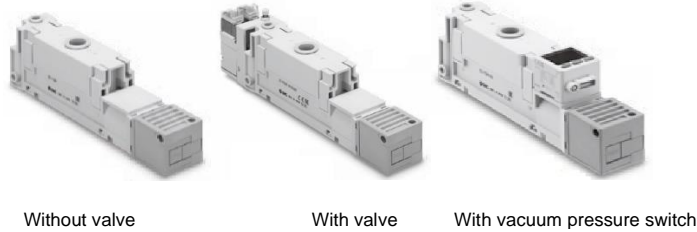




Instruction Manual

Multistage Ejector

Series ZL112A



The intended use of this product is to generate vacuum.

1 Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “Caution,” “Warning” or “Danger.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC <sup>\*)</sup>1), and other safety regulations.

<sup>\*)</sup>ISO 4414: Pneumatic fluid power — General rules and safety requirements for systems and their components.  
ISO 4413: Hydraulic fluid power — General rules and safety requirements for systems and their components  
IEC 60204-1: Safety of machinery - Electrical equipment of machines - Part 1: General requirements  
ISO 10218-1: Robotics — Safety requirements — Part 1: Industrial robots

- Refer to product catalogue, Operation Manual and Handling Precautions for SMC Products for additional information.
- Keep this manual in a safe place for future reference.

	<b>Danger</b>	Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
	<b>Warning</b>	Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
	<b>Caution</b>	Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

**Warning**

- Always ensure compliance with relevant safety laws and standards.
- All work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.

2 Specifications

2.1 General Specifications

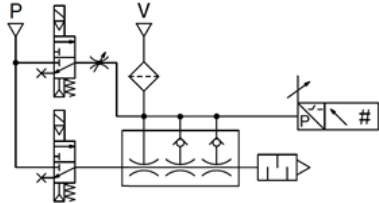
Model	ZL112A	
Nozzle diameter	1.2 mm	
Standard supply pressure	Without valve: 0.33 MPa	With valve: 0.35 MPa
Maximum vacuum pressure <sup>*1</sup>	-84 kPa	
Air consumption <sup>*1</sup>	57 L/min (ANR)	
Max suction flow rate <sup>*1</sup>	100 L/min (ANR)	
Supply pressure range	0.2 to 0.5 MPa	
Operating temperature range	5 to 50 °C (No condensation)	
Fluid	Air	
Vibration resistance <sup>*2</sup>	30 m/s <sup>2</sup> (w/o pressure switch)	20 m/s <sup>2</sup> (with pressure switch)
Impact resistance <sup>*3</sup>	150 m/s <sup>2</sup> (w/o pressure switch)	100 m/s <sup>2</sup> (with pressure switch)

NOTE <sup>\*1</sup>) Values are at the same standard supply pressure and based on SMC's measurement standards. They depend on atmospheric pressure (weather, altitude, etc.) and measurement method.  
NOTE <sup>\*2</sup>) 10 to 500Hz for 2 hours in each direction of X, Y and Z (de-energised, initial value).  
NOTE <sup>\*3</sup>) 3 times in each direction of X, Y and Z (de-energised, initial value).  
NOTE <sup>\*4</sup>) Refer to operation manual of solenoid valve (SYJ500 series) and pressure switch (ZSE20A series, ZSE30A series) for the characteristics.

2 Specifications – continued

2.2 pneumatic circuit diagram

(With valve and vacuum pressure switch)



For other circuit diagrams, please refer to the ZL1 operation manual.

3 Installation

3.1 Installation

**Warning**

- Do not install the product unless the safety instructions have been read and understood.
- It is necessary to perform maintenance and replacement of the suction filter regularly to maintain the proper operation of the multistage ejector. Ensure sufficient space for maintenance work when installing the product.
- The suction cover of this product is integrated with the vacuum piping. Secure sufficient space and some length of the tube with the piping (tubes) on the vacuum side so that the suction cover can be removed.
- Do not fix the piping on the vacuum side such that a load is always applied to the suction cover in a bending or pulling direction. This can damage the body and/or the suction cover.
- If the multistage ejector (silencer exhaust specification) is operated in a dusty environment or if there is dust on the surface of the workpieces, it can cause clogging of the silencing material as well as the suction filter due to dust being sucked in. Secure space necessary for the maintenance check and replacement of the silencer when the multistage ejector performance decreases.
- Keep the ambient temperature of the product between 5 and 50°C. In environments such as inside a panel where heat radiation efficiency is poor, the ambient temperature will rise due to the heat generation of the coil of the solenoid valve, causing malfunction.

- When handling the product, do not lift it by the lead wires or cables of the solenoid valve, pressure switch for vacuum.
- Otherwise, it can cause vacuum leakage or broken wire or damage to the product.
- Avoid repeatedly bending or stretching the lead wire of the solenoid valve or of the pressure switch. Lead wires will break if bending stresses or tensile forces are applied to the lead wires repeatedly.
- Use the product within the specified supply pressure range. Operation over the specified supply pressure range can cause damage to the product.
- Do not drop, hit or apply excessive shock to the product when handling it. Even if the body looks undamaged, the internal components may be damaged, leading to a malfunction.

3.2 Environment

**Warning**

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact in excess of the product's specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of the product's specifications.
- Do not use the product in a place where static electricity is a problem. It may result in system failure or malfunction.

3.3 Piping

**Caution**

- Before connecting piping make sure to clean up chips, cutting oil, dust etc.
- When installing piping or fittings, ensure sealant material does not enter inside the port. When using seal tape, leave 1 thread exposed on the end of the pipe/fitting.
- Tighten fittings to the specified tightening torque.
- The product may break if it is held by hand.

3 Installation - continued

Piping to the Air Supply Port (P)

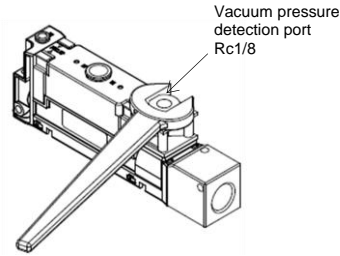
- When connecting tubing, consider factors such as changes in the tubing length due to pressure, and allow a sufficient margin. Otherwise, it can damage the fitting and cause the tube to come off. Refer to Fittings & Tubing Precautions on SMC's website <http://www.smcworld.com> for the recommended piping conditions.

Piping to the Vacuum Port (V)

- Allow a sufficient margin of tube length when piping, in order to prevent twisting, tensile, moment loads, vibration or impact being applied to the tubes and fittings. This can cause damage to the tube fittings and crushing, bursting or disconnection of tubing.
- Piping to the product is assumed to be static piping. If the tube moves, it may become worn, elongated, or torn due to tensile forces, or disconnected from the fitting. Ensure the tube is in a static condition always before using.
- Prevent the connected tube from being rotated. If the fittings are used in this way, the fitting may be broken.
- Do not lift the product by holding the piping after the tube is connected to the vacuum (V) port. Otherwise, the suction cover and/or the One-touch tube fitting will be damaged.

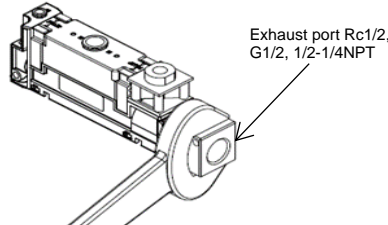
Piping to the Vacuum Port Adapter

- When mounting or removing the fitting, etc. to or from the vacuum port adapter, hold the vacuum port adapter with a wrench (across the flats 19mm). Recommended tightening torque: 3 to 5 N·m



Piping to the Exhaust Port

- When mounting or removing the piping to or from the exhaust port, hold the exhaust block with a wrench (across the flats 36mm). Recommended tightening torque: 20 to 25 N·m



Load to the ejector body

- The body material is resin, therefore do not apply load to the port after mounting. Prevent the operation which generates moment, as it may cause performance reduction or damage to the body.

3.4 Lubrication

**Caution**

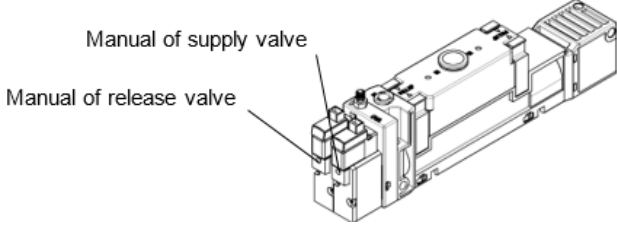
- SMC products have been lubricated for life at manufacture, and do not require lubrication in service.
- If a lubricant is used in the system, refer to catalogue for details.

3.5 Wiring to the solenoid valve and pressure switches

Refer to the operation manual of solenoid valve (SYJ500 series) and pressure switch (ZSE20A, ZSE30A series).

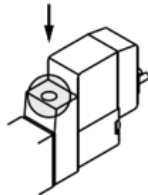
4 Settings

Manual Override (With supply valve and release valve)



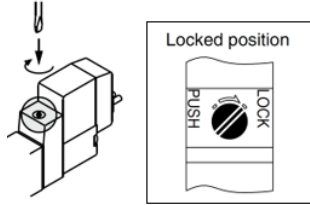
Non-locking push type

- Press in the direction of the arrow.



Push-turn slotted locking type

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



5 How to Order

Refer to the catalogue for 'How to Order'.

6 Outline Dimensions

Refer to the catalogue for outline dimensions.

7 Maintenance

7.1 General Maintenance

**Caution**

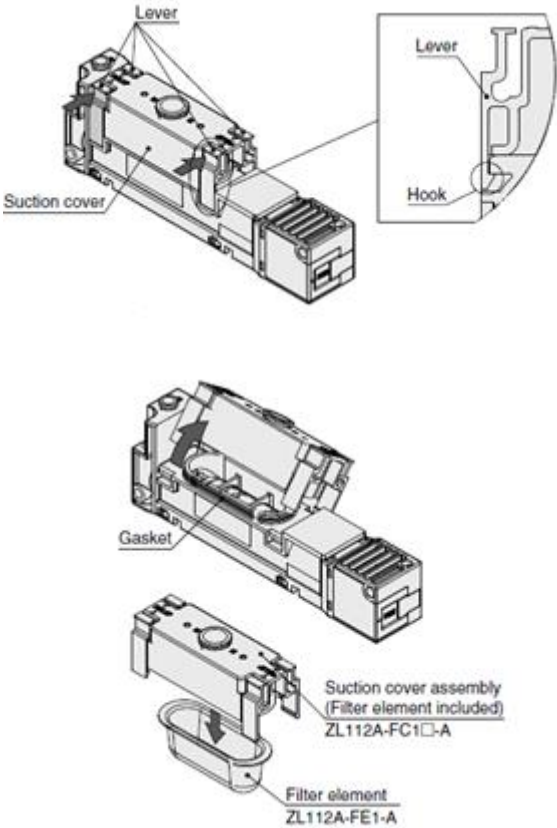
- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- If handled improperly, compressed air can be dangerous.
- Maintenance of pneumatic systems should be performed only by qualified personnel.
- Before performing maintenance, turn off the power supply and be sure to cut off the supply pressure. Confirm that the air is released to atmosphere.
- After installation and maintenance, apply operating pressure and power to the equipment and perform appropriate functional and leakage tests to make sure the equipment is installed correctly.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.
- Remove condensate from air filters and mist separators regularly. If the collected drainage is drained to the downstream side, it can stick inside of the product, causing operation failure and failure to reach the specified vacuum pressure.
- Replace the filter element built into the multistage ejector and the silencer regularly. Refer to the replacement procedure below. It is recommended to replace the filter element and the silencer when the pressure drop reaches 5 kPa as a guideline. The replacement cycle varies depending on the operating conditions, operating environment and supply air quality. However, if there is a vacuum pressure drop and/or delay in the vacuum (adsorption) response time which causes problem with the settings during operation, stop the operation of the product and replace the element regardless of the above-mentioned replacement guideline.

7 Maintenance - continued

- Operation in an environment where there is a lot of dust in the air the processing capacity of the filter element built into the product may be insufficient. It is recommended to use SMC's air suction filter (ZFA, ZFB, ZFC series) to avoid problems beforehand.
- Check before and after the maintenance work. When the product is to be removed, turn off the power supply, and be sure to cut off the supply pressure and exhaust the compressed air. Confirm that the air is released to atmosphere. When mounting the product after the maintenance work, supply compressed air, connect to the power, check if it functions properly and have a leakage inspection.
- Do not disassemble or modify the product, other than the replacement parts specified in this manual.
- Refer to online operation manual for replacement parts.

7.2 Replacement Procedure for Filter element (ZL112A-FE1-A)

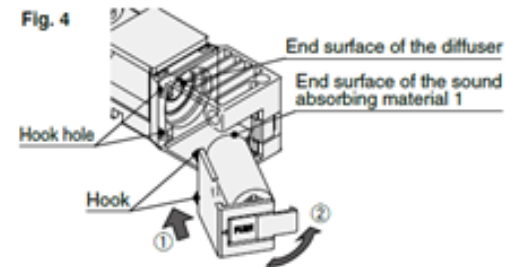
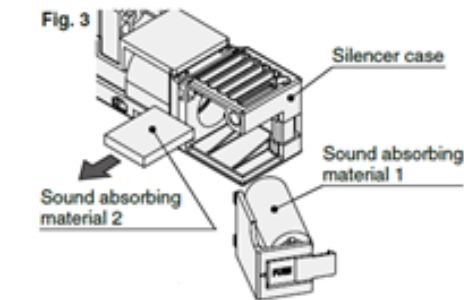
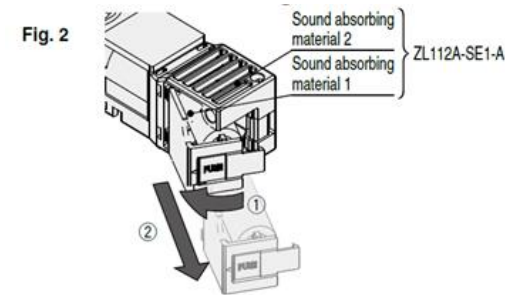
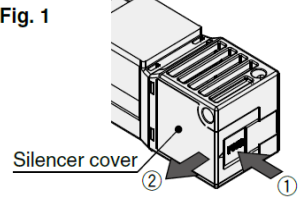
- Suction cover can be removed by pushing the suction cover levers (2 pcs) on the side. It also can be removed from the opposite side.
- Replace the filter element assembled in the filter case.
- Check that the gasket is correctly fit in the groove before mounting the suction cover.
- Check that the lever hook is locked in the correct position when mounting the suction cover. If the hook or the lever is damaged or deformed, replace the suction cover assembly.



7.3 Replacement procedure for sound absorbing material (ZL112A-SE1-A)

- Push the area where word "PUSH" is printed on the silencer cover in direction shown in Fig. 1.
- The silencer cover will come out (Fig. 2). Remove the sound absorbing material 1 and 2 and replace with the new ones (Fig. 3).
- After replacing the sound absorbing material, place the end surface of the sound absorbing material 1 to the end surface of the diffuser while engaging the hooks to the hook holes and push the silencer cover back into the place (Fig. 4).

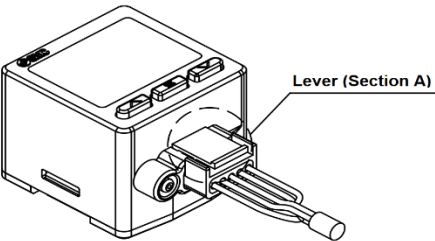
7 Maintenance - continued



7.4 Replacement Procedure for Connector assembly of Pressure switch

For ZSE20A series

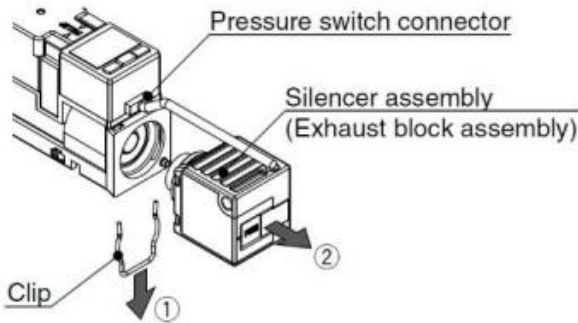
- When mounting the connector to the switch housing, push the connector straight onto the pins until the lever locks into the housing slot.
- When removing the connector from the switch housing, push the lever (section A) down with your thumb to unlock it from the slot, and then lift the connector straight off the pins.



7 Maintenance - continued

For ZSE30A series

- Before removal or mounting of the pressure switch connector, it is necessary to remove the silencer assembly (exhaust block assembly).
- Remove the silencer assembly (exhaust block assembly) following the procedure below to remove or to mount the pressure switch connector.
- Remove the clip using flat blade screwdriver from the bottom of the product. Remove the silencer assembly (exhaust block assembly) from the body. Remove or mount the pressure switch connector.



8 Limitations of Use

8.1 Limited warranty and Disclaimer/Compliance Requirements  
Refer to Handling Precautions for SMC Products.

Caution

Connection of the Solenoid Valve or Pressure Switch

1) Incorrect wiring can damage the switch and cause failure or malfunction. Connections should only be made when the power supply is

- turned off.
- 2) Do not attempt to insert or pull out the connector while the power is on. Otherwise, it may cause malfunction.
- 3) Malfunctions stemming from noise may occur if the wire is installed in the same route as that of power or high-voltage cable. Wire the switch independently.
- 4) Be sure to ground the frame ground (FG) terminal when using a commercially available switching power supply. (Pressure switch)

5) Avoid energizing the solenoid valve for long periods of time. If a solenoid valve is continuously energized for an extended period of time, the heat generated by the coil assembly may reduce performance and life of the valve or have adverse effects on peripheral equipment. Therefore, when it is continuously energized for an extended period of time or when the energized period per day is longer than the de-energized period, use N.O. (normally open) type product. When the valve is mounted onto a control panel, take measures to radiate heat in order to keep the product temperature within the specified range.

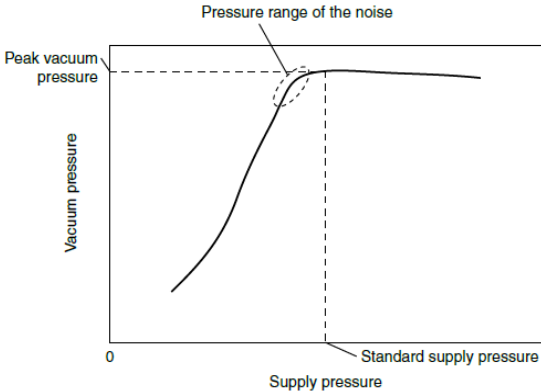
Exhaust from Multistage ejector

The exhaust resistance should be as small as possible to obtain the full ejector performance. There should be no shield around the exhaust port for the silencer exhaust specification. For the port exhaust specification, the back pressure should be 5 kPa or less, as exhaust resistance is generated with some piping bore sizes and piping lengths. DO NOT block the exhaust port. The product will fracture or break.

Exhaust Noise

When vacuum ejector generates vacuum, noise can be heard from the exhaust port when the standard supply pressure is close to the pressure that generates peak vacuum pressure making vacuum pressure unstable. If the vacuum pressure range is adequate for adsorption, there should not be a problem. If the noise causes a problem or affects the setting of the pressure switch, change the supply pressure slightly to avoid the pressure range of the noise.

8 Limitations of Use - continued



Vacuum Break Flow Adjusting Needle

- 1) The needle has a retaining mechanism, so it will not turn further when it reaches the rotation stop position. Turning the needle too far may cause damage.
- 2) Do not use tools, such as pliers, to rotate the knob. This can cause the idle rotation of the knob or damage.
- 3) Do not over tighten the lock nut. It is possible to tighten the lock nut (hexagon) manually. When tightening further with tools, tighten by approximately 15° to 30°. Over tightening may cause breakage.

9 Contacts

Refer to [www.smcworld.com](http://www.smcworld.com) or [www.smc.eu](http://www.smc.eu) for your local distributor/importer.

SMC Corporation

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Template DKP50047-F-085O