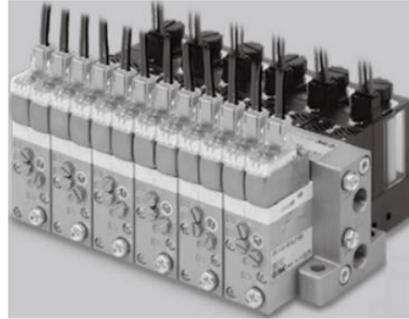




Instruction Manual

Vacuum Module

Series ZX



The intended use of the vacuum unit is to generate vacuum and control the operation of suction and release.

2 Specifications

2.1 Ejector Unit Specifications

Unit No.	ZX1-W05 ¹ _{2(T)}	ZX1-W07 ¹ _{2(T)}	ZX1-W10 ¹ _{2(T)}
Nozzle dia. (mm)	0.5	0.7	1.0
Suction flow (L/min(ANR))	5	10	22
Air consumption (L/min(ANR))	13	23	46
Vacuum pressure reached	-84 kPa		
Max. operating pressure	0.7 MPa		
Supply pressure range	0.2 MPa to 0.55 MPa		
Standard supply pressure	0.45 MPa		
Operating temperature range	5 to 50°C		
Ejector exhaust type*	Code 1	Built-in silencer..... For single unit and manifold	
	Code 2	Port exhaust..... For single unit and manifold	
Weight	33 g	ZX1-W□1□ (With bracket)	Built-in silencer
	25 g	ZX1-W□1□-N (Without bracket)	
	37 g	ZX1-W□2□ (With bracket)	Port exhaust
	29 g	ZX1-W□2□-N (Without bracket)	

*Codes 1 and 2 are corresponding to the suffixes in "How to Order" to indicate the ejector exhaust method.

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/IEC¹⁾, and other safety regulations.

¹⁾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.

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

2.2 Valve Unit for Ejector System Specifications

Unit no.	ZX1-VA□□□□□□□ (-Q)					
Component	Supply valve			Release valve		
	Pilot operated			Direct operated		
	Solenoid valve	Air operated		Solenoid valve	Air operated	
Operation	N.C. V114 N.O. SYJ324M	N.C. ZX1A N.O. SYJA324	N.C. SYJ314 N.C. V114	External release ZX1A	N.C. SYJA314	
Cv factor	0.17 Main valve			0.08	0.008	-
Supply pressure range of air pressure SUP (PV) port	0.3 to 0.6 MPa					
Supply pressure range of pilot pressure SUP (PA, PB) ports for supply and release <small>Note</small>	PV port pressure to 0.6 MPa					
Max. operating frequency	5 Hz					
Operating temperature range	5 to 50°C					
Interface plate symbol	PV ⇄ PS ⇄ PD					

Note) Combination of supply valve and release valve: K4, K5, K6, K7, K8, J3, K4, D4. The supply and release valves of this product have a structure which uses the pressure of the air pressure SUP (PV) port to operate them. Be sure to supply a pressure that is the pressure of the air pressure SUP (PV) port or more, and 0.6MPa or less to the pilot pressure SUP (PA,PB) ports for supply and release.

2 Specifications - continued

2.3 Valve Unit for Pump System Specifications

Unit no.	ZX1-VB□□□□□□□ (-Q)					
Component	Supply valve			Release valve		
	Pilot operated			Direct operated		
	Solenoid valve	Air operated		Solenoid valve	Air operated	
Operation	N.C. V114 N.O. SYJ324M	N.C. ZX1A N.O. SYJA324	N.C. SYJ314 N.C. V114	External release ZX1A	N.C. SYJA314	
Cv factor	0.17 Main valve			0.08	0.008	-
Supply pressure range of vacuum pressure SUP (PV) port	-0.1 to 0 MPa					
Supply pressure range of pilot pressure SUP (PS) port	0.3 to 0.6 MPa					
Supply pressure range of pilot pressure SUP (PA, PB) ports for supply and release <small>Note</small>	PS port pressure to 0.6 MPa					
Max. operating frequency	5 Hz					
Operating temperature range	5 to 50°C					
Interface plate symbol	(PV)*(PS⇄PD)					
Standard accessory	Bracket B (ZX1-OB)					

Note) The supply and release valves of this product have a structure which uses

the pressure of the pilot pressure SUP (PS) port to operate them. Be sure to supply a pressure that is the pressure of the pilot pressure SUP (PS) port or more, and 0.6 MPa or less to the pilot pressure SUP (PA,PB) ports for supply and release.

2.4 Solenoid Valve Specifications

Model	V114	SYJ314, SYJ324M
Rated voltage	24, 12, 6, 5, 3 VDC/100, 110 VAC* (50/60 Hz)	
Electrical entry	L plug connector, grommet	L plug connector, M plug connector, grommet
Light/surge voltage suppressor	With or Without	
Manual operation	Non-locking push type/Locking slotted type	

*Applicable to plug connector only.

2.5 Suction Filter Unit Specifications

Unit no.	ZX1-F	
Operating pressure range	-100 to 500 kPa	
Operating temperature range	5 to 50°C	
Filtration efficiency	30µm	
Element	PVA	
Weight	37 g	ZX1-F-□ (with bracket A)
	29 g	ZX1-F-□-N (without bracket A)

2 Specifications - continued

2.6 Vacuum Pressure Switch Specifications

Model	ZSE2	
	For vacuum	
Rate pressure/ set pressure range	0 to -101 kPa	
Proof pressure	500 kPa	
Fluid	Air/non-corrosive, non-flammable gas	
Power supply voltage	12 to 24 VDC±10%, Ripple (P-P) 10% or less (with power supply polarity protection)	
Current consumption	17 mA or less at 24 VDC	
Response time	5 ms or less	
Repeatability	±1% F.S. or less	
Resistance	Enclosure	IP40
	Operating temperature range	Operating: 0 to 60°C. Stored: -10 to 60°C (with no condensation and no freezing)
	Operating humidity range	Operating/stored: 35 to 85%RH (with no condensation)
Temperature characteristics (25°C)	±3% F.S. or less	
Withstand voltage	1000 VAC for 1 min. (between terminals and housing)	
Insulation resistance	50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing	
Port size	O1: R 1/8, M5 x 0.8. T1: NPTF 1/8. M5 x 0.8. OX: with suction filter (for mounting on ZX unit). OR: based mount type (for mounting on ZR unit)	
Weight	35 g (including 0.6m long lead wire)	
Lead wire	Grommet type	Oil proof heavy-duty vinyl cable 3 cores, Ø3.4. Conductor area: 0.2mm ² . Insulator O.D: 1.1mm
	Connector type	Heat resistant vinyl electric wire, 3 wires. Conductor area: 0.31mm ² . Insulator O.D: 1.55mm

2.7 Vacuum Pressure Switch Output Specifications

Model	Nil	55
Switch output	NPN open collector 30 V, 80 mA or less	PNP open collector 80 mA or less
Residual voltage	1 V or less (with load current of 80 mA)	
Number of outputs	1	
Hysteresis	3% F.S. or less (fixed)	
Indicator light	ON: when output is ON (red)	
Trimmer adjustment	200°	

3 Installation

3.1 Installation

Warning

- Do not install the product unless the safety instructions have been read and understood.
- When mounting the product, tighten it with the recommended tightening torque (M3: 0.28–0.34 Nm. M5: 1.4–1.6 Nm).
- When installing the product, secure the space required for maintenance and inspection of the product
- Do not drop, hit, or apply excessive impact to the product.

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
- The suction filter used in this product is a simple one. If there is a lot of dust in the usage environment, please consider using a suction filter (ZFC series, etc.).
- Do not use in place where static electricity build-up can occur.
- Do not use in an environment where surges occur.

3.3 Air Supply

Caution

- Do not use air containing chemicals, synthetic oils containing organic solvents, salts, or corrosive gases.
- Recommended quality of the supplied air be equivalent to the compressed air cleanliness grade "2: 6: 3" according to ISO8573-1: 2010.
- Do not supply the pressure in excess of the product's specifications.

3.4 Piping

Caution

- Before connecting piping make sure to clean up chips, cutting oil, dust, etc.
- When piping a joint to each port, fix the part where the port is attached and use the recommended torque (M3: 0.4 to 0.5 Nm, M5: 1.0 to 1.5 Nm, 1/8: 3 to 5 Nm)

3.5 Wiring to the solenoid valve and pressure switches

Refer to the operation manual of solenoid valve (V100, SYJ300 series) and pressure switch (ZSE2 series). Manuals can be found by the links below:

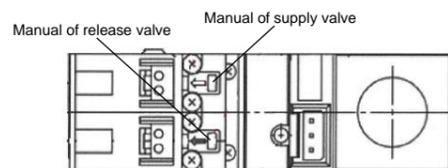
V100: <https://www.smcworld.com/manual/en-jp/?k=V100>

SYJ300: <https://www.smcworld.com/manual/en-jp/?k=SYJ300>

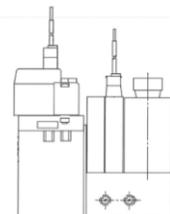
ZSE2: <https://www.smcworld.com/manual/en-jp/?k=ZSE2>

4 Settings

4.1 Manual Override (With supply valve and release valve)



4 Settings - continued



Refer to the operation manual of the solenoid valve V100, SYJ300 series for the manual operation method.

4.2 Release flow adjusting needle

When the release valve is turned on, vacuum release air is let out. The release flow adjusting needle allows to control the vacuum break air flow rate.

For products with locknut, loosen the locknut and use a flat-blade screwdriver to adjust the release flow rate adjustment needle at the back of the lock nut.

The breaking flow rate adjustment needle can be turned clockwise to reduce the release flow rate, and counterclockwise to increase the release flow rate.

For products with locknut, after adjusting the release flow rate adjustment needle, tighten the locknut to fix the adjustment position.

5 How to Order

Refer to the catalogue for 'How to Order'.

6 Outline Dimensions (mm)

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.
- If any electrical connections are disturbed during maintenance, ensure they are reconnected correctly, and safety checks are carried out as required to ensure continued compliance with applicable national regulations.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions
- Implement the maintenance and check shown below to use the space saving vacuum unit safely and in an appropriate way for a long period of time.
- Drain the air filter and mist separator regularly
- Replace the sound absorbing material (silencer) built into the ejector regularly
- Refer to the online operation manual for replacement parts.
- Do not use benzene or thinner for cleaning

7.2 Sound absorbing material replacement method

- Single Unit
 - Loosen the two assembly screws of the silencer case and remove the silencer case assembly.
 - Replace the sound absorbing material in the silencer case.
 - Assemble the silencer case assembly with the replaced sound absorbing material, and assemble it with screws (recommended tightening torque: 0.2 to 0.3 Nm)

7 Maintenance - continued

7.3 Filter element replacement method

- Loosen the tension bolt and remove the filter case.
- Replace the filter element built into the filter case.
- Assemble the filter case with tension bolts (recommended tightening torque: 0.12 to 0.18 Nm).

8 Limitations of Use

8.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

Caution

- Exhaust from vacuum module (ejector system)**
 - For the silencer exhaust type, make sure that there is no obstruction around the exhaust port.
 - In the case of port exhaust type, exhaust resistance may be affected depending on the pipe diameter and length, so make sure that the back pressure is 1 kPa or less.
 - Do not block the exhaust port.
- Ejector exhaust noise**

When the vacuum ejector generates a vacuum, an intermittent noise (abnormal noise) may be generated from the exhaust section near the standard supply pressure where the vacuum pressure peaks, and the vacuum pressure may not be constant. There is no problem in use as long as the vacuum pressure range is sufficient for adsorption, but if you are concerned about the sound or affect the setting of the pressure switch, slightly change the supply pressure and reduce the range of the intermittent sound. Please avoid it.
- About the release flow rate adjusting needle**
 - Leakage cannot be reduced to zero when the needle is fully closed.
 - The breaking flow rate adjustment needle changes from the fully closed state to the fully open state after two rotations. If it is turned more than that, it may come off, so please do not turn it more than 2 times
 - For products with locknut, when tightening the locknut, tighten it by hand to about 15 to 30 degrees, and be careful not to damage it due to overtightening.
- About solenoid valve and pressure switch**

For the solenoid valve (V100, SYJ300 series) and pressure switch (ZSE2 series), refer to each instruction manual.

9 Product disposal

This product should not be disposed of as municipal waste. Check your local regulations and guidelines to dispose this product correctly, in order to reduce the impact on human health and the environment.

10 Contacts

Refer to www.smcworld.com or www.smc.eu for your local distributor/importer.

SMC Corporation

URL : <https://www.smcworld.com> (Global) <https://www.smc.eu> (Europe)
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