Installation and Maintenance Manual Multistage Ejector

ZL212 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.

| A Caution | Indicates a hazard with a low level of risk, which if not avoided, could result in minor or moderate injury. |
|-----------|--|
| A 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. |

2 Specifications

2.1 Specifications

Specification of ejector

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| Model | ZL212 | ZL212-G | ZL212-Dx-Q |
|-----------------------------|-------------------------|-------------------------------|--------------------------------|
| Nozzle diameter | ∲ 1.2 x 2 | | |
| Max. suction flow rate | 200 l/min (ANR) | | |
| Air consumption | 126 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 |
| Enclosure | | Equivalent to IP30 | |

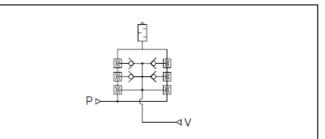
Valve Specifications (SYJ700 series)

| Fluid | | Air | |
|------------------------------------|------------------------|--|--|
| Operating pressure range | Internal pilot type | 0.15 to 0.7MPa | |
| Ambient and fluid tem | perature | -10~50°C (No freezing.) | |
| Response time (at 0.5 | MPa) | 30 ms or less | |
| Max. operating freque | ncy | 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/s ² | |
| 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. Regulating unit | 0.1kPa | | |
| Applicable Fluid | Air, inert gas, Non-flammable gas | | |
| Devuer events veltere | 12 to 24VDC±10%, Ripple (p-p) 10% or less | | |
| Power supply voltage | (With power supply polarity protection) | | |
| Current consumption | 40mA or less | | |
| Switch output | NPN or PNP open collector 1 output | | |
| Switch 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) | | |

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.

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.

A Caution

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

| | oonse time out protection | (Response time selections with anti-chattering function: 20, 100, 500, 1000, 2000ms) Short circuit protection | | | | | |
|---|---|---|--|---------------------|--|---|--|
| tability | | Short circuit protection | | | | | |
| Í | | Short circuit protection ±0.2%F.S. ±1digit | | | | | |
| esis | | | | | | | |
| | Hysteresis mode Window comparator | Adjustable (can be set from 0) (note) | | | | | |
| | mode | | | | | | |
| æ | Output voltage | 1 to 5v±2.5%F.S. | | | | | |
| oltag | Linearity | \pm 1%F.S. or less | | | | | |
| > 0 | Output impedance | Approx. 1k Ω | | | | | |
| | Output current | 4 to 20mA±2.5%F.S. | | | | | |
| | Linearity | \pm 1%F.S. or less | | | | | |
| Current output | Load impedance | Max. load impedance: 300Ω with power supply voltage of 12V 600Ω with power supply voltage of 24V | | | | | |
| | | Min. lad impedance:50 Ω | | | | | |
| Display method Indicator accuracy Indicator | | 4-digit 7-segment indicator LCD 2-color display (Red and green) ±2%F.S.±1digit(at 25℃±3℃ ambient temperature) Light up 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) | |
| 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/s ² amplitude in X,Y,Z directions for 2 hours each | | | | | |
| Impact resistance | | 100m/s ² 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 | | | | | |
| | y meth or accor Enclos Ambie Withst Insula Vibrati Impac rature vire | Output impedance Output current Linearity Load impedance y method or accuracy Enclosure Ambient temperature Ambient humidity Withstand voltage Insulation resistance Vibration proof Impact resistance rature characteristics | | | | | |

Vacuum pressure gauge specification

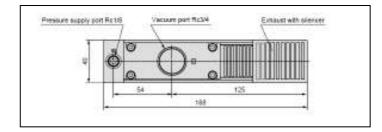
| Model No. | GZ30S | | |
|-----------------------------|---------------------------------|--|--|
| Fluid | Air | | |
| Pressure range | -100 to 100kPa | | |
| Scale angle | 230° | | |
| Accuracy | ±3% F. S. (full span) | | |
| Class | Class 3 | | |
| Operating temperature range | 0 to 50°C | | |
| Material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

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.

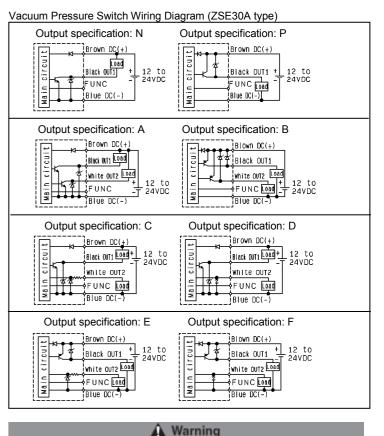
| Thread | Tightening Torque | |
|--------|--|--|
| M5 | By hand + 1/6 turn with a wrench (1/4 turn for miniature fittings) | |
| Rc 1/8 | 7 to 9 | |



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.



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

A 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.

A 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.

ZL212-TFK34GB

• 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

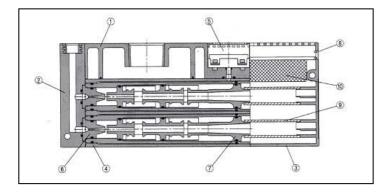
When installing vacuum generators the rule is one generator \rightarrow one vacuum pad. If this rule is ignored then possible loss of vacuum during pick-up will occur.

4 Maintenance

4.1 General Maintenance

A 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.



Parts List

| No. | Description | Note | | | |
|-----|--------------------|-----------------------------|--|--|--|
| 1 | Suction Cover | | | | |
| 2 | Front Cover A | Without Valve | | | |
| 3 | End Plate | | | | |
| 4 | Body | | | | |
| 5 | Vacuum Sensor Unit | | | | |
| 6 | Nozzle | | | | |
| 7 | Diffuser | | | | |
| 8 | Detent Plug | Other than vacuum switch | | | |
| | Lead Wire Cover | Vacuum switch specification | | | |
| | | | | | |

Replacement Parts

| No. | Description | Material | Part No. |
|-----|----------------------------|----------|----------------------|
| 9 | Sound absorbing material A | PVF | ZL212-SP01 |
| 10 | Sound absorbing material | PVF | (Set No. for 9 & 10) |

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

| 5 Contacts | | | | | |
|------------|-------------------|----------------|-------------------|--|--|
| AUSTRIA | (43) 2262 62280-0 | LATVIA | (371) 781 77 00 | | |
| BELGIUM | (32) 3 355 1464 | LITHUANIA | (370) 5 264 8126 | | |
| BULGARIA | (359) 2 974 4492 | NETHERLANDS | (31) 20 531 8888 | | |
| 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 | | |
| IRELAND | (353) 1 403 9000 | SWITZERLAND | (41) 52 396 3131 | | |
| ITALY | (39) 02 92711 | UNITED KINGDOM | (44) 1908 563888 | | |

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