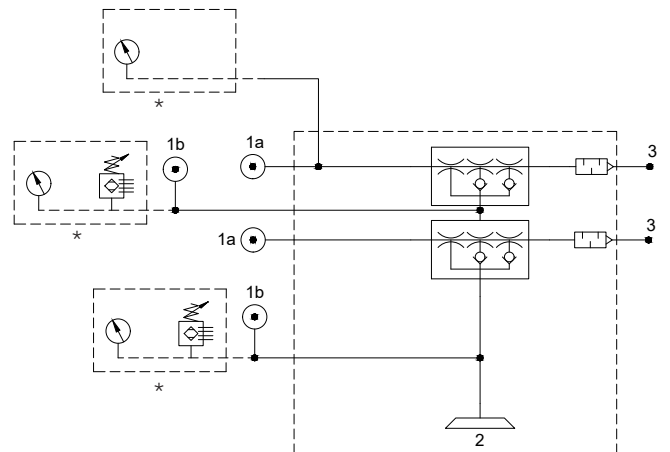


Figure 32 KSG Ejector Base Double Ejector.

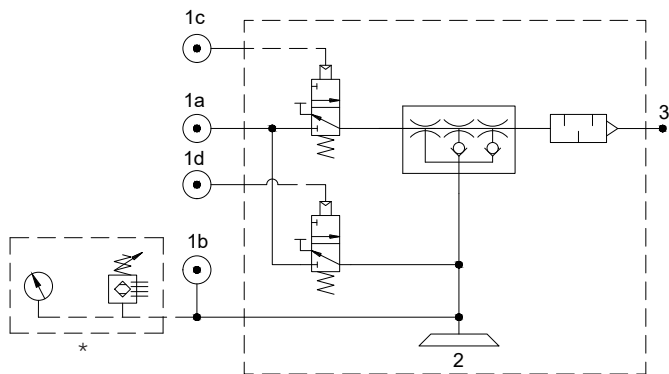


Figure 29 KSG Ejector A2.

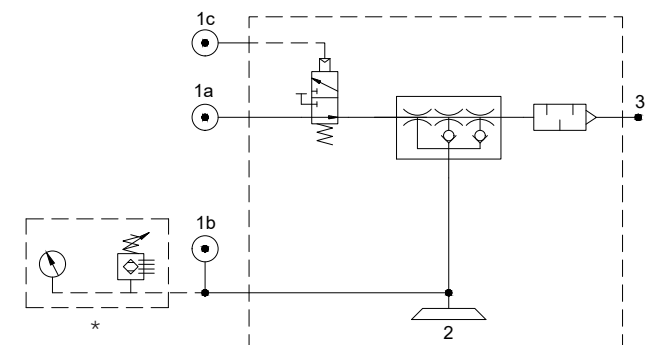


Figure 30 KSG Ejector A3.

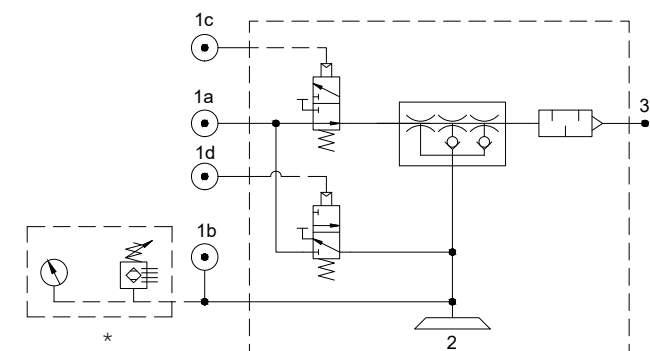


Figure 31 KSG Ejector A4.

7. Working cycle



Warning!

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

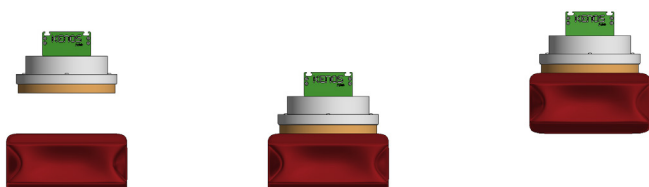


Figure 33 Working cycle.

Working cycle:

1. Position the gripper module at the object to be handled with the grip pad parallel to the grip surface.
2. Lower the module until it is in contact with the grip surface of the object. **For fast cycles, it is recommended to activate the vacuum before the grip pad is in contact with the object.**
3. Vacuum activation. **Note: The activation for vacuum can be done before or after the grip pad is in contact with the workpiece.**
4. Pick-up of the object to be handled.
5. Drop-off of the object with removal of vacuum and, if necessary, activation of blow-off.



Figure 34 Acceptable ways of transporting the handled object.



Note!

It is recommended to run preliminary tests with original samples before a full-scale implementation. Piab can perform these tests for you.

8. Maintenance



8.1 Ejector maintenance (ejector version from 19/10/2020)

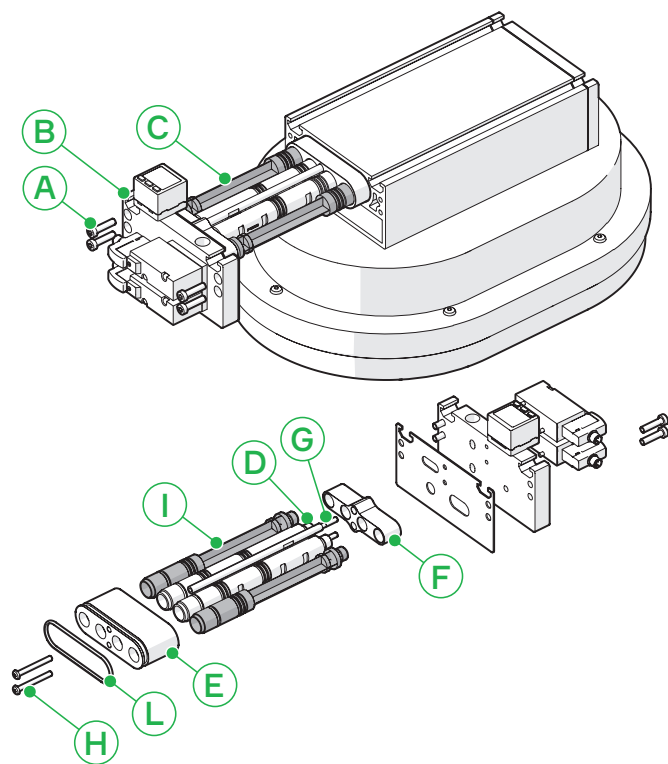


Figure 35 Push-in ejector (version from 19/10/2020)

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

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

The push-in ejector is modular and therefore expandable. It is easy to increase the performance in this way.

Follow these steps:

1. Loosen screws H
2. Slip off posterior housing E.
3. Remove blind cartridge I.
4. Insert a new cartridge in the free housing.

5. Assemble the posterior housing E.

6. Fix the screws H.

For more information about the ejector please see the Spare parts section.

8.2 Ejector maintenance (ejector version from 21/10/2019 until 18/10/2020)

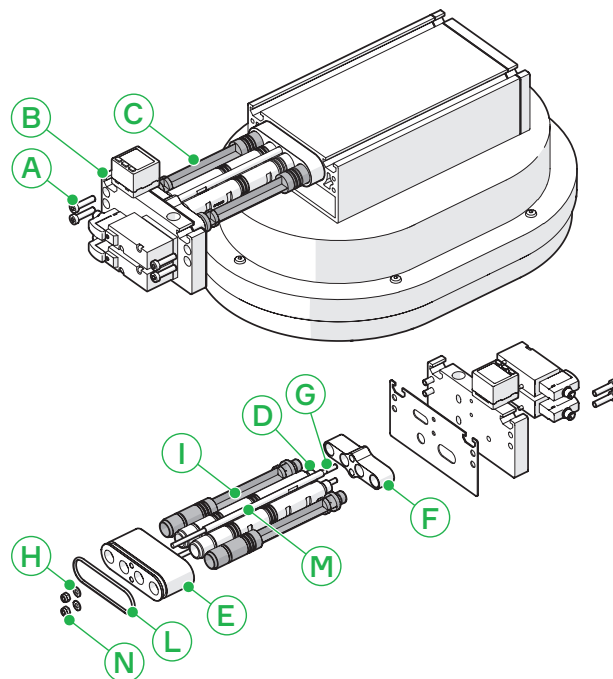


Figure 36 Push-in ejector (version from 21/10/2019 until 18/10/2020)

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

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

The push-in ejector is modular and therefore expandable. It is easy to increase the performance in this way.

Follow these steps:

1. Loosen nuts N.

2. Slip off posterior housing E.
3. Remove blind cartridge I.
4. Insert a new cartridge in the free housing.
5. Assemble the posterior housing E.
6. Fix the tie-beam with nuts N.

For more information about the ejector please see the Spare parts section.

8.3 Ejector maintenance (ejector version until 21/10/2019)

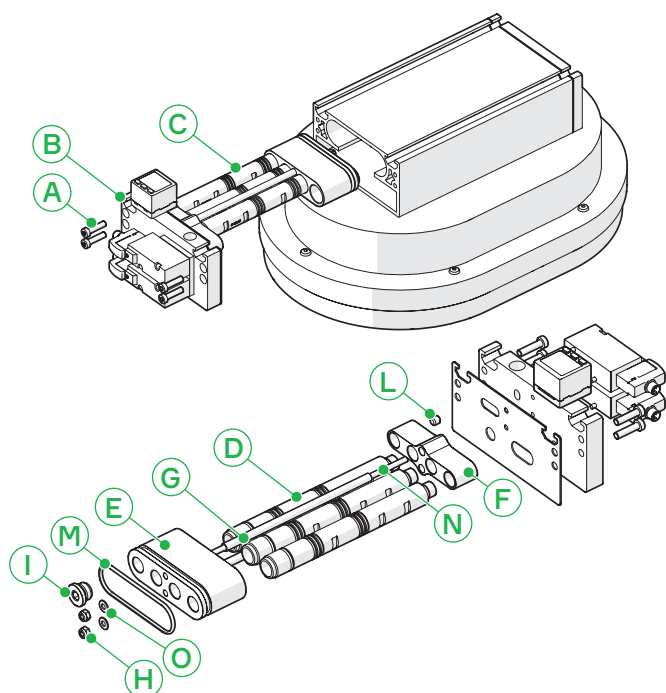


Figure 37 Push-in ejector (version until 21/10/2019)

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

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

The push-in ejector is modular and therefore expandable. It is easy to increase the performance in this way.

Follow these steps:

1. Loosen nuts H.
2. Slip off posterior housing E.
3. Loosen the tie-beam N,
4. Remove plugs I and L.
5. Insert a new cartridge in the free housing.
6. Screw the tie-beam to the supply cover B.
7. Assemble the posterior housing E.
8. Fix the tie-beam with nuts H.

For more information about the ejector please see the Spare parts section.

8.4 Ejector maintenance (double ejector version)

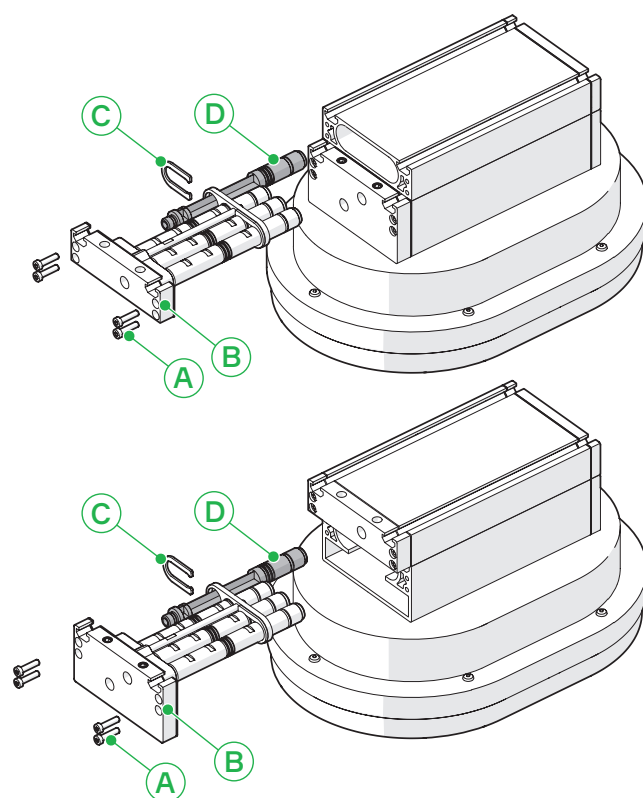


Figure 38 Push-in double ejector version.

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

1. Loosen closing screws A of the supply cover and extract the complex B.
2. Blow and clean the ejectors with compressed air. Verify that the plastic body is intact.
3. Push in the complex B and close with screws A.

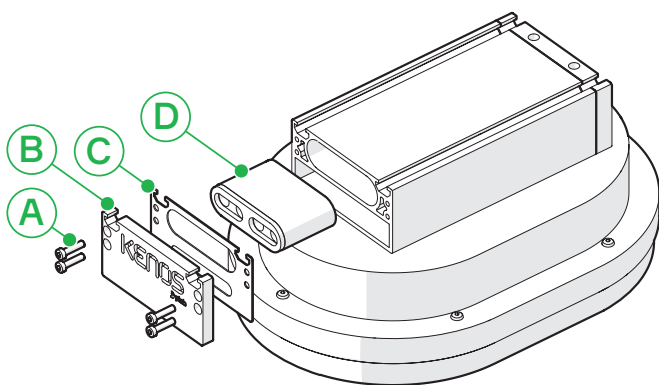
The push-in ejector is modular and therefore expandable. It is easy to increase the performance in this way.

Follow these steps:

1. Loosen closing screws A of the supply cover and extract the complex B
2. Remove C-lock C.
3. Remove blind cartridge D.
4. Insert a new cartridge in the free housing.
5. Lock the new cartridge with C-lock C.
6. Push in the complex B and close with screws A.

For more information about the ejector please see the Spare parts section.

8.5 Silencer maintenance



For the maintenance of the silencer follow these steps:

1. Loosen closing screws A of the exhaust cover B and extract the silencer D.
2. Verify that the exhaust cover gasket C is in good condition, in case of damage it must be replaced.
3. Push in the silencer and close the exhaust cover B with screws A.

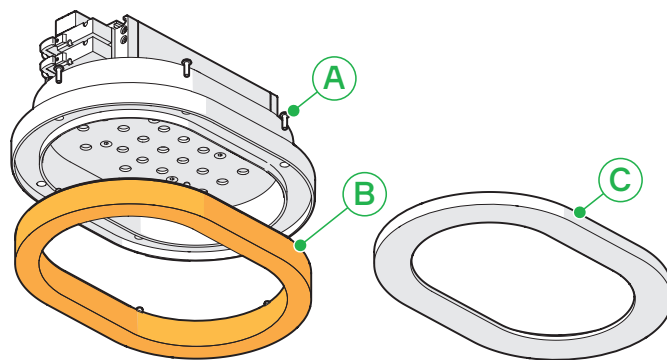


Note!

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.

For more information about the silencer please see the Spare parts sections.

8.6 Gripping interface maintenance



- (A) Fixing screws for gripping seal
- (B) Natural Rubber (NR) gripping seal
- (C) Metal ring

8.6.1 Foam

The foam that builds the gripping surface can be damaged during normal use. The average lifetime depends on many factors:

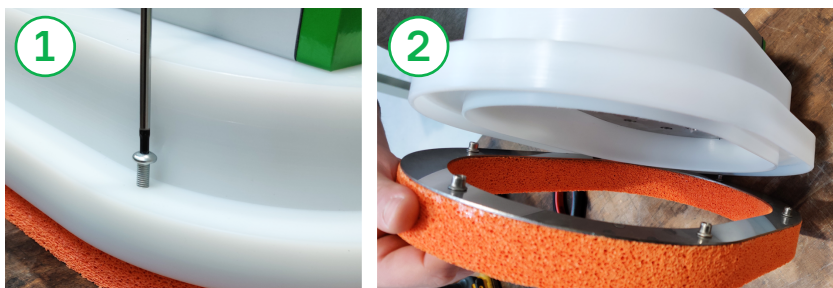
- nature of the handled objects
- quality of the gripping surface
- work conditions
- cycle times etc.

The foam is available as spare part. For easy maintenance, foam already attached to a mounting plate ring in a gripping seal, is available as spare part.

8.6.2 Storing of foam ring and mounting plate

- Temperature 5-25°C (41-77°F) and in a dry location
- Avoid direct sun- or artificial light
- Store in relaxed condition, free from tensions
- Store in a dust-free location
- Protect from chemicals.

8.6.3 Replacement of gripping seal



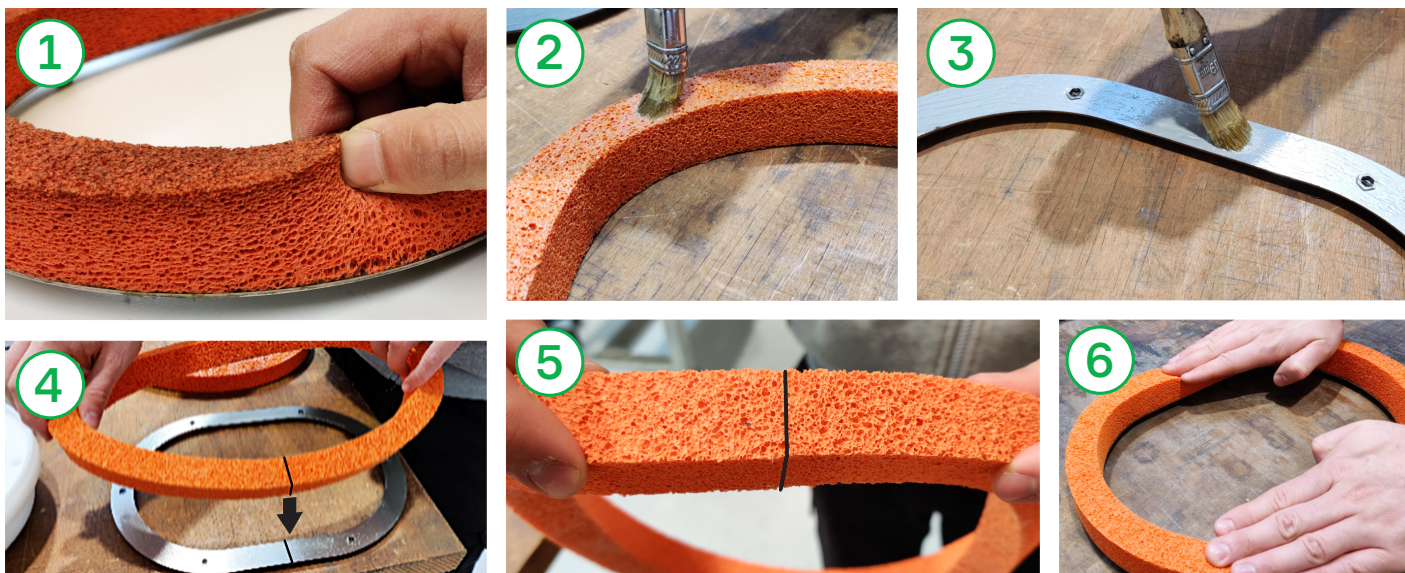
① Remove the screws.

② Remove the old ring (foam attached to a mounting plate). Install the new ring and fix it with screws.

8.6.4 Replacement of foam

The foam is available as spare part. It needs to be attached to the metal mounting ring with glue.

Follow these steps:



① Remove the old foam from the mounting plate. If necessary, clean the mounting plate surface from any rubber, adhesive or dust residues with solvent.

② Distribute mastic glue (Würth type TIX 120, or similar) equally on the metal plate and on the new foam ring surface. Pay attention that the glue does not exceed the foam or ring surfaces.

③ Wait about 10 minutes at 20 °C.

④ Align and fix the new foam ring on the mounting plate.

⑤ Pay attention, the ring junction must be placed on the straight section of the mounting plate.

⑥ Press the new ring and keep it under load for 15-20 minutes. After that it is ready to use for lifting.

8.7 Maintenance plan

Control step	Daily	Weekly	Monthly	Every 6 months	Every 12 months
Check max vacuum level of ejector		X			
Check the electrical connections			X		
Check the silencer			X		
Check tightenings				X	
Check the NR ring	X				
Check supply air pressure		X			
Check the air connection		X			
Check the general condition					X
Clean gripper exterior				X	

9. Spare parts and accessories

9.1 Single spare parts list

Article no	Description
3101602	Vacuum gauge 100 -kPa/30 -inHg, with nut
3101603	Pressure gauge (Manometer 1 MPa)
0107053	COAX® cartridge MIDI Si32-3
0212040	Vacuum switch 3-color digital display M8
0211305	Solenoid valve 3/2 N.O
0209259	Solenoid valve 3/2 N.C
0211307	Pneumatic valve 3/2 N.O
0211306	Pneumatic valve 3/2 N.C
0112527	Blind Cartridge for Midi COAX
0232290	NR Foam incl. Mounting plate-ATC-230x140
0209604	NR Foam incl. Mounting plate-ATC-260x180
0209605	NR Foam incl. Mounting plate-ATC-310x210
0209606	NR Foam incl. Mounting plate-ATC-350x250
0209607	NR Foam incl. Mounting plate-ATC-400x250
0232291	NR Foam-G1-230x140
0209599	NR Foam-G1-260x180
0209598	NR Foam-G1-310x210
0209597	NR Foam-G1-350x250
0209596	NR Foam-G1-400x250
0232692	G4 Foam incl. Mounting plate-ATC-230x140
0216531	G4 Foam incl. Mounting plate-ATC-260x180
0216608	G4 Foam incl. Mounting plate-ATC-310x210
0216506	G4 Foam incl. Mounting plate-ATC-350x250
0216778	G4 Foam incl. Mounting plate-ATC-400x250
0232693	Foam-G4-230x140

Article no	Description
0231094	Foam-G4-260x180
0216776	Foam-G4-310x210
0216777	Foam-G4-350x250
0216779	Foam-G4-400x250

9.2 Spare parts kit KSG-KBC

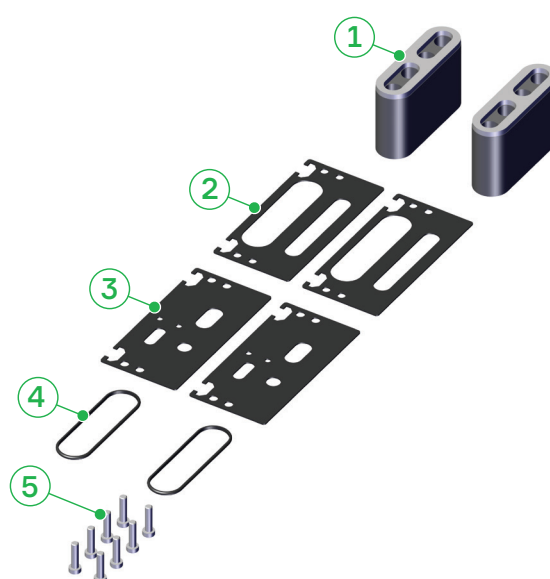


Figure 39 Spare parts kit KSG-KBC

- ① Silencer KVG120-60
- ② Exhaust cover seal KVG120-60
- ③ Supply cover seal KVG120-60
- ④ O-ring 3212-53,64X2,62-NBR70
- ⑤ Cover screw KVG120-60-ISO 14580 - M5x20x8

Article no	Description
0211437	Spare parts kit KSG-KBC: 2 x Silencer KVG120-60 2 x Exhaust cover seal KVG120-60 2 x Supply cover seal KVG120-60 2 x O-ring OR3212-53,64X2,62-NBR70 8 x Cover screw KVG120-60-ISO 14580 - M5x20x8

9.3 Accessories

9.3.1 T-slot nut kits



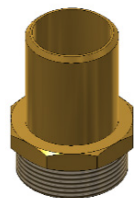
Article no	Description
0209862	T-slot nut kit 11079-M4-U10 - 4pcs
0209585	T-slot nut kit 11080-M5-U10 - 4pcs
0209586	T-slot nut kit 11081-M6-U10 - 4pcs
0209588	T-slot nut kit 11082-M8-U10 - 4pcs

9.3.2 Kit flange



Article no	Description
0209503	KIT-FL-FX-KVG120-60

9.3.3 Hose connector



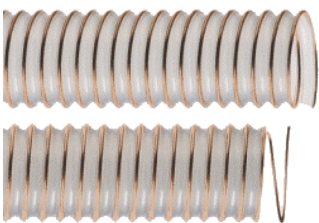
Article no	Description
0208948	Hose connector KP-1-1/2-40

9.3.4 Hose clamp



Article no	Description
0208957	Hose clamp KB-45-60

9.3.5 Hose



Article no	Description
0210660	Hose KTU-M-49-40-PU

10. Troubleshooting



Note!

It is recommended to always run preventative tests with original samples. Piab can assist with running such tests.

Type of trouble	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	Insert one more cartridge ejector
	Lift is too fast	Slow down lift, avoid acceleration peaks
	Pieces not suitable for lift with this system	Replace grip solution
	Occluded silencer	Replace silencer
NR ring wears very quickly	The system is not correctly placed on the workpiece	The gripping system must be parallel to the workpiece surface

11. Warranties

The Seller gives its Customers a one-year warranty from the receipt of the Products, accessories, control devices and Kenos® products included.

It is a duty of the Buyer to check the goods at the time of delivery at the agreed destination. Complaints relating to the state of the packaging, quantity, number or external characteristics of the Products (apparent defects) must be reported to the Seller, under penalty of forfeiture of the guarantee, by means of a reservation noted on the transport document upon receipt of the products; the transport document with the noted reservation must be forwarded to the Seller by fax, e-mail, registered mail with notice of collection, within 8 (eight) days of receipt of the goods.

The warranty covers manufacture and materials defects in the Products and it also covers if the Products do not conform to the Product specification, excluding minor defects, if reasonably acceptable and that do not compromise efficiency in their use.

The warranty does not apply to any Product (including any component or other parts in such Products (such as suction cups, filter elements, sealings, hoses, foam, etc.) or to the software of any Products) that it was used other than the intended purpose, and: (a) has been subjected to abuse, misuse, negligence, improper storage, improper handling, improper use, improper installation, abnormal physical stress, abnormal environmental or working conditions, or use, application, installation, care, control or maintenance contrary to any applicable manual or instructions for the Products issued by the Seller or good trade practice regarding the same; or (b) has been reconstructed, repaired or altered by any persons or entities other than the Seller or its authorized representatives, or have a defect as a result of fair wear and tear or wilful 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 and Conditions shall apply to any repaired or replaced Products by the Seller.

12. Recycling and disposal



Environmental aspects are considered in the development process of Piab's products to make sure that a minimal environmental footprint is used.

The ways of handling recycling and disposals vary from country to country, and therefore this process needs to be in full compliance with each national regulation.

If possible, disassemble the product into its various components. Batteries, electrical and electronic equipment should be handed over to an authorized body for disposal, as well as the metal parts. All other parts can either be recycled or assorted as waste.

Appendix 1

Essential Health and Safety Requirements - applied and respected (R.E.S.S)

1	Essential safety and protection of health	Compliance
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	Control systems	
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 failing 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	
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 temperature	
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	Maintenance of 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	Information	
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	

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