



Installation and Maintenance Manual

Multistage Ejector

ZL112 Series



1 Safety Instructions

This manual contains essential information for the protection of users and others from possible injury and/or equipment damage.

- Read this manual before using the product, to ensure correct handling, and read the manuals of related apparatus before use.
- Keep this manual in a safe place for future reference.
- These instructions indicate the level of potential hazard by label of “Caution”, “Warning” or “Danger”, followed by important safety information which must be carefully followed.
- To ensure safety of personnel and equipment the safety instructions in this manual and the product catalogue must be observed, along with other relevant safety practices.

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

Warning

- The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications. Since the products specified here can be used in various operating conditions, their compatibility with the specific pneumatic system must be based on specifications or after analysis and/or tests to meet specific requirements.
- **Only trained personnel should operate pneumatically operated machinery and equipment.**
Compressed air can be dangerous if an operator is unfamiliar with it. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced personnel.
- **Do not service machinery/equipment or attempt to remove components until safety is confirmed.**
 - 1) Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out control positions.
 - 2) When equipment is to be removed, confirm the safety process as mentioned above. Switch off air and electrical supplies and exhaust all residual compressed air in the system.
 - 3) Before machinery/equipment is re-started, ensure all safety measures to prevent sudden movement of cylinders etc. (Supply air into the system gradually to create back pressure, i.e. incorporate a soft-start valve).
- **Do not use this product outside of the specifications. Contact SMC if it is to be used in any of the following conditions:**
 - 1) Conditions and environments beyond the given specifications, or if the product is to be used outdoors.
 - 2) Installations in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverage, recreation equipment, emergency stop circuits, press applications, or safety equipment.
 - 3) An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.

Caution

- Ensure that the air supply system is filtered to 5 microns.

2 Specifications

2.1 Specifications

Specification of ejector

Model	ZL112	ZL112-G	ZL112-Dx-Q	ZL112-K1/K2x-x-Q
Nozzle diameter	φ 1.2mm			
Max. suction flow rate	100 l/min (ANR)			
Air consumption	63 l/min (ANR)			
Max. vacuum pressure	-84kPa			
Max. operating pressure	0.7Mpa			
Supply pressure range	0.2 to 0.5Mpa			
Standard supply pressure	0.4Mpa			
Operating temperature range	5 to 50°C			
Option	No option (Standard)	With vacuum pressure gauge	With vacuum pressure switch	With valve
Enclosure	Equivalent to IP30			

Valve specifications (SYJ500 series)

Fluid		Air
Operating pressure range	Internal pilot type	0.15 to 0.7MPa
Ambient and fluid temperature		-10~50°C (No freezing.)
Response time (at 0.5MPa)		25 ms or less
Max. operating frequency		5 Hz
Effective sectional area		0.25 Cv
Manual override (Manual operation)		Non-locking push type Lock driver operation type, Lock manual operation type
Pilot exhaust method		Pilot valve separate exhaust, Main valve, Pilot valve common exhaust
Lubrication		Not required
Mounting orientation		Unrestricted
Shock / Vibration resistance		150/30 m/s²
Enclosure		Dust proof

Digital vacuum pressure switch specifications (ZSE30A type)

Rated pressure range	0.0 to -101.0kPa
Set pressure range	10.0 to -105.0kPa
Proof pressure	500kPa
Min. display unit	0.1kPa
Applicable fluid	Air, inert gas, Non-flammable gas
Power supply voltage	12 to 24VDC±10%, Ripple(p-p)10% or less (With power supply polarity protection)
Current consumption	40mA or less
Switch output	NPN or PNP open collector 1 output NPN or PNP open collector 2 output (selectable)
Max. load current	80mA
Max. applied voltage	28V (With NPN output)
Residual voltage	1V or less (With load current of 80mA)

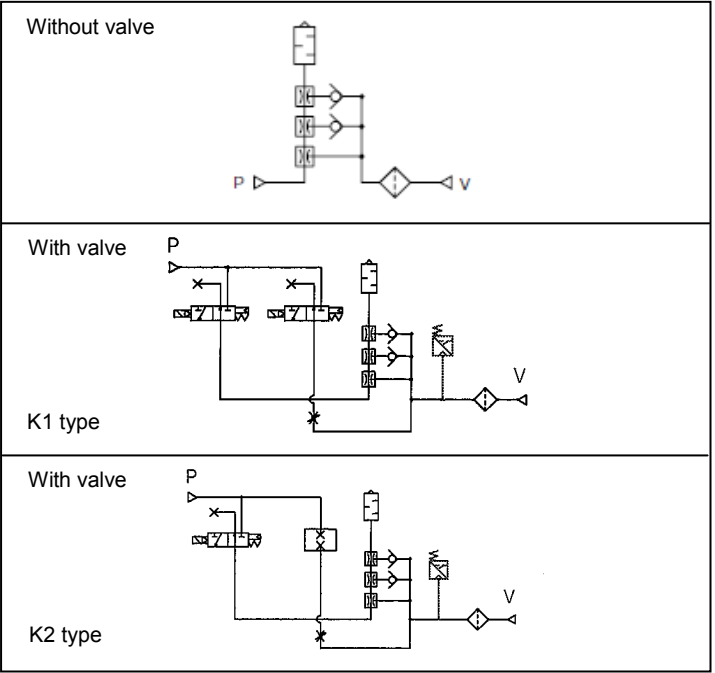
Repeatability	Response time	2.5ms or less (Response time selections with anti-chattering function: 20, 100, 500, 1000, 2000ms)
	Output protection	Short circuit protection
		±0.2%F.S. ±1digit
	Hysteresis	Adjustable (can be set from 0) (note)
Analogue output	Voltage output	Hysteresis mode
		Window comparator mode
		Adjustable (can be set from 0) (note)
	Current output	Output voltage
		1 to 5v±2.5%F.S.
		Linearity
Environmental Resistance	Voltage output	Linearity
		±1%F.S. or less
		Output impedance
	Current output	Approx. 1kΩ
		Output current
		4 to 20mA±2.5%F.S.
Environmental Resistance	Voltage output	Linearity
		±1%F.S. or less
		Load impedance
	Current output	Max. load impedance:
		300Ω with power supply voltage of 12V
		600Ω with power supply voltage of 24V
Environmental Resistance	Min. lad impedance:50Ω	
	Display method	4-digit 7-segment indicator LCD 2-color display (Red and green)
	Indicator accuracy	±2%F.S.±1digit(at 25°C±3°C ambient temperature)
	Indicator	LED lit when output is ON OUT1: Green OUT2 :Red
	Enclosure	IP40
	Ambient temperature	Operating:0 to 50°C,Stored: -10 to 60°C (No freezing or condensation)
Environmental Resistance	Ambient humidity	Operating and stored: 35 to 85%RH(No condensation)
	Withstand voltage	1000VAC for1 min, between live parts and enclosure
	Insulation resistance	50MΩ or more between live parts and enclosure (at 500VDC)
	Vibration proof	10 to 150Hz 1.5mm or20m/s² amplitude in X,Y,Z directions for 2 hours each
	Impact resistance	100m/s² X,Y,Z directions3 times each
	Temperature characteristics	±2%F.S.(based on 25°C)
Lead wire	Oil resistant heavy-duty vinyl cable 3 wire φ3.5 2m 4 wire conductor cross section: 0.15mm²(AWG26) Insulator outside diameter: 1.0mm	

Note) If the applied voltage fluctuates around the set value, the set hysteresis must exceed the fluctuation width, otherwise, chattering will occur.

Vacuum pressure gauge specification

Model No.	GZ30S
Fluid	Air
Pressure range	-100 to 100kPa
Scale angle	230°
Accuracy	±3% F. S. (full span)
Class	Class 3
Operating temperature range	0 to 50°C
Material	Case: Polycarbonate / ABS resin

2.2 Circuit Symbols



3 Installation

3.1 Installation

Warning

- Do not install the product unless the safety instructions have been read and understood

3.2 Environment

Warning

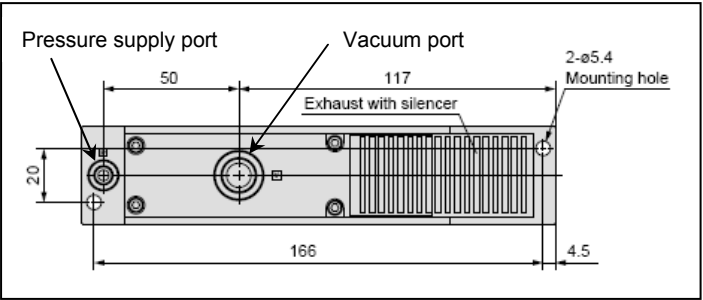
- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact. Check the product specifications.
- Do not mount in a location exposed to radiant heat.

3.3 Piping

Warning

- Before 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 1.5 to 2 threads exposed on the end of the pipe/fitting.
- Tighten fittings to the specified tightening torque.

Thread	Tightening Torque
M5	By hand + 1/6 turn with a wrench (1/4 turn for miniature fittings)
Rc 1/8	7 to 9

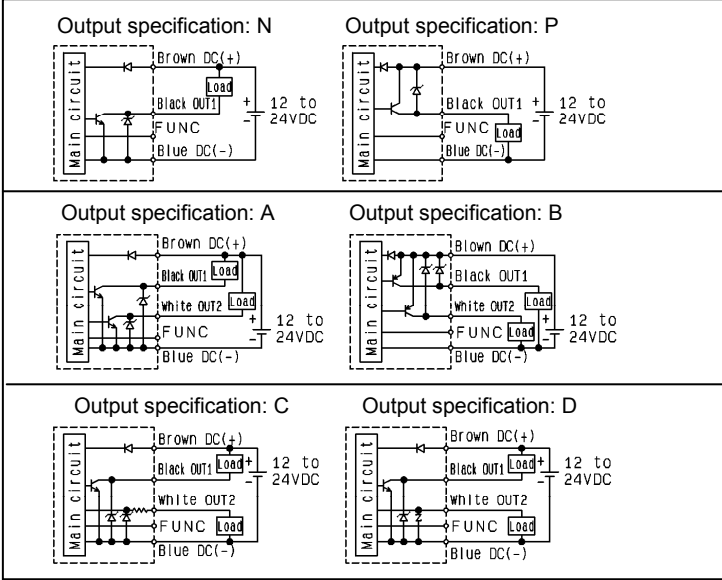


3.4 Electrical Connection

Caution

- When DC power is connected to a solenoid valve equipped with light and/or surge voltage suppressor, check for polarity indications.
- For polarity indications:
 - No diode to protect polarity: if polarity connection is wrong, the diode in the valve or switching device at control equipment or power supply may be damaged.
 - With diode to protect polarity: if polarity connection is wrong, the valve does not switch.

Vacuum Pressure Switch Wiring Diagram (ZSE30A type)



Warning

Wiring electronic Pressure Switch

- **Confirm wire colours and terminal numbers when wiring.**
Since incorrect wiring can lead to breakage or failure of the switch as well as malfunction, perform wiring after confirming wiring colours and terminal numbers with the instruction manual.
- **Avoid repeatedly bending or stretching lead wires.**
Broken lead wires will result from applying bending stress or stretching force to the lead wires. In the event that lead wires are damaged creating a possibility of malfunction, replace the entire product. (For cases in which the lead wires cannot be replaced through grommets.)
- **Confirm proper insulation of wiring.**
Be certain that there is no faulty wiring insulation (contact with other circuits, ground fault, improper insulation between terminals, etc.). Damage may occur due to excess current flow into a switch.
- **Do not wire with power lines or high voltage lines.**
Wire separately from power lines or high voltage lines, avoiding parallel wiring or wiring in the same conduit. Control circuits containing switches may malfunction due to noise from other lines.
- **Do not allow short circuiting of loads.**
Use caution, as switches will be damaged if a load is short circuited. Be especially careful not to reverse the power supply line (Brown) and the output line (Black).

3.5 Mounting

Warning

- **Read the instruction manual carefully.**
The product should be mounted and operated with a good understanding of its contents. Also, keep the manual where it can be easily referred to at any time.
- **Ensure space for maintenance.**
Ensure the necessary space for maintenance activities.
- **Be sure to tighten screws with the proper torque.**
When mounting, tighten screws with the recommended torque.
- **Do not obstruct the exhaust port of the ejector.**
If the exhaust port is obstructed when mounted, a vacuum will not be generated.

Warning

Electronic Pressure Switch

- **Do not use if equipment does not operate properly.**
Verify correct mounting by suitable function and leakage inspections after air and power are connected following mounting or maintenance.
- **Do not drop or bump.**
Do not drop, bump or apply excessive impact (1000m/s²) when handling. Even if the switch body is not damaged, the switch may suffer internal damage that will lead to malfunction.
- **Hold the product from the body side when handling.**
The tensile strength of the power cord is 49N, and pulling it with a force greater than this can cause failure. Hold by the body when handling.
- **Turn the setting trimmer gently using a watchmakers screwdriver.**
Turn the setting trimmer gently using a watchmakers screwdriver. Do not turn beyond the stoppers located at both ends. If the trimmer is broken, adjustment will be impossible.
- **Pressure port**
Do not insert wire, etc., from the pressure port. This will damage the pressure sensor, making it impossible to obtain normal operation.

3.6 Air Supply Circuit

Warning

- When designing the air supply circuit ensure that pipe sizes have sufficient capacity to prevent any pressure drop within the generator, this also applies to valves and fittings.
- The supply air should be clean and oil free.

- **Vacuum circuit**
Ensure that the piping from generator to vacuum pad is kept as short as possible to prevent restriction and leakage.

- **Vacuum pads**
When installing vacuum generators the rule is one generator → one vacuum pad. If this rule is ignored then possible loss of vacuum during pick-up will occur.

4 Maintenance

4.1 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.

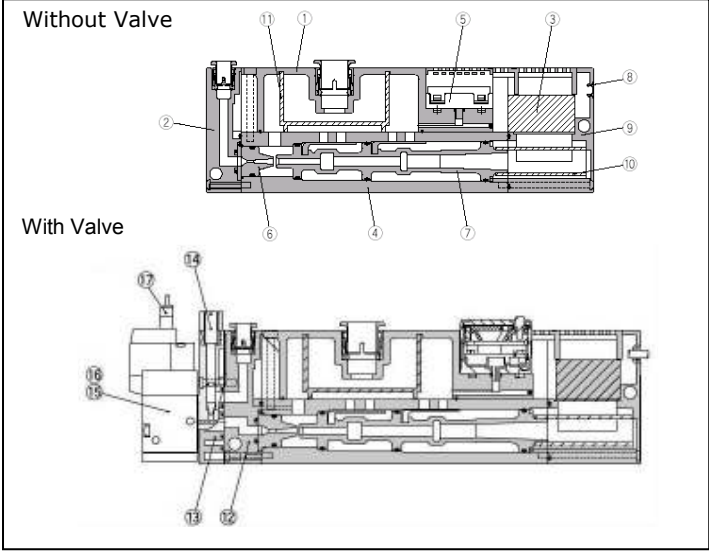
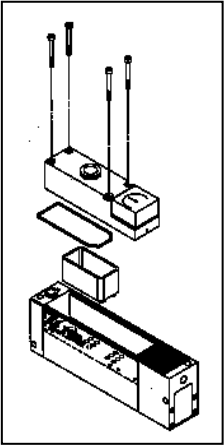
Replacement procedure of Part No.: ZL112-G

Disassembly

- Remove hexagon socket head cap screw (M3×30: 4 pieces).
- Detach suction cover from body.
- Remove suction filter.

Assembly

- Assemble component parts in reverse order of disassembly.
- When assembling, be sure that the gasket is fitted into the appropriate groove respectively.
- (Note: Take care not to drop vacuum pressure gauge.)



Parts List

No.	Description	Note
1	Suction Cover	
2	Front Cover	Without Valve
3	End Cover	
4	Body	
5	Vacuum Sensor Unit	
6	Nozzle	
7	Diffuser	
8	Detent Plug	Other than vacuum switch
	Lead Wire Cover	Vacuum switch specification
12	Front Cover B	With Valve
13	Valve Plate	With Valve
14	Needle	With Valve
15	Supply Valve (N.C.)	With Valve
16	Release Valve (N.C)	With Valve

Replacement Parts

No.	Description	Material	Part No.
9	Sound absorbing material B	PVF	ZL112-SP01 (Set No. for 9,10 & 11)
10	Sound absorbing material A	PVF	
11	Suction Filter	PE	

When ordering a vacuum pressure gauge or digital vacuum pressure switch separately, use the part numbers shown in the option specifications on page 3.

Contacts

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CZECH REP.	(420) 541 424 611	NORWAY	(47) 67 12 90 20
DENMARK	(45) 7025 2900	POLAND	(48) 22 211 9600
ESTONIA	(372) 651 0370	PORTUGAL	(351) 21 471 1880
FINLAND	(358) 207 513513	ROMANIA	(40) 21 320 5111
FRANCE	(33) 1 6476 1000	SLOVAKIA	(421) 2 444 56725
GERMANY	(49) 6103 4020	SLOVENIA	(386) 73 885 412
GREECE	(30) 210 271 7265	SPAIN	(34) 945 184 100
HUNGARY	(36) 23 511 390	SWEDEN	(46) 8 603 1200
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