



ORIGINAL INSTRUCTIONS

Instruction Manual
Vacuum Manifold for fieldbus system
Series ZKJ



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

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^{*)} and other safety regulations.

^{*)}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 Specifications

2.1 Ejector specifications ^{Note 1)}

Model	ZKJ07	ZKJ10	ZKJ12	ZKJ15		
Fluid	Air					
Nozzle diameter [mm]	0.7	1.0	1.2	1.5		
Standard supply pressure [MPa]	0.4					
Max. vacuum pressure [kPa]	-89					
Max. suction flow ^{Note 2)} ³⁾	Port exhaust	Without exhaust sealing valve	31	53	63	74
		With exhaust sealing valve	30	48	57	-
	High-noise reduction silencer exhaust	Without exhaust sealing valve	31	51	60	68
		With exhaust sealing valve	30	45	54	-
Air consumption ^{Note 2)} [L/min(ANR)]	26	48	68	102		

2 Specifications - continued

Ejector specifications - continued

Supply pressure range [MPa]	0.3 to 0.5	
Type of actuation	Supply valve: N.C., Release valve: N.C. (ZKJ-JSY3A) Supply valve: N.O., Release valve: N.C. (ZKJ-JSY3E)	
Response time at 0.5 [MPa] ^{Note 4)}	23 [ms] or less	
Max. operating frequency [Hz]	3	
Manual override	Non-locking push type	
Power consumption [W]	0.4	
Environmental resistance	Operating temperature range [°C]	0 to 50 (No condensation)
	Vibration resistance ^{Note 5)} [m/s ²]	30
	Impact resistance ^{Note 6)} [m/s ²]	150
	Withstand voltage	500 [VAC] for 1 [min] between terminals and FE
	Insulation resistance	500 [VDC], 10 [MΩ] or more between terminals and FE
	Enclosure ^{Note 7)}	IP65

Table 1.

Note 1) The supply valve and release valve mounted on this product is the SMC dual 3-port valve JSY3000 series. Refer to the Web Catalogue for details on the JSY3000 series.

Note 2) Values are at the standard supply pressure and based on SMC's measurement standards.

Note 3) If the vacuum port diameter is Φ6 or Φ1/4", Max. Suction flow rate is reduced by 15% or less.

Note 4) It shows supply valve/release valve specification. Based on dynamic performance test, JIS B 8419-2010 (Coil temperature: 20[°C], at rated voltage).

Note 5) The characteristics are satisfied when tested for 2 hours in each of the X, Y and Z directions at 10 to 500 Hz without energization (Initial value).

Note 6) The characteristics are satisfied when tested one time in each of the X, Y and Z directions without energization (Initial value).

Note 7) Cannot be used in an environment where oil, such as cutting oil, splashes or it is constantly exposed to water. Take appropriate protective measures.

2.2 Positive pressure unit specifications

Model	ZKJ1V#P-15U	ZKJ1V#P-25U	ZKJ1V#P-A5U
Fluid	Air		
Supply pressure range [MPa]	0.3 to 0.5		
Type of actuation	2-position single	2-position double	4-position dual 3-port valve (N.C/N.C)
Response time ^{Note 8)}	18 [ms] or less	12 [ms] or less	23 [ms] or less
Max. operating frequency [Hz]	5		
Manual override	Non-locking push type		
Power consumption [W]	0.4		
Environmental resistance	Operating temperature range [°C]	0 to 50 (No condensation)	
	Vibration resistance ^{Note 9)} [m/s ²]	30	
	Impact resistance ^{Note 10)} [m/s ²]	150	
	Withstand voltage	500 [VAC] for 1 [min] between terminals and FE	
	Insulation resistance	500 [VDC], 10 [MΩ] or more between terminals and FE	
	Enclosure ^{Note 11)}	IP65	

Table 2.

Note 8) It shows the solenoid valve specification. Based on a dynamic performance test, JIS B 8419:2010 (coil temperature: 20°C, at rated voltage).

Note 9) The characteristics are satisfied when tested for 2 hours in each of the X, Y, and Z directions at 10 to 50 Hz without energisation (initial value).

Note 10) The characteristics are satisfying when tested one time in each of the X, Y, and Z directions without energisation (initial value).

Note 11) Cannot be used in an environment where oil, such as cutting oil, splashes or where the product is constantly exposed to water. Take appropriate protective measures.

2 Specifications - continued

2.3 Noise Level (Reference value) ^{Note 12,13)}

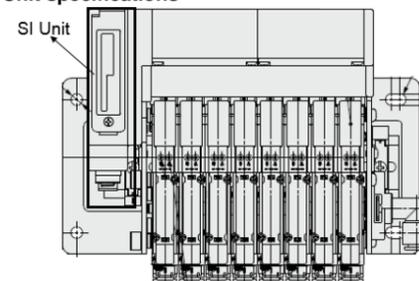
Model	ZKJ07	ZKJ10	ZKJ12	ZKJ15
Noise level [dB(A)]	52	63	67	71

Table 3.

Note 12) Values at the standard supply pressure.

Note 13) Values are with 1 ejector generating vacuum pressure adequately for adsorption with high-noise reduction silencer (Not guaranteed values).

2.4 SI Unit specifications



Series	EX260
Protocol	PROFINET, IO-Link, EtherNet/IP, EtherCAT

Table 4.

For details, refer to SI unit operation manual for 'Specifications'.

2.5 Pressure sensor specifications ^{Note 14)}

Rated pressure range [kPa]	Without exhaust sealing valve	-100 to 100
	With exhaust sealing valve	-100 to 200
Proof pressure [kPa]	500	
Accuracy	± 3%F.S.	
Current consumption (per piece)	15 [mA] or less	

Table 5.

Note 14) Cannot be used for actuating the cylinders. Do not apply release pressure constantly.

Warning

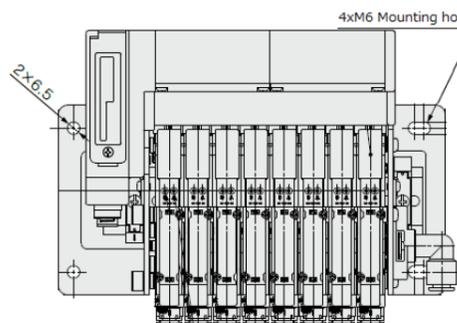
Special products (-X) might have specifications different from those shown in this section. Contact SMC for specific drawings.

3 Installation

3.1 Installation

3.1.1 Mounting

Mount and tighten the manifold using the holes in the end plate (4xM6)



3.1.2 Connecting cables

Refer to SI unit operation manual for 'Wiring'. Select the appropriate cables to make with the connectors mounted on the SI unit.

3 Installation - continued

3.1.3 Ground terminal

The SI unit must be connected to FE (Functional Earth) to divert electromagnetic interference. For maximum protection, the FE cable should be as thick and short as reasonably possible.

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 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.

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.

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.

4 Settings

Refer to SI unit operation manual. The setting file can be found on the SMC website.

5 How to Order

Refer to catalogue for 'How to Order'.

6 Outline Dimensions

Refer to 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 checks shown below in order to use the ejector safely and in an appropriate way for a long period of time:

7 Maintenance - continued

- Maintenance should be performed according to the procedure indicated in the Operation Manual. Improper handling can cause damage and malfunction of equipment and machinery.
- Maintenance work
Compressed air can be dangerous when handled incorrectly. Therefore, in addition to observing the product specifications, replacement of elements and other maintenance activities should be performed by personnel with sufficient knowledge and experience pertaining to pneumatic equipment.
- Draining
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 ejector and the silencer regularly.
It is recommended to replace the filter element and the silencer when the pressure drop reaches 5kPa 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.
- 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) in order 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 of parts specified in the operation manual.
- Tighten to the specified tightening torque.

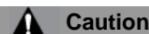
If the tightening torque is exceeded, the product, the mounting screws and brackets can be broken. Insufficient torque can cause displacement of the product from each proper position and loosening of the mounting screws.

- Before piping, perform air blow (flushing) or cleaning to remove any cutting chips, cutting oil, dust, etc. from the piping. Otherwise, failure or malfunction may occur.
- If the fluid contains foreign matter, install and connect a filter or mist separator to the inlet. Otherwise, failure, malfunction or inaccurate measurements from the pressure sensor may occur.

8 Limitations of Use

8.1 Limited warranty and disclaimer/compliance requirements

Refer to Handling Precautions for SMC Products.

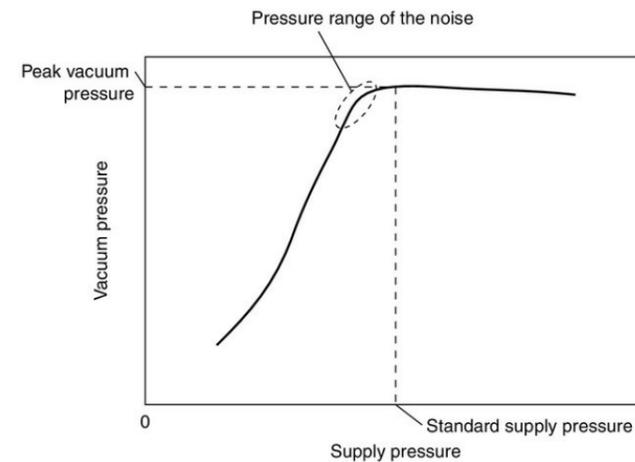


Caution

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



9 Product Disposal

This product shall 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)
SMC Corporation, 1-5-5, Kyobashi, Chuo-ku, Tokyo 104-0031, JAPAN
Specifications are subject to change without prior notice from the manufacturer.
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