# Vacuum Manifold for Fieldbus System

New

CE  UK CA  RoHS

IP65

Ejector System

## Fieldbus-compatible

- Space saving: Requires no separate input/output units
- Reduced wiring time
- Compatible protocol  PROFI NET®  IO-Link

## Vacuum Ejector

### Air consumption

# 90 % reduction

Air saving by the energy saving SI unit and built-in pressure sensor
(Under SMC's measurement conditions)

New

## Exhaust sealing function

- Vacuum release flow rate increased by 2 times
  (Under SMC's measurement conditions)
- High release pressure allows for the quick release of workpieces.

## Supply valve: N.O. specification available

- Can hold vacuum*1 even when the power goes out or is turned off
- Prevents the sudden dropping of workpieces*1
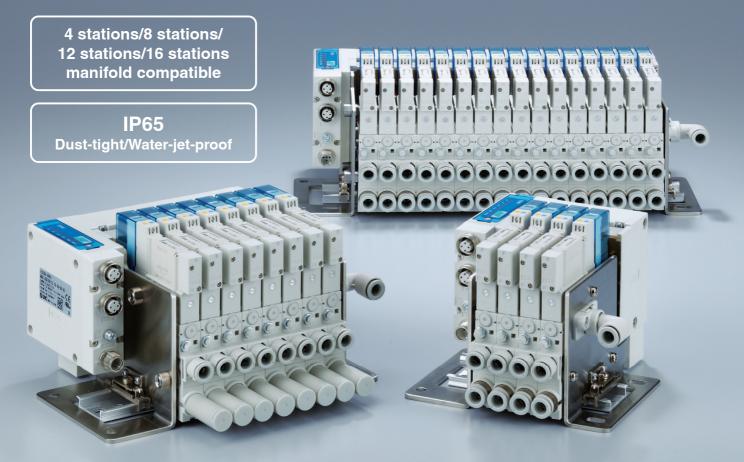
*1 Supposing the supply pressure is being maintained

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4 stations/8 stations/ 12 stations/16 stations manifold compatible

IP65
Dust-tight/Water-jet-proof

# ZKJ Series

SMC®

## Energy saving

### Air saving by the energy saving SI unit and built-in pressure sensor
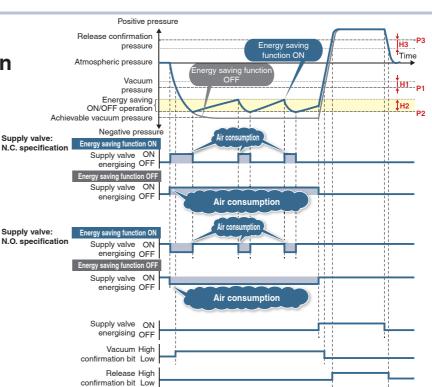
**Air consumption**

# 90 % reduction[1]

*1 Under SMC's measurement conditions

**Energy saving function ON**

Air is supplied **intermittently** when the vacuum decreases.

**Energy saving function OFF**

Air is supplied **continuously** during the adsorption of the workpiece.



# Energy saving efficiency: 90 % reduction

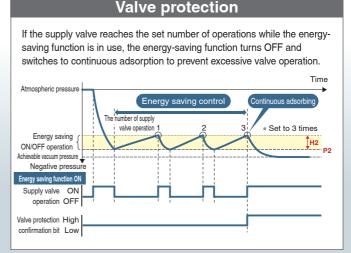## Power consumption cost per year reduced by 78,75 €/year[2]

The energy saving function shortens the exhaust time, which reduces the annual power consumption cost.

**Per ejector**

With energy saving function

| | Power consumption cost per year | Annual air consumption | Air consumption (1 cycle) | Exhaust time (1 cycle) |
|---|---|---|---|---|
| **ZKJ/Energy saving function ON** | **8,75 €/year** | **748 m³/year** | **0.68 L** | **0.6 s** |
| ZKJ/Energy saving function OFF | 87,50 €/year | 7,480 m³/year | 6.8 L | 6 s |

*2 **Cost conditions** Air unit 0,12 €/m³ (ANR), Annual operating cycles: 1100000
(Operating hours: 10 hours/day, Operating days: 250 days/year, 450 cycles, Vacuum ejector ZKJ12 (Air consumption 68 l/min (ANR)) when 1 unit is used)

### Supply valve (N.O.)

Vacuum can be held during a power outage or when the power is turned OFF, preventing the workpiece from dropping.[1]



*1 Supposing the supply pressure is being maintained

### Valve protection

If the supply valve reaches the set number of operations while the energy-saving function is in use, the energy-saving function turns OFF and switches to continuous adsorption to prevent excessive valve operation.
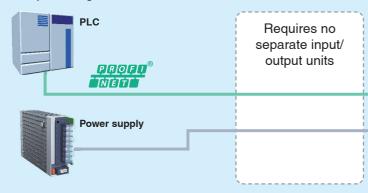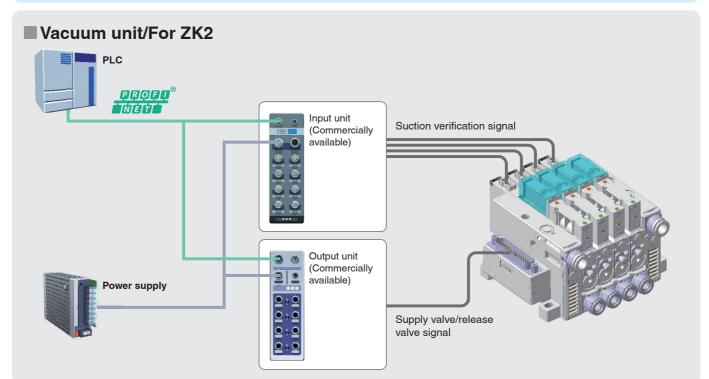


1

SMC

# Space saving/Less wiring work

## ■Vacuum manifold for fieldbus system/For ZKJ

- Requires no separate input/output units
- Reduction of network load
- Less communication/power supply cables and wiring work
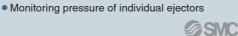- Simple wiring/Minimised disconnection risk

**PLC**

**PROFI NET®**

Requires no separate input/output units

**Power supply**

## ■Vacuum unit/For ZK2

**PLC**

**PROFI NET®**

Input unit (Commercially available)

Suction verification signal

Output unit (Commercially available)

Supply valve/release valve signal

**Power supply**

# Remote control and monitoring are available.

**PLC**

**PROFI NET®**

**Configurable items**

- Energy saving function
- Pressure (checking adsorption (P1, H1), energy saving function threshold (P2, H2), release confirmation (P3, H3))

**Monitoring**

- Monitoring pressure of individual ejectors

SMC

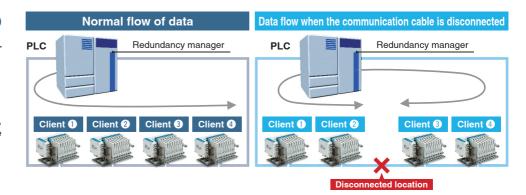# Vacuum Manifold for Fieldbus System *ZKJ* Series

## PROFINET Compatible

## MRP/MRPD function

### MRP (Media Redundancy Protocol) function

Communication can be continued even if one of the communication cables in the network is disconnected or damaged.
Furthermore, as it is possible to identify the disconnection point quickly, the network disconnection time can be kept within 200 ms.
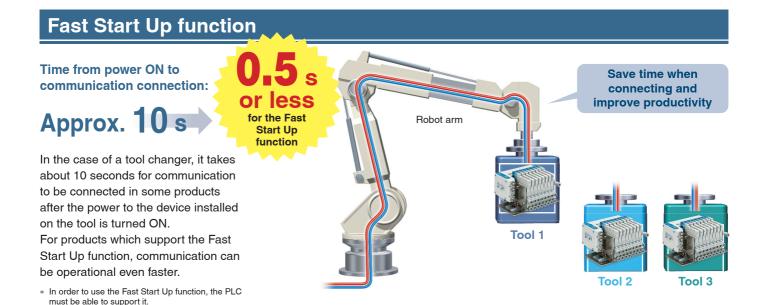
∗ In order to use the MRP function, the PLC must be able to support it.

**Normal flow of data**

PLC — Redundancy manager

Client ❶   Client ❷   Client ❸   Client ❹

**Data flow when the communication cable is disconnected**

PLC — Redundancy manager

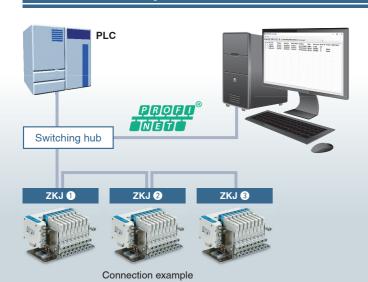Client ❶   Client ❷   Client ❸   Client ❹

✕ **Disconnected location**

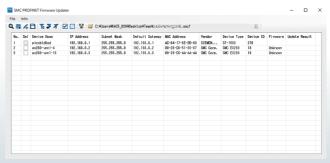### MRPD (Media Redundancy for planned duplication)

It is possible to duplicate routes with a ring topology configured with PROFINET IRT communication.

Communication reconnection time is faster than with the MRP function, so communication can be continued without recovery time.

## Fast Start Up function

**Time from power ON to communication connection:**

# Approx. **10** s →

**0.5** s **or less**
for the Fast Start Up function

In the case of a tool changer, it takes about 10 seconds for communication to be connected in some products after the power to the device installed on the tool is turned ON.
For products which support the Fast Start Up function, communication can be operational even faster.

∗ In order to use the Fast Start Up function, the PLC must be able to support it.

Robot arm

**Save time when connecting and improve productivity**

Tool 1

Tool 2     Tool 3

## FW (firmware) updates

PLC

Switching hub

ZKJ ❶     ZKJ ❷     ZKJ ❸

Connection example

| No. | Sel | Device Name | IP Address | Subnet Mask | Default Gateway | MAC Address | Vendor | Device Type | Device ID | Firmware | Update Result |
|-----|-----|-------------|------------|-------------|-----------------|-------------|--------|-------------|-----------|----------|---------------|
| 1 | | plcxb1dded | 192.168.0.1 | 255.255.255.0 | 192.168.0.1 | AC-64-17-6E-BB-00 | SIEMEN... | S7-1500 | 276 | | |
| 2 | | ex260-vpn1-4 | 192.168.0.2 | 255.255.255.0 | 192.168.0.2 | 00-23-C6-51-00-07 | SMC Corp. | SMC EX260 | 18 | | Unknown |
| 3 | | ex260-vpn1-16 | 192.168.0.3 | 255.255.255.0 | 192.168.0.3 | 00-23-C6-AA-AA-AA | SMC Corp. | SMC EX260 | 18 | | Unknown |

● Batch firmware updating for up to 255 units is possible from the Ethernet line.

● Easy to handle future version upgrades

∗ Depending on the product's hardware and firmware versions, it may not be possible to use the firmware update function.
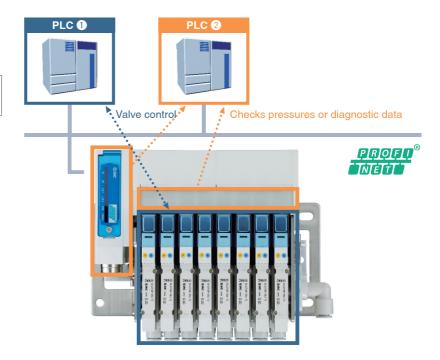
SMC

# PROFINET Compatible

## Shared Device function

An I/O data connected to an SI unit can be controlled and checked by multiple I/O controllers (PLC).

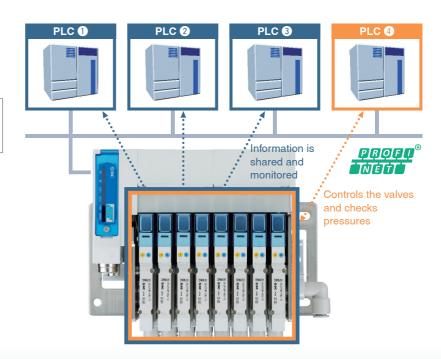Ex. PLC1 controls the valve
PLC2 checks pressures or diagnostic data

PLC ❶     PLC ❷

Valve control     Checks pressures or diagnostic data

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● Information can be shared with up to 3 controllers in addition to the control PLC.
● The cost of the hardware, cables, and installation space can be reduced.

Ex. Information of PLC4 is shared and monitored by PLC1 to 3.
PLC4 controls the valves and checks pressures.

PLC ❶    PLC ❷    PLC ❸    PLC ❹

Information is shared and monitored

Controls the valves and checks pressures

---

∗ The Shared Device function enables an I/O module connected to the I/O device to be controlled by multiple I/O controllers (PLC). The control status can be shared among other I/O controllers. As the function can be used across the entire PROFINET line, the cost for hardware, cables, and installation space can be reduced.
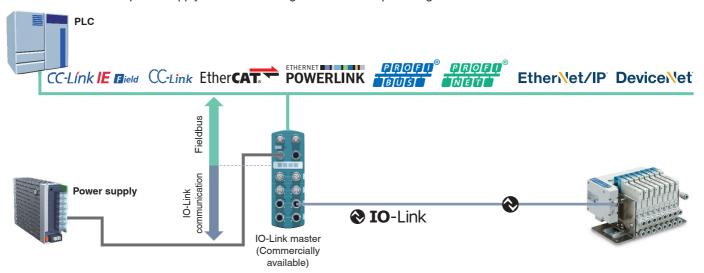
## New IO-Link Compatible ⊘ IO-Link

## Space saving/Less wiring work

- Requires no separate input/output units
- Connectable to various networks via an IO-Link master
  (Communication is possible without reliance on a Fieldbus or PLC.)
- Less communication/power supply cables and wiring work

- Reduced wiring space
- Reduced network load due to the reduction in the number of Fieldbus connected devices
- Simple wiring/Minimised disconnection risk

PLC

CC-Link IE Field  CC-Link  EtherCAT®  ETHERNET POWERLINK  PROFIBUS®  PROFINET®  EtherNet/IP®  DeviceNet®

Fieldbus

IO-Link communication

Power supply

⊘ IO-Link

IO-Link master
(Commercially available)

## Connectable with a single general-purpose cable

**Port class B**
IO-Link master
(Commercially available)

Power supply load

- Connect the IO-Link master port to the device using a 1:1 configuration.
- Connect using an M12 connector.
- Maximum cable length: 20 m
- Special communication cables are not necessary.
  * In order to connect the SI unit using a single cable, use a port class B type IO-Link master.
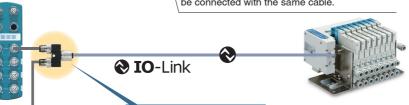
**Port class B** compliant

⊘ IO-Link

**Port class A**
IO-Link master
(Commercially available)

General-purpose 5-wire unshielded cables are used for connection.
The signal wire and valve power supply wire can be connected with the same cable.

⊘ IO-Link

Power supply load

### SI unit/Connector pin arrangement

| Pin no. | SI unit port pin function (Port class B) |
|---------|------------------------------------------|
| 1 | +24 V for control and input |
| 2 | +24 V for output |
| 3 | 0 V for control and input |
| 4 | IO-Link communication |
| 5 | 0 V for output |

**Y Branch Connector**

### Difference between IO-Link master port class A and class B

| Pin no. | IO-Link master port pin function | |
|---------|------------|------------|
| | Port class A | Port class B |
| 1 | +24 V | +24 V |
| 2 | NC/DI/DO | Additional power supply +24 V |
| 3 | 0 V | 0 V |
| 4 | IO-Link/DI/DO | IO-Link/DI/DO |
| 5 | NC | Additional power supply 0 V |

**Port class A** compliant

**A special wiring Y branch connector is available.**

Used when connecting to a port class A type IO-Link master, which is often used when connecting to an IO-Link sensor
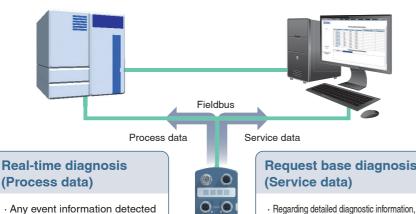
Connect to the master
1
2
3
4
5

Connect to power supply
1
2
3
4
5

Connect to the SI unit
1
2
3
4
5

⊘SMC

## (New) IO-Link Compatible  ◇ IO-Link

# Self-diagnosis function/Automatic parameter saving and writing



Fieldbus

Process data    Service data

### Self-diagnosis contents (Examples)

| Diagnostic contents | Event category |
|---|---|
| Internal failure of the SI unit | Error |
| Ejector valve short circuit | Error |
| Pressure sensor short circuit | Error |
| Pressure sensor failure/disconnection | Error |
| Voltage drop of power supply for logic/input | Warning |
| Valve protection function in use | Warning |

### Real-time diagnosis (Process data)

· Any event information detected by the SI unit using the process data can be transmitted to the PLC and PC in real time via the upper level Fieldbus.

· 2 types of event flags are transmitted to the PLC and PC. (Error/Warning)

IO-Link master (Commercially available)

### Request base diagnosis (Service data)

· Regarding detailed diagnostic information, the event codes can be transmitted as service data to the PLC and PC.

◇ IO-Link

### Data storage function

· The parameters of each ejector can be saved automatically to the IO-Link master.

· When replacing or adding an IO-Link device, the saved parameters can be written automatically, reducing replacement/setup time.



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## Implement diagnostic bits in the process data.

The diagnostic bit in the cyclic process data makes it easy to find problems with the equipment. It is possible to find problems with the equipment in real time using the cyclic (periodic) data and to monitor such problems in detail with the noncyclic (aperiodic) data.

### Process Data

| Vacuum manifold stations | Input process data | Output process data |
|---|---|---|
| 4 | 4 byte | 2 byte |
| 8 | 5 byte | 3 byte |
| 12 | 6 byte | 4 byte |
| 16 | 7 byte | 5 byte |

∗ The process data size occupied by the SI Unit depends on the number of vacuum manifold stations.

### Input process data

| Byte | 1 | | | | | | | | 0 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bit offset | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Item | Process data | | | | | | | | | | | | | | | |

| Byte | 3 | | | | | | | | 2 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bit offset | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Item | CH3 Release confirmation | CH3 Suction verification | CH2 Release confirmation | CH2 Suction verification | CH1 Release confirmation | CH1 Suction verification | CH0 Release confirmation | CH0 Suction verification | Valve protection | Parameter setting error | Supply valve setting mismatch | Power supply diagnostics for logic/input | Manifold connection error | Pressure sensor failure/ disconnection | Pressure sensor short circuit | Valve short circuit |

| Byte | 5 | | | | | | | | 4 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bit offset | 47 | 46 | 45 | 44 | 43 | 42 | 41 | 40 | 39 | 38 | 37 | 36 | 35 | 34 | 33 | 32 |
| Item | CH11 Release confirmation | CH11 Suction verification | CH10 Release confirmation | CH10 Suction verification | CH9 Release confirmation | CH9 Suction verification | CH8 Release confirmation | CH8 Suction verification | CH7 Release confirmation | CH7 Suction verification | CH6 Release confirmation | CH6 Suction verification | CH5 Release confirmation | CH5 Suction verification | CH4 Release confirmation | CH4 Suction verification |

| Byte | | | | | | | | | 6 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bit offset | | | | | | | | | 55 | 54 | 53 | 52 | 51 | 50 | 49 | 48 |
| Item | | | | | | | | | CH15 Release confirmation | CH15 Suction verification | CH14 Release confirmation | CH14 Suction verification | CH13 Release confirmation | CH13 Suction verification | CH12 Release confirmation | CH12 Suction verification |

∗ The pressure value of the monitoring channel selected in the output process data can be checked.

### Output process data

| Byte | 1 | | | | | | | | 0 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bit offset | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Item | CH3 Release instruction | CH3 Vacuum instruction | CH2 Release instruction | CH2 Vacuum instruction | CH1 Release instruction | CH1 Vacuum instruction | CH0 Release instruction | CH0 Vacuum instruction | Pressure value monitoring channel selection | | | | | | | |

| Byte | 3 | | | | | | | | 2 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bit offset | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Item | CH11 Release instruction | CH11 Vacuum instruction | CH10 Release instruction | CH10 Vacuum instruction | CH9 Release instruction | CH9 Vacuum instruction | CH8 Release instruction | CH8 Vacuum instruction | CH7 Release instruction | CH7 Vacuum instruction | CH6 Release instruction | CH6 Vacuum instruction | CH5 Release instruction | CH5 Vacuum instruction | CH4 Release instruction | CH4 Vacuum instruction |

| Byte | | | | | | | | | 4 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bit offset | | | | | | | | | 39 | 38 | 37 | 36 | 35 | 34 | 33 | 32 |
| Item | | | | | | | | | CH15 Release instruction | CH15 Vacuum instruction | CH14 Release instruction | CH14 Vacuum instruction | CH13 Release instruction | CH13 Vacuum instruction | CH12 Release instruction | CH12 Vacuum instruction |

# Variations

## SI unit/Compatible protocol

PROFI NET®

IO-Link

### Manifold stations
4 stations, 8 stations,
12 stations, 16 stations

### Nozzle size
Ø 0.7, Ø 1.0, Ø 1.2, Ø 1.5

### Combination of supply valve and release valve

| Supply valve | Release valve |
|---|---|
| N.O. | N.C. |
| N.C. | N.C. |

### Manual override for residual pressure release

None (Plug)

Red manual override*1
*1 Option

### Air pressure supply (P) port
Ø 8, Ø 5/16" One-touch fittings

### Air pressure supply (P) port
None (Plug)/Ø 6, Ø 1/4" One-touch fittings

### Vacuum (V) port
Ø 6, Ø 8 One-touch fittings
Ø 1/4", Ø 5/16" One-touch fittings

## Vacuum break flow adjusting needle

Manual override type

Screwdriver operation type long lock nut*2
*2 Option

## Exhaust (EXH) port

High-noise reduction silencer exhaust

Port exhaust

SMC
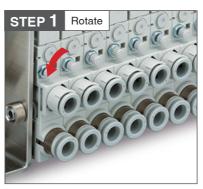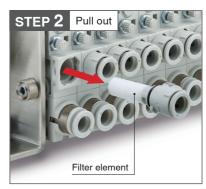
## No tools are required!
## Maintenance labour can be reduced.

**Easier replacement of the filter element**
**Vacuum port located above the exhaust port**
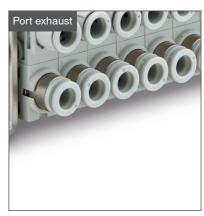
∗ The location of the vacuum port and exhaust port is different from ZK2 series.

Vacuum port

Exhaust port

| STEP 1 | Rotate |
| --- | --- |

| STEP 2 | Pull out |
| --- | --- |

Filter element

## Applicable for the high performance silencer exhaust

High-noise reduction silencer exhaust
(Exhaust noise: 52 [dB(A)] )∗1

Port exhaust

Unpleasant frequencies are removed while maximizing vacuum performance by using a dedicated silencer with better silencing effect.
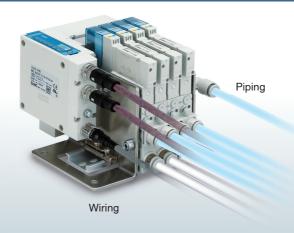
∗1  Adsorbs the workpiece (nozzle diameter Ø 0.7 (1 station)). (Under SMC's measurement conditions)

## Wiring and piping are integrated on one side.

Piping

Wiring

SMC

# CONTENTS

## Vacuum Manifold for Fieldbus System *ZKJ* Series

# Vacuum Manifold for Fieldbus System
# *ZKJ* Series  $C\epsilon$ UK CA RoHS

## How to Order

**Vacuum manifold** **ZZKJ** 04 – **FAN** – L8
❶ ❷ ❸

### ❶ Manifold stations

| Symbol | Manifold stations | Vacuum ejector stations |
|---|---|---|
| 04 | 4 | Max. 4 stations |
| 08 | 8 | Max. 8 stations |
| 12 | 12 | Max. 12 stations |
| 16 | 16 | Max. 16 stations |

∗ The product outline is every four stations manifold. Be sure that the total number of the ejectors and the blanking plates is equal to the manifold stations.
∗ The manifold model number cannot be ordered alone.
∗ The ejector can be increased by exchanging the blanking plate to an ejector, and also decreased for maintenance. Refer to How to Increase Manifold Stations on page 20.

### ❷ SI Unit Specifications

| Symbol | Protocol |
|---|---|
| FAN | PROFINET |
| KAN | IO-Link |

### ❸ U-side end plate and supply (P) port
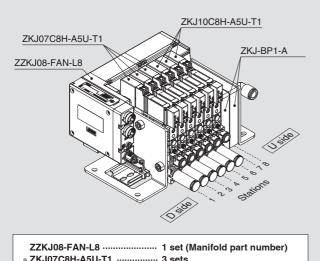
| Symbol | Supply (P) port |
|---|---|
| L8 | Ø 8 Elbow One-touch fittings |
| LN9 | Ø 5/16" Elbow One-touch fittings |

## Ordering Example

### Example 1
· When the number of vacuum ejector stations is 6, select 8 stations for a manifold and order 2 sets of blanking plates.

ZKJ10C8H-A5U-T1
ZKJ07C8H-A5U-T1
ZZKJ08-FAN-L8
ZKJ-BP1-A
U side
D side
Stations

| | |
|---|---|
| ZZKJ08-FAN-L8 | 1 set (Manifold part number) |
| ∗ ZKJ07C8H-A5U-T1 | 3 sets |
| ∗ ZKJ10C8H-A5U-T1 | 3 sets |
| ∗ ZKJ-BP1-A | 2 sets |

↳ The asterisk denotes the symbol for the assembly. Prefix to the single unit part number.

### Example 2
· When the number of vacuum ejector stations is 8 and it is possible that the stations increase to 12, select 12 stations for a manifold and order 4 sets of blanking plates.

ZKJ10C8H-A5U-T1
ZKJ07C8H-A5U-T1
ZZKJ12-FAN-L8
ZKJ-BP1-A
U side
D side
Stations
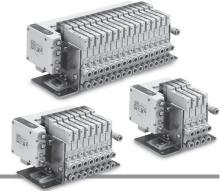
| | |
|---|---|
| ZZKJ12-FAN-L8 | 1 set (Manifold part number) |
| ∗ ZKJ07C8H-A5U-T1 | 4 sets |
| ∗ ZKJ10C8H-A5U-T1 | 4 sets |
| ∗ ZKJ-BP1-A | 4 sets |

↳ The asterisk denotes the symbol for the assembly. Prefix to the single unit part number.
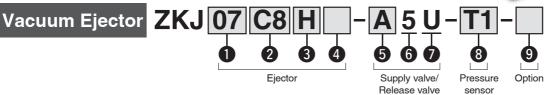
· When the manifold is viewed from V port, the first station starts from the left (D side).
· After the manifold part number, specify the installed single unit from the first station.
· Please refer to Manifold Options on page 21 for details of the blanking plate.

**SMC**

⚠ **Caution** | This product cannot be ordered only with the manifold part number. Under the manifold part number, be sure to add the single unit part number with an asterisk prefix.

## Vacuum Ejector  ZKJ 07 C8 H ☐ – A 5 U – T1 – ☐

❶ ❷ ❸ ❹ | ❺ ❻ ❼ | ❽ | ❾

Ejector | Supply valve/Release valve | Pressure sensor | Option

### ❶ Nominal nozzle size

| Symbol | Nominal nozzle size |
|---|---|
| **07** | Ø 0.7 |
| **10** | Ø 1.0 |
| **12** | Ø 1.2 |
| **15** | Ø 1.5 |

### ❷ Vacuum (V) port, supply (P) port

| Symbol | Standard | Vacuum (V) port | Supply (P) port |
|---|---|---|---|
| **C6** | Metric | Ø 6 | Plug |
| **C8** | Metric | Ø 8 | Plug |
| **N7** | Inch | Ø 1/4" | Plug |
| **N9** | Inch | Ø 5/16" | Plug |
| **C6U** | Metric | Ø 6 | Ø 6[*1] |
| **C8U** | Metric | Ø 8 | Ø 6[*1] |
| **N7U** | Inch | Ø 1/4" | Ø 1/4"[*1] |
| **N9U** | Inch | Ø 5/16" | Ø 1/4"[*1] |

∗1 When selecting "Plug for individual supply" for options (8) or increasing the flow rate of supply air, select Supply (P) port.

### ❸ Exhaust (EXH) port

| Symbol | Exhaust |
|---|---|
| **H** | High-noise reduction silencer exhaust |
| **P** | Port exhaust[*2] |

∗2 Port size of exhaust port; mm: Ø 8, inch: Ø 5/16"

### ❹ Exhaust sealing valve

| Symbol | Specification |
|---|---|
| **—** | None |
| **V** | Exhaust sealing valve |

∗ When "15" is selected for the nominal nozzle size, leave the symbol for the exhaust sealing valve blank.

### ❺ Combination of supply valve and release valve

| Symbol | Supply valve | Release valve |
|---|---|---|
| **A** | N.C. | N.C. |
| **E** | N.O. | N.C. |

### ❻ Rated voltage

| Symbol | Voltage |
|---|---|
| **5** | 24 VDC |

### ❼ Light/surge voltage suppressor and common specification

| Symbol | With light | Surge voltage suppressor | Common specification |
|---|---|---|---|
| **U** | Yes | Yes | Non-polar |

### ❽ Pressure sensor

| Symbol | Specifications |
|---|---|
| **T1** | −100 to 100 [kPa] |
| **T2** | −100 to 200 [kPa] |

∗ When "Nil" for ❹ exhaust sealing valve is selected, T1 is available, when "V" is selected, T2 is available.
Change the SI unit settings in accordance with the specifications of the selected pressure sensor.

### ❾ Option[*3]

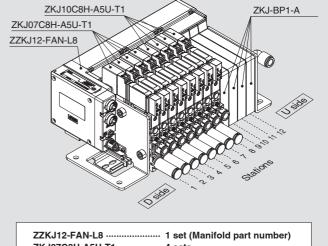| Symbol | Type |
|---|---|
| **—** | Without option |
| **E** | Vacuum break flow adjusting needle screwdriver operation type long lock nut |
| **M** | Plug for individual supply[*4],[*5] (Blocking the air supply passage to the D side) |
| **R** | With manual override for residual pressure release[*6] |
| **Y** | Vacuum (V) port release to atmosphere type (Check valve: 1 pc.)[*7] |

∗3 When more than one option is selected, list the option symbols in alphabetical order. (Example -EM)
∗4 The supply (P) port for vacuum manifold is mounted only on the U side.
Select the supply (P) port for ❷ on the D side of the ejector where the plug for individual supply is mounted.
For detail, refer to Manifold Option on page 21.
∗5 The plug for individual supply is mounted on the first station to block the air supply passage to the D side. Option M can be selected after second station.
∗6 Manual override to release vacuum (V) port to atmosphere. When option R is selected, option Y cannot be used together.
∗7 When "Y" is selected, the energy saving function is not available. When the vacuum generation is stopped, the vacuum (V) port is released to the atmosphere.
∗8 When option Y is selected, "V" for ❹ exhaust sealing valve cannot be selected.

## Specifications

### Ejector[*1]

| Model | | ZKJ07 | ZKJ10 | ZKJ12 | ZKJ15 |
|---|---|---|---|---|---|
| Fluid | | Air | | | |
| Nozzle size [mm] | | 0.7 | 1.0 | 1.2 | 1.5 |
| Standard supply pressure [MPa] | | 0.4 | | | |
| Max. vacuum pressure [kPa][*2] | | −89 | | | |
| Max. suction flow rate [l/min (ANR)][*2, *3] | Port exhaust — Without exhaust sealing valve | 31 | 53 | 63 | 74 |
| | Port exhaust — With exhaust sealing valve | 30 | 48 | 57 | — |
| | High-noise reduction silencer exhaust — Without exhaust sealing valve | 31 | 51 | 60 | 68 |
| | High-noise reduction silencer exhaust — With exhaust sealing valve | 30 | 45 | 54 | — |
| Air consumption [l/min (ANR)][*2] | | 26 | 48 | 68 | 102 |
| 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)[*4] | | 23 ms or less | | | |
| Max. operating frequency | | 3 Hz | | | |
| Manual override | | Non-locking push type | | | |
| Power consumption | | 0.4 W | | | |
| Environmental resistance | Operating temperature range | 0 to 50 °C (No condensation) | | | |
| | Vibration resistance[*5] | 30 m/s² | | | |
| | Impact resistance[*6] | 150 m/s² | | | |
| | Withstand voltage | 500 VAC for 1 minute between terminals and FE | | | |
| | Insulation resistance | 500 VDC, 10 MΩ or more between terminals and FE | | | |
| | Enclosure[*7] | IP65 | | | |
| Standards | | CE/UKCA marking (EMC directive/RoHS directive) | | | |

*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.
*2 Values are at the standard supply pressure and based on SMC's measurement standards. They depend on atmospheric pressure (weather, altitude, etc.) and the measurement method.
*3 If the vacuum port diameter is Ø6 or Ø1/4", Max. Suction flow rate is reduced by 15 % or less.
*4 It shows supply valve/release valve specification. Based on dynamic performance test, JIS B 8419-2010. (Coil temperature: 20 °C, at rated voltage)
*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)
*6 The characteristics are satisfied when tested one time in each of the X, Y and Z directions without energization. (Initial value)
*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.

### Max. Number of Manifold Stations that Can Operate Simultaneously[*8]

| Model | ZKJ07 | ZKJ10 | ZKJ12 | ZKJ15 |
|---|---|---|---|---|
| Air supply: 1 section (U-side end plate P port (Ø8)) | 16 | 6 | 5 | 3 |
| Air supply: 2 sections (U-side end plate P port (Ø8), Vacuum ejector P port (Ø6)) | 16 | 8 | 7 | 4 |

*8 Values are the number of ejector stations that can be generated vacuum simultaneously.

### Noise Level (Reference values)

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

*9 Values are at the standard supply pressure.
*10 Values are with 1 ejector generating vacuum pressure adequately for adsorption with high-noise reduction silencer (Not guaranteed values)

### Weight

| Manifold stations (ejectors) | 4 stations | 8 stations | 12 stations | 16 stations |
|---|---|---|---|---|
| Weight [kg] | 1.7 | 2.5 | 3.3 | 4.1 |

*11 When the blanking plate is mounted, please subtract 0.1 [kg] per unit.

* The solenoid valve mounted on this product is equivalent to the SMC JSY3000 series 5-port solenoid valve.

For details on solenoid valve functions, refer to the Operation Manual of the JSY3000 series on the SMC website (https://www.smc.eu).

5-port solenoid valve JSY3000 series

ZKJ-JSY3☐00－5U

Vacuum manifold for fieldbus system ZKJ series

ZKJ☐☐☐－5U－T1

● Combination of supply valve and release valve

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## Specifications

### SI Unit (PROFINET) (For details, refer to the Operation Manual.)

| | Model | | **EX260-VPN1** |
|---|---|---|---|
| **Electrical** | **Power supply for Control/ Input** | **Power supply voltage** | 24 VDC ±10 % |
| | | **Internal current consumption** | 100 mA or less |
| | **Power supply for output** | **Power supply voltage** | 24 VDC +10 %, -5 % |
| **Communication** | **Protocol** | | PROFINET |
| | **Device type** | | PROFINET IO |
| | **Configuration file**[*1] | | GSD File |
| | **Version** | | PROFINET Specification Version 2.3 |
| | **Communication speed** | | 100 Mbps full duplex |
| | **Applicable function** | | MRP function MRPD function Fast Start Up function Shared Device function FW update function Conformance Class C Net Load Class lll |
| **Vacuum** | **Applicable function** | | Energy saving Valve protection Zero-clear function |

∗1  The configuration file can be downloaded from the SMC website: https://www.smc.eu

### SI Unit (IO-Link)

| | Model | | **EX260-VIL1** |
|---|---|---|---|
| **Electrical** | **Power supply for Control/ Input** | **Power supply voltage** | 24 VDC ±10 % |
| | | **Internal current consumption** | 100 mA or less |
| | **Power supply for output** | **Power supply voltage** | 24 VDC +10 %, −5 % |
| **Communication** | **Protocol** | | IO-Link |
| | **IO-Link type** | | Device |
| | **Port Class** | | Class B |
| | **Configuration file**[*2] | | IODD File |
| | **Version** | | V1.1 |
| | **Communication speed** | | COM2 (38.4 kbps) |
| | **Applicable function** | | ISDU Data Storage FW update function |
| **Vacuum** | **Applicable function** | | Energy saving Valve protection Zero-clear function |

∗2  The configuration file can be downloaded from the SMC website: https://www.smc.eu

### Control Unit Specifications

| | Model | ZKJ-S004-A | ZKJ-S008-A | ZKJ-S012-A | ZKJ-S016-A |
|---|---|---|---|---|---|
| **Station** | | 4 | 8 | 12 | 16 |
| **Input** | **Pressure sensor** | 4 | 8 | 12 | 16 |
| | **Pressure sensor short circuit detection/Protection circuit** | Built-in (Common detection/protection) | | | |
| **Output** | **Number of valve outputs** | 8 | 16 | 24 | 32 |
| | **Valve short circuit detection/ Protection circuit** | Built-in (Individual detection/protection) | | | |
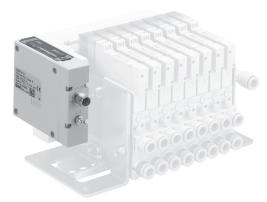
### Pressure Sensor Specifications
(For details, refer to the PSE54☐ series in the **Web Catalogue**, and the Operation Manual.)

| Item | | Specifications |
|---|---|---|
| **Rated pressure range** | Without exhaust sealing valve | −100 to 100 [kPa] |
| | With exhaust sealing valve | −100 to 200 [kPa] |
| **Withstand pressure**[*3] | | 500 [kPa] |
| **Accuracy** | | ±3 % F.S. |
| **Current consumption** | | 15 mA or less |
| **Sensor pressure receiving area** | | Silicon |
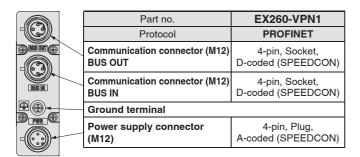
∗3  Do not use the product to drive an actuator such as a cylinder (when release pressure is constantly applied).

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# *ZKJ* Series
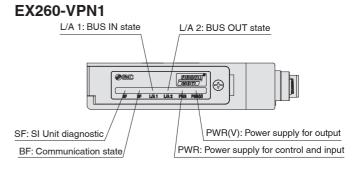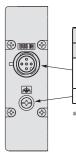
## Connector/LED Indicator

| Part no. | **EX260-VPN1** |
|---|---|
| Protocol | **PROFINET** |
| **Communication connector (M12) BUS OUT** | 4-pin, Socket, D-coded (SPEEDCON) |
| **Communication connector (M12) BUS IN** | 4-pin, Socket, D-coded (SPEEDCON) |
| **Ground terminal** | |
| **Power supply connector (M12)** | 4-pin, Plug, A-coded (SPEEDCON) |

### EX260-VPN1

L/A 1: BUS IN state

L/A 2: BUS OUT state

SF: SI Unit diagnostic

BF: Communication state

PWR(V): Power supply for output

PWR: Power supply for control and input

| Part no. | **EX260-VIL1** |
|---|---|
| Protocol | **IO-Link** |
| **Communication/Power connector (M12)**∗1 | 5-pin, Plug, A-coded (SPEEDCON) |
| **Ground terminal** | M3 |

∗1 The communication line, Power supply for control and input line, and the power supply for output line are connected using the same cable.

### EX260-VIL1

COM: IO-Link state

PWR(V): Power supply for output

ST: SI Unit diagnostic

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# ZKJ *Series*

## Exhaust Characteristics/Flow Rate Characteristics (Representative value)

### ZKJ07

**Exhaust Characteristics**
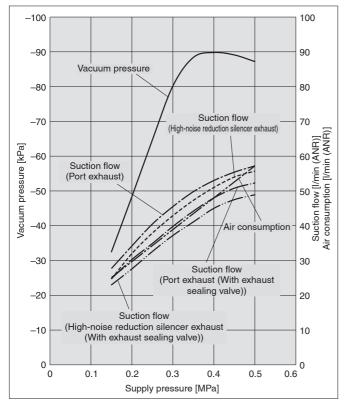
**Flow Rate Characteristics**  Supply pressure: 0.4 MPa (Standard supply pressure)



∗ Port exhaust: V port Ø 8, no exhaust port piping

### ZKJ10

**Exhaust Characteristics**

**Flow Rate Characteristics**  Supply pressure: 0.4 MPa (Standard supply pressure)



∗ Port exhaust: V port Ø 8, no exhaust port piping

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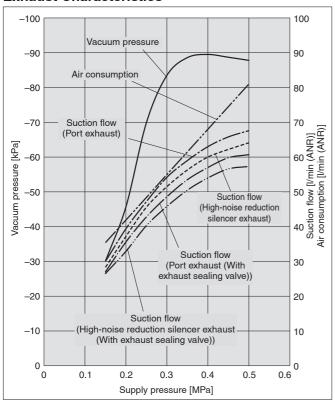
∗ Values are based on standard of SMC measurements. They depend on atmospheric pressure (weather, altitude, etc.) and measurement method.
∗ The flow rate characteristics correspond to the standard supply pressure.

## Exhaust Characteristics/Flow Rate Characteristics (Representative value)
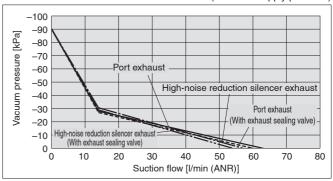
### ZKJ12

**Exhaust Characteristics**
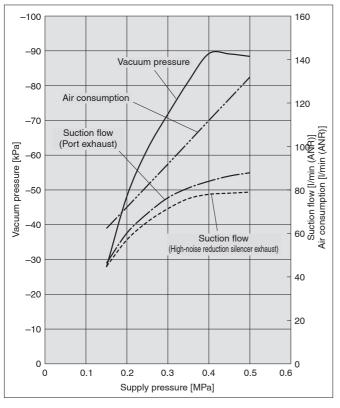


**Flow Rate Characteristics** — Supply pressure: 0.4 MPa (Standard supply pressure)



∗ Port exhaust: V port Ø 8, no exhaust port piping
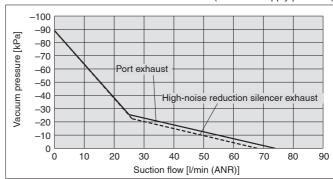
### ZKJ15

**Exhaust Characteristics**



**Flow Rate Characteristics** — Supply pressure: 0.4 MPa (Standard supply pressure)
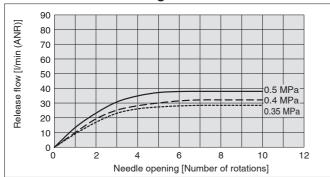


∗ Port exhaust: V port Ø 8, no exhaust port piping
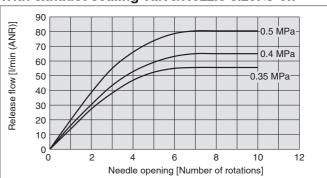
## Vacuum Release Flow Rate Characteristics (Representative value)

The graph shows the flow rate characteristics at different supply pressures when the vacuum break flow adjusting needle is open from the fully closed state. The actual suction flow at the point of suction varies depending on the piping conditions.
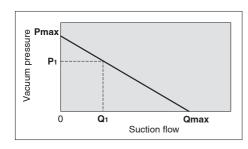
### Without exhaust sealing valve/Nozzle size: ⌀ 0.7



### With exhaust sealing valve/Nozzle size: ⌀ 0.7



## How to Read the Flow Rate Characteristics Graph



The flow rate characteristics indicate the relationship between the vacuum pressure and the suction flow of the ejector. They also show that when the suction flow changes, the vacuum pressure also changes. In general, this indicates the relationship at the ejector's standard operating pressure.

In the graph, **Pmax** indicates the max. vacuum pressure, and **Qmax** indicates the max. suction flow. These are the values that are published as specifications in catalogues, etc. Changes in vacuum pressure are explained in the order below.

1. If the ejector's suction port is closed and sealed tight, the suction flow becomes "0," and the vacuum pressure increases to the max. (**Pmax**).
2. If the suction port is opened gradually and air is allowed to flow (the air leaks), the suction flow increases, and the vacuum pressure decreases. (The condition of $P_1$ and $Q_1$)
3. If the suction port is opened completely, the suction flow increases to the max. (**Qmax**), while the vacuum pressure then drops almost to "0" (atmospheric pressure).
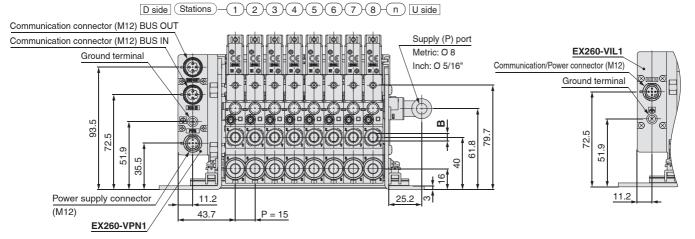
As described above, the vacuum pressure changes when the suction flow changes. In other words, when there is no leakage from the vacuum (V) port, the vacuum pressure can reach its maximum, but as the amount of leakage increases, the vacuum pressure decreases. When the amount of leakage and the maximum suction flow become equal, the vacuum pressure becomes almost zero.

When adsorbing workpieces which are permeable, subject to leakage, etc., caution is required as the vacuum pressure will not be very high.

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## Dimensions

### ZZKJ☐-☐-☐

D side | Stations | 1 2 3 4 5 6 7 8 n | U side

Communication connector (M12) BUS OUT
Communication connector (M12) BUS IN
Ground terminal

Supply (P) port
Metric: Ø 8
Inch: 5/16"

93.5
72.5
51.9
35.5

Power supply connector (M12)

**EX260-VPN1**

11.2
43.7
P = 15

B
79.7
61.8
40
16
3
25.2

**EX260-VIL1**
Communication/Power connector (M12)
Ground terminal

72.5
51.9

11.2

SI unit

Indicator light
4 x M6 Mounting hole

**L1**
**L2**
8
6

2 x 6.5

2 x 6.5

75
59.9
12

75
99
12

8
**L2**
6

Manual override
Supply valve: A side (Blue)
Release valve: B side (Yellow)

118

138

A
16.1

5.7

Exhaust (EXH) port
Metric: Ø 8
Inch: 5/16"

E

D

Vacuum (V) port
Metric: Ø 6, Ø 8
Inch: Ø 1/4", Ø 5/16"

Vacuum break flow adjusting needle

**E**
**For high-noise reduction silencer exhaust**

39.5

Exhaust port

**D**
**With supply (P) port**

C

62

Supply (P) port
Metric: Ø 6
Inch: Ø 1/4"

[mm]

| Manifold stations | 4 | 8 | 12 | 16 |
|---|---|---|---|---|
| **L1** | 142 | 202 | 262 | 322 |
| **L2** | 118 | 178 | 238 | 298 |

| Port type | | **A** | Hexagon width across flats **B** | **C** |
|---|---|---|---|---|
| Metric | C6 | Ø 6 | 14.8 | 4 | 9.7 |
| | C8 | Ø 8 | 18 | 6 | — |
| Inch | N7 | Ø 1/4" | 16.3 | 4.76 | 12.3 |
| | N9 | Ø 5/16" | 18 | 6 | — |
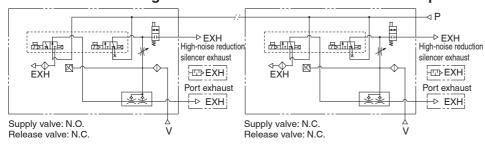
# *ZKJ* *Series*

## Air Circuit Diagram

### Without exhaust sealing valve



Supply valve: N.O.
Release valve: N.C.

High-noise reduction
silencer exhaust
EXH
Port exhaust
EXH

Supply valve: N.C.
Release valve: N.C.

High-noise reduction
silencer exhaust
EXH
Port exhaust
EXH
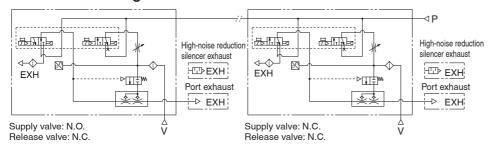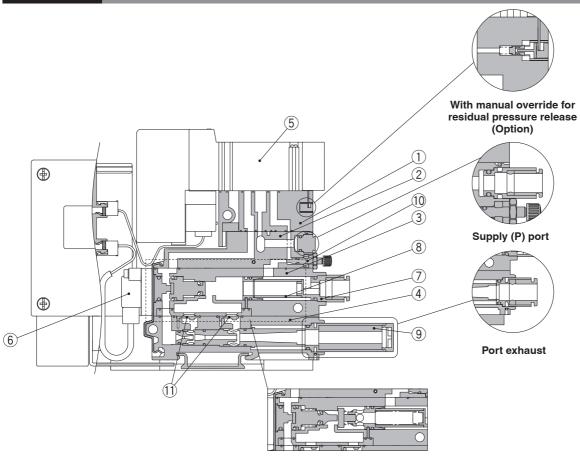
### Without exhaust sealing valve/With manual override for residual pressure release



Supply valve: N.O.
Release valve: N.C.

EXH
High-noise reduction
silencer exhaust
EXH
Port exhaust
EXH

Supply valve: N.C.
Release valve: N.C.

EXH
High-noise reduction
silencer exhaust
EXH
Port exhaust
EXH

### With exhaust sealing valve



Supply valve: N.O.
Release valve: N.C.

High-noise reduction
silencer exhaust
EXH
Port exhaust
EXH

Supply valve: N.C.
Release valve: N.C.

High-noise reduction
silencer exhaust
EXH
Port exhaust
EXH

SMC

## Construction



With manual override for
residual pressure release
(Option)

Supply (P) port

Port exhaust

Exhaust seeling valve

## Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Valve adapter assembly** | PBT | FKM, HNBR, Stainless steel, and Aluminium are also used. |
| 2 | **Valve body assembly** | PBT | FKM and Stainless steel are also used. |
| 3 | **Sealing valve body assembly** | PBT | FKM, HNBR, Stainless steel, and Aluminium are also used. |
| 4 | **Ejector body assembly** | PBT | HNBR and Stainless steel are also used. |
| 5 | **Supply valve and release valve assembly** | — | Refer to page 18 for replacement parts. |
| 6 | **Pressure sensor assembly** | — | — |
| 7 | **Vacuum port adapter assembly** | — | Refer to page 18 for replacement parts. With One-touch fitting and filter element |
| 8 | **Filter element** | Non-woven fabric | Refer to page 18 for replacement parts. Nominal filtration rating: 30 $\mu$m, 10 pcs. per set |
| 9 | **High-noise reduction silencer assembly** | POM, PVA | Refer to page 28 for replacement procedure. With sound absorbing material (Part number: ZK2-SE4-6-A) |
| 10 | **Needle assembly** | Brass | Electroless nickel plated brass, resin, steel and FKM are used. |
| 11 | **Check valve** | HNBR | When option "Y" is selected, the check valve on the left side as shown in the above figure is not mounted |

## How to Order Replacement Parts
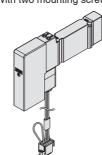
⑤ **Supply Valve and Release Valve Assembly** [With two mounting screws]
(Tightening torque for mounting screw: 0.2 N·m]

**ZKJ − JSY3 A 00 − 5U**

● **Supply valve/Release valve combination**

| Symbol | Supply valve | Release valve |
|--------|--------------|---------------|
| **A** | N.C. | N.C. |
| **E** | N.O. | N.C. |

⑦ **Vacuum port adapter assembly** (Purchasing order is available in units of 1 piece.)

**ZK2 − VA1S 8 F V − A**
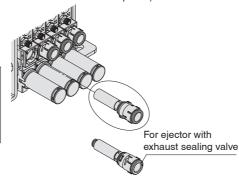
**One-touch fitting size**

| **6** | Ø 6 | Metric |
|-------|-----|--------|
| **8** | Ø 8 | |
| **7** | Ø 1/4" | Inch |
| **9** | Ø 5/16" | |
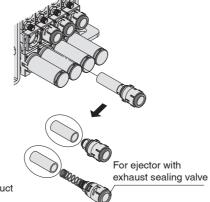
**Exhaust sealing valve specification**

| **—** | For ejector without exhaust sealing valve |
|-------|-------------------------------------------|
| **V** | For ejector with exhaust sealing valve (With spring) |

For ejector with exhaust sealing valve

For replacement procedure, refer to the "Specific Product Precautions" on page 27.
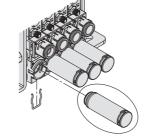
⑧ **Filter element** (10 pcs. per set)

**ZK2 − FE1 − 3 − A**

● **Nominal filtration rating**

| **3** | 30 μm |
|-------|-------|

For ejector with exhaust sealing valve

For replacement procedure, refer to the "Specific Product Precautions" on page 27.

⑨ **High-noise reduction silencer assembly**

**ZK2 − SC3F − 4 − A**

● **Applicable nozzle size**
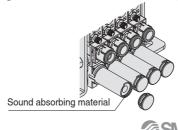
| **4** | For nozzle size 07, 10 |
|-------|------------------------|
| **6** | For nozzle size 12, 15 |

For replacement procedure, refer to the "Specific Product Precautions" on page 28.
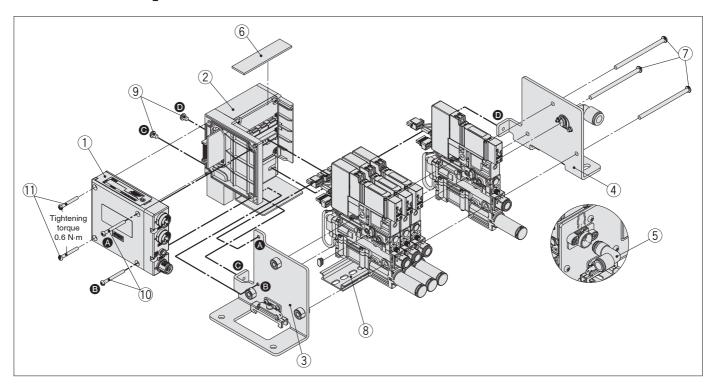
**Sound absorbing material for high-noise reduction silencer** (5 pcs. per set)

**ZK2 − SE4 − 6 − A**

Sound absorbing material

# Exploded View of Manifold



## Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | SI unit | — | Refer to ① below for replacement parts. |
| 2 | Control unit | — | Refer to ② below for replacement parts. |
| 3 | D-side end plate | Stainless steel | — |
| 4 | U-side end plate | Stainless steel | — |
| 5 | Elbow type One-touch fitting assembly | — | Refer to ⑤ below for replacement parts. |

| No. | Description | Material | Note |
|---|---|---|---|
| 6 | Protection plate | PC | Refer to ⑥ below for replacement parts. |
| 7 | Tension bolt | Steel | Refer to ⑦ below for replacement parts. |
| 8 | DIN rail | Aluminum | Refer to ⑧ below for replacement parts. |
| 9 | Round head combination screw | Steel | Refer to ⑨ below for replacement parts. |
| 10 | Round head combination screw | Steel | Refer to ⑩ below for replacement parts. |
| 11 | Round head combination screw | Steel | Refer to ⑪ below for replacement parts. |

### ① SI unit

**EX260 – V PN 1**

SI unit specifications

| Symbol | Protocol |
|---|---|
| PN | PROFINET |
| IL | IO-Link |

### ② Control unit

**ZKJ – S0 04 – A**

Length symbol

| 04 | Manifold stations: 4 stations |
|---|---|
| 08 | Manifold stations: 8 stations |
| 12 | Manifold stations: 12 stations |
| 16 | Manifold stations: 16 stations |

### ⑤ Elbow type One-touch fitting assembly

**SZ3000 – 74 – 1A – L8** (∅ 8 elbow)

**KQ2L09 – 14 – X224** (∅ 5/16" elbow)

### ⑥ Protection plate

**ZKJ – PL2 – 4 – A**

Length symbol

| 4 | Manifold stations: 4 stations |
|---|---|
| 8 | Manifold stations: 8 stations |
| 12 | Manifold stations: 12 stations |
| 16 | Manifold stations: 16 stations |

### ⑦ Tension bolt (3 pcs. per set)

**ZKJ – TB1 – 4 – A**

Length symbol

| 4 | Manifold stations: 4 stations |
|---|---|
| 8 | Manifold stations: 8 stations |
| 12 | Manifold stations: 12 stations |
| 16 | Manifold stations: 16 stations |

### ⑧ DIN rail

**VZ1000 – 11 – 1 – 1**

Length symbol

| 1 | Manifold stations: 4 stations (Length: 110.5 mm) |
|---|---|
| 6 | Manifold stations: 8 stations (Length: 173 mm) |
| 10 | Manifold stations: 12 stations (Length: 223 mm) |
| 15 | Manifold stations: 16 stations (Length: 285.5 mm) |

### ⑨ Round head combination screw (10 pcs. per set)

**ZKJ – TB2 – A** (M4 x 5)

### ⑩ Round head combination screw (10 pcs. per set)
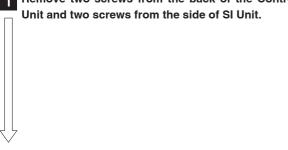
**ZKJ – TB3 – A** (M3 x 30)
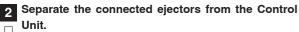
### ⑪ Round head combination screw (10 pcs. per set)

**ZKJ – TB4 – A** (M3 x 24)

SMC
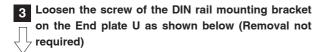
## How to Increase Manifold Stations

**1** Remove two screws from the back of the Control Unit and two screws from the side of SI Unit.

Control unit
SI unit

(Tightening torque: 0.6 N·m)

Removal not required

(Tightening torque: 0.9 N·m)

**2** Separate the connected ejectors from the Control Unit.

**3** Loosen the screw of the DIN rail mounting bracket on the End plate U as shown below (Removal not required)

Protection plate

Control unit

Screw for DIN rail mounting bracket

(Tightening torque: 0.9 N·m)
∗ Removal not required

**4** Remove three tension bolts.
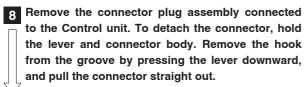
**5** Remove the End plate U from the DIN rail.
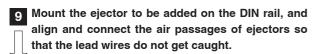
**6** Remove the Protection plate.

U-side end plate

Tension bolt
(Tightening torque: 0.9 N·m)
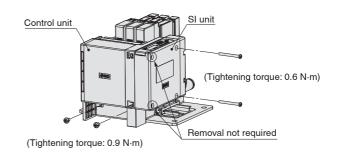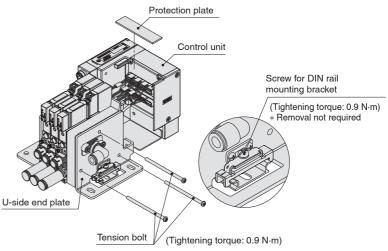
**7** Separate the blanking plate from the connected ejectors and remove the hook from the groove by pressing the blanking plate as shown Fig. Remove the blanking plate from the DIN rail.

**8** Remove the connector plug assembly connected to the Control unit. To detach the connector, hold the lever and connector body. Remove the hook from the groove by pressing the lever downward, and pull the connector straight out.

Lever    Hook

Connector plug assembly

**9** Mount the ejector to be added on the DIN rail, and align and connect the air passages of ejectors so that the lead wires do not get caught.

Hook

**10** Insert the supply valve and release valve assembly connector to the top of the Control Unit (VALVE), and the pressure sensor assembly connector to the bottom of the Control Unit (SENSOR). Lock the connectors by pushing the lever hook into the concave groove on the housing.

**11** Mount each of the removed parts by following steps **1** to **6** in reverse.

### When exchanging the first station

When exchanging to the vacuum ejector, order the vacuum ejector with the plug for individual supply (option M).
When exchanging to the blanking plate, order the blanking plate and the plug for individual supply separately. Refer to "Manifold Options" on page 21.

When increasing over 4, 8, 12 manifold stations, exchange the Control Unit, Tension bolts, Protection plate and DIN rail for suitable parts for manifold stations. Refer to Exploded View of Manifold on page 19.
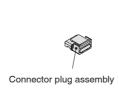
# *ZKJ* *Series*
# Manifold Options
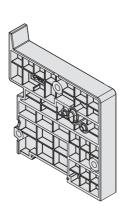
## Manifold Options

### ■ Blanking plate

[With two connector plug assembly]

Used in situations where ejectors are not mounted for manifold.

**ZKJ – BP1 – A**

Connector plug assembly
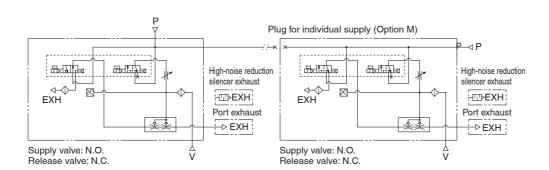
### ■ Plug for individual supply

By placing "Plug for individual supply" in an ejector manifold's pressure supply passage, two different pressures can be supplied to one manifold.

The supply (P) port for vacuum manifold is mounted only on the U side. Be sure to select the supply (P) port for ejector model number on the D side of the ejector where the plug for individual supply is mounted.

**ZK2 – MP2F – A**

P

Plug for individual supply (Option M)

P ◁ P

High-noise reduction
silencer exhaust

EXH

EXH

Port exhaust

EXH

Supply valve: N.O.
Release valve: N.C.

V

High-noise reduction
silencer exhaust

EXH

EXH

Port exhaust

EXH

Supply valve: N.O.
Release valve: N.C.

V

SMC
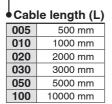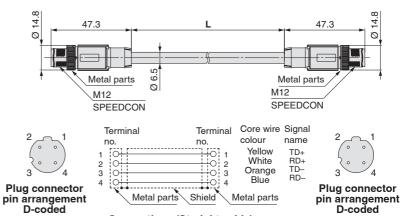
# ZKJ *Series*
# Accessories

## ❶ Communication Cable

### For PROFINET

**EX9-AC 005 EN-PSPS** (With connector on both sides (Plug/Plug))
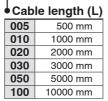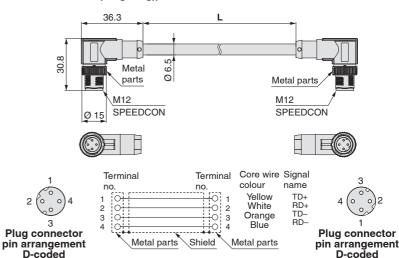
● **Cable length (L)**

| | |
|---|---|
| **005** | 500 mm |
| **010** | 1000 mm |
| **020** | 2000 mm |
| **030** | 3000 mm |
| **050** | 5000 mm |
| **100** | 10000 mm |

Ø 14.8    47.3    **L**    47.3    Ø 14.8

Ø 6.5

Metal parts    Metal parts
M12    M12
SPEEDCON    SPEEDCON

2  1
3  4
**Plug connector pin arrangement D-coded**

Terminal no.    Terminal no.    Core wire colour    Signal name
1          1    Yellow    TD+
2          2    White    RD+
3          3    Orange    TD–
4          4    Blue    RD–

Metal parts  Shield  Metal parts

**Connections (Straight cable)**

2  1
3  4
**Plug connector pin arrangement D-coded**

| Item | Specifications |
|---|---|
| **Cable O.D.** | Ø 6.5 mm |
| **Conductor nominal cross section** | 0.34 mm²/AWG22 |
| **Wire O.D. (Including insulator)** | 1.55 mm |
| **Min. bending radius (Fixed)** | 19.5 mm |

**EX9-AC 005 EN-PAPA** (With angled connector on both sides (Plug/Plug))
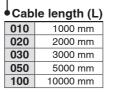
● **Cable length (L)**

| | |
|---|---|
| **005** | 500 mm |
| **010** | 1000 mm |
| **020** | 2000 mm |
| **030** | 3000 mm |
| **050** | 5000 mm |
| **100** | 10000 mm |

36.3    **L**

30.8    Ø 6.5

Metal parts    Metal parts
M12    M12
Ø 15    SPEEDCON    SPEEDCON

1
2    4
3
**Plug connector pin arrangement D-coded**

Terminal no.    Terminal no.    Core wire colour    Signal name
1          1    Yellow    TD+
2          2    White    RD+
3          3    Orange    TD–
4          4    Blue    RD–

Metal parts  Shield  Metal parts

**Connections (Straight cable)**

3
4    2
1
**Plug connector pin arrangement D-coded**

| Item | Specifications |
|---|---|
| **Cable O.D.** | Ø 6.5 mm |
| **Conductor nominal cross section** | 0.34 mm²/AWG22 |
| **Wire O.D. (Including insulator)** | 1.55 mm |
| **Min. bending radius (Fixed)** | 19.5 mm |

**SMC**

# *ZKJ* Series

❶ **Communication Cable**

For PROFINET
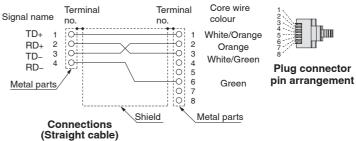
**EX9-AC 020 EN-PSRJ** (Plug/RJ-45 connector)

● **Cable length (L)**

| | |
|---|---|
| **010** | 1000 mm |
| **020** | 2000 mm |
| **030** | 3000 mm |
| **050** | 5000 mm |
| **100** | 10000 mm |

Ø 14.8　M12　Metal parts　Ø 6.4　Metal parts　RJ-45

47.3　L　44

**Plug connector pin arrangement D-coded**

| Signal name | Terminal no. | | Terminal no. | Core wire colour |
|---|---|---|---|---|
| TD+ | 1 | | 1 | White/Orange |
| RD+ | 2 | | 2 | Orange |
| TD− | 3 | | 3 | White/Green |
| RD− | 4 | | 4 | |
| | | | 5 | |
| | | | 6 | Green |
| | | | 7 | |
| | | | 8 | |

Metal parts

**Connections (Straight cable)**

Shield　Metal parts
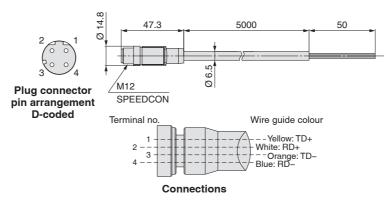
**Plug connector pin arrangement**
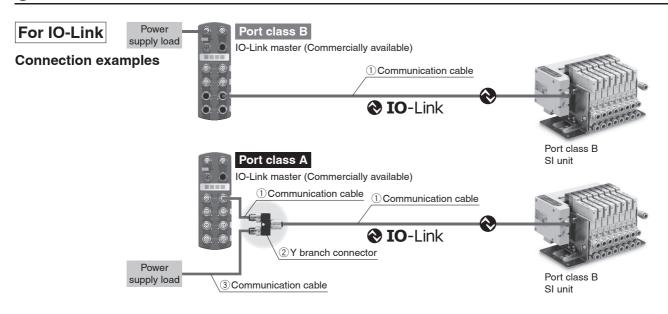
| Item | Specifications |
|---|---|
| **Cable O.D.** | Ø 6.4 mm |
| **Conductor nominal cross section** | 0.14 mm²/AWG26 |
| **Wire O.D. (Including insulator)** | 0.98 mm |
| **Min. bending radius (Fixed)** | 26 mm |

**PCA-1446566** (Plug)
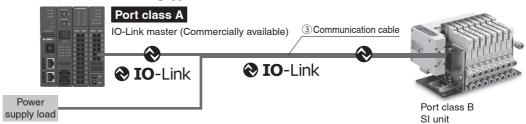
Ø 14.8　47.3　5000　50

Ø 6.5

**Plug connector pin arrangement D-coded**

M12 SPEEDCON

| Terminal no. | Wire guide colour |
|---|---|
| 1 | Yellow: TD+ |
| 2 | White: RD+ |
| 3 | Orange: TD− |
| 4 | Blue: RD− |

**Connections**

| Item | Specifications |
|---|---|
| **Cable O.D.** | Ø 6.5 mm |
| **Conductor nominal cross section** | 0.34 mm²/AWG22 |
| **Wire O.D. (Including insulator)** | 1.55 mm |
| **Min. bending radius (Fixed)** | 19.5 mm |

SMC

# ❶ Communication Cable

## For IO-Link

**Connection examples**

Power supply load

**Port class B**
IO-Link master (Commercially available)

① Communication cable

**IO**-Link

Port class B
SI unit

**Port class A**
IO-Link master (Commercially available)

① Communication cable   ① Communication cable

**IO**-Link

② Y branch connector

Power supply load

③ Communication cable

Port class B
SI unit

**Terminal block wiring type**

**Port class A**
IO-Link master (Commercially available)

③ Communication cable

**IO**-Link   **IO**-Link

Power supply load

Port class B
SI unit

## ① Communication cable

### EX9-AC 005 -SSPS (With connector on both sides (Socket/Plug))

**● Cable length (L)**

| 005 | 500 mm |
|-----|--------|
| 010 | 1000 mm |
| 020 | 2000 mm |
| 030 | 3000 mm |
| 050 | 5000 mm |
| 100 | 10000 mm |

Socket connector pin arrangement
A-coded (Normal key)

Ø 14.9    L    Ø 14.9
40.7    Ø 6    44.7
M12    M12

Plug connector pin arrangement
A-coded (Normal key)

Terminal no.    Wire guide colour

| 1 | 1 | Brown |
| 2 | 2 | White |
| 3 | 3 | Blue |
| 4 | 4 | Black |
| 5 | 5 | Grey |

**Connections**

| Item | Specifications |
|------|----------------|
| **Cable O.D.** | Ø 6 mm |
| **Conductor nominal cross section** | 0.3 mm²/AWG22 |
| **Wire O.D. (Including conductor)** | 1.5 mm |
| **Min. bending radius (Fixed)** | 40 mm |

### EX9-AC 005 -SAPA (With connector on both sides (Socket/Plug))

**● Cable length (L)**

| 005 | 500 mm |
|-----|--------|
| 010 | 1000 mm |
| 020 | 2000 mm |
| 030 | 3000 mm |
| 050 | 5000 mm |
| 100 | 10000 mm |

Socket connector pin arrangement
A-coded (Normal key)

Ø 14.9
M12    M12    Ø 14.9
28.3    Ø 6    32.3
25.3    L    25.3

Plug connector pin arrangement
A-coded (Normal key)

Terminal no.    Wire guide colour

| 1 | 1 | Brown |
| 2 | 2 | White |
| 3 | 3 | Blue |
| 4 | 4 | Black |
| 5 | 5 | Grey |

**Connections**

| Item | Specifications |
|------|----------------|
| **Cable O.D.** | Ø 6 mm |
| **Conductor nominal cross section** | 0.3 mm²/AWG22 |
| **Wire O.D. (Including conductor)** | 1.5 mm |
| **Min. bending radius (Fixed)** | 40 mm |

# *ZKJ* Series

## ❶ Communication Cable

### For IO-Link

#### ② Y branch connector

This connector is used to supply output power by branching the IO-Link communication cable when a port class A IO-Link master is used.

**EX9-ACY02-S**



Socket connector
pin arrangement
A-coded (Normal key)

Plug connector
pin arrangement
A-coded (Normal key)

**Power cable side pin arrangement for output when using Y branch connector**

| 1 | — | Unused |
|---|---|---|
| 2 | SV24V | +24 V for output |
| 3 | — | Unused |
| 4 | — | Unused |
| 5 | SV0V | 0 V for output |

#### ③ Communication cable

**EX500-AP 050 - S**

**Cable length (L)**

| 010 | 1000 mm |
|---|---|
| 050 | 5000 mm |

**Connector specification**

| S | Straight |
|---|---|
| A | Angled |

**Straight connector type**

Socket connector
pin arrangement
A-coded (Normal key)

| Item | Specifications |
|---|---|
| Cable O.D. | Ø 6 mm |
| Conductor nominal cross section | 0.3 mm²/AWG22 |
| Wire O.D. (Including insulator) | 1.5 mm |
| Min. bending radius (Fixed) | 40 mm |

**Angled connector type**

Socket connector
pin arrangement
A-coded (Normal key)

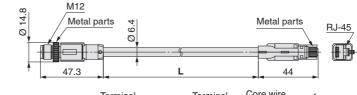| Item | Specifications |
|---|---|
| Cable O.D. | Ø 6 mm |
| Conductor nominal cross section | 0.3 mm²/AWG22 |
| Wire O.D. (Including insulator) | 1.5 mm |
| Min. bending radius (Fixed) | 40 mm |

**Made to Order**

| Cable length | 10000 mm | **Web Catalogue** |
|---|---|---|
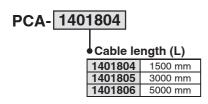
Terminal no. / Core wire colour

1 — Brown: 18 to 30 VDC (Power supply for control and input)*1, Not connected*2
2 — White: 24 VDC +10 %/-5 % (Power supply for output)
3 — Blue: 0 V (Power supply for control and input)*1, Not connected*2
4 — Black: IO-Link communication*1, Not connected*2
5 — Grey: 0 V (Power supply for output)

**Connections (IO-Link)**

*1 When used as an IO-Link communication cable
*2 When used as a solenoid valve power supply cable

**PCA- 1401804**

**Cable length (L)**

| 1401804 | 1500 mm |
|---|---|
| 1401805 | 3000 mm |
| 1401806 | 5000 mm |

Socket connector
pin arrangement
A-coded (Normal key)

M12
SPEEDCON
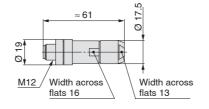
| Item | Specifications |
|---|---|
| Cable O.D. | Ø 5 mm |
| Conductor nominal cross section | 0.34 mm²/AWG22 |
| Wire O.D. (Including insulator) | 1.27 mm |
| Min. bending radius (Fixed) | 21.7 mm |

Terminal no. / Core wire colour
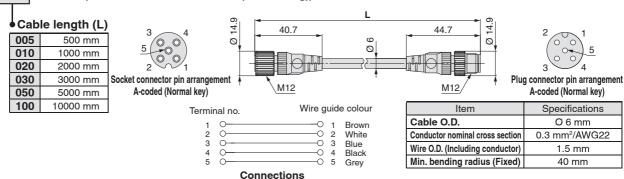
1 — Brown: 18 to 30 VDC (Power supply for control and input)*1, Not connected*2
2 — White: 24 VDC +10 %/-5 % (Power supply for output)
3 — Blue: 0 V (Power supply for control and input)*1, Not connected*2
4 — Black: IO-Link communication*1, Not connected*2
5 — Green/Yellow: 0 V (Power supply for output)

**Connections (IO-Link)**    *1 When used as an IO-Link communication cable    *2 When used as an output power supply cable

SMC

## ❷ Field-wireable Communication Connector

### For PROFINET

**PCA-1446553**

**D-coded**

≈ 61   Ø 17.5
Ø 19

M12   Width across flats 16   Width across flats 13
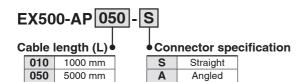
#### Applicable Cable

| Item | Specifications |
|---|---|
| Cable O.D. | 4.0 to 8.0 mm |
| Wire gauge (Stranded wire cross section) | 0.14 to 0.34 mm²/AWG26 to 22 |
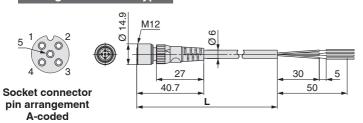
∗ The table above shows the specifications for the applicable cable. Adaptation for the connector may vary on account of the conductor construction of the electric wire.

## ❸ Power Supply Cable

### For PROFINET

**EX500-AP│050│-│S│**

**Cable length (L)**

| 010 | 1000 mm |
|---|---|
| 050 | 5000 mm |

**Connector specification**

| S | Straight |
|---|---|
| A | Angled |

#### Straight connector type

Ø 14.9   M12   Ø 6
27 · 40.7 · L · 30 · 5 · 50

**Socket connector pin arrangement A-coded**

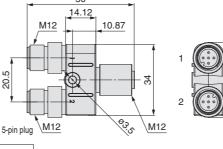| Item | Specifications |
|---|---|
| Cable O.D. | Ø 6 mm |
| Conductor nominal cross section | 0.3 mm²/AWG22 |
| Wire O.D. (Including insulator) | 1.5 mm |
| Min. bending radius (Fixed) | 40 mm |

#### Angled connector type

Ø 14.9   M12   28.3   Ø 6
25.3 · L · 30 · 5 · 50

**Socket connector pin arrangement A-coded**

| Item | Specifications |
|---|---|
| Cable O.D. | Ø 6 mm |
| Conductor nominal cross section | 0.3 mm²/AWG22 |
| Wire O.D. (Including insulator) | 1.5 mm |
| Min. bending radius (Fixed) | 40 mm |

Terminal no. / Core wire colour
1 — Brown: 24 VDC +10 %/-5 % (Power supply for output)
2 — White: 0 V (Power supply for output)
3 — Blue: 24 VDC ±10 % (Power supply for control and input)
4 — Black: 0 V (Power supply for control and input)
5 — Grey: Not connected

**Connections**

**PCA-│1401804│**

**Cable length (L)**

| 1401804 | 1500 mm |
|---|---|
| 1401805 | 3000 mm |
| 1401806 | 5000 mm |

**Socket connector pin arrangement A-coded**

Ø 14.8   44.5 · L · 50   Ø 5   M12 SPEEDCON

| Item | Specifications |
|---|---|
| Cable O.D. | Ø 5 mm |
| Conductor nominal cross section | 0.34 mm²/AWG22 |
| Wire O.D. (Including insulator) | 1.27 mm |
| Min. bending radius (Fixed) | 21.7 mm |

Terminal no. / Core wire colour
1 — Brown: 24 VDC +10 %/-5 % (Power supply for output)
2 — White: 0 V (Power supply for output)
3 — Blue: 24 VDC ±10 % (Power supply for control and input)
4 — Black: 0 V (Power supply for control and input)
5 — Green/Yellow: Not connected

**Connections**

# *ZKJ* *Series*

## ❸ Power Supply Cable

**With connector on one side (Socket)**
**Cable length: 10000 mm**
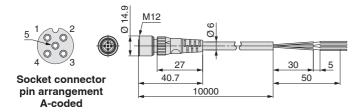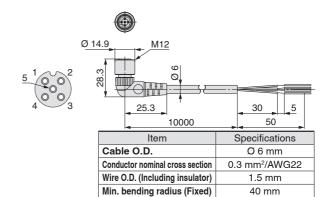
### EX500-AP100-[S]-X1

●**Connector specification**

| S | Straight |
|---|---|
| A | Angled |

**Straight connector type**

Ø 14.9  M12  Ø 6

5 1 2
4 3

27
40.7
10000

30  5
50

**Socket connector
pin arrangement
A-coded**

| Item | Specifications |
|---|---|
| Cable O.D. | Ø 6 mm |
| Conductor nominal cross section | 0.3 mm²/AWG22 |
| Wire O.D. (Including insulator) | 1.5 mm |
| Min. bending radius (Fixed) | 40 mm |

**Angled connector type**

Ø 14.9  M12  Ø 6

5 1 2
4 3

28.3
25.3
10000

30  5
50

| Item | Specifications |
|---|---|
| Cable O.D. | Ø 6 mm |
| Conductor nominal cross section | 0.3 mm²/AWG22 |
| Wire O.D. (Including insulator) | 1.5 mm |
| Min. bending radius (Fixed) | 40 mm |

Terminal no.     Core wire colour

1 ––– Brown: 24 VDC +10 %/-5 % (Solenoid valve power supply)
2 ––– White: 0 V (Solenoid valve power supply)
3 ––– Blue: 24 VDC ±10 % (Power supply for control)
4 ––– Black: 0 V (Power supply for control)
5 ––– Grey: Not connected

**Connections**

## ❹ Seal Cap (10 pcs.)
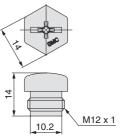
Use this on ports that are not being used for communication connector (M12 connector socket).
Use of this seal cap maintains the integrity of the IP65 enclosure.

∗ Tighten the seal cap with the prescribed tightening torque. (For M12: 0.1 N·m)

### EX9-AW **TS**

●**Connector specification**

| TS | For M12 connector socket (10 pcs.) |
|---|---|

One waterproof cap is provided for an EX260-VPN1.

14
14
10.2
M12 x 1

**For M12 connector socket**

SMC

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## Design / Selection

## ⚠ Warning

**1. Confirm the specifications.**

Products represented in this catalogue are designed only for use in compressed air systems (including vacuum).

Do not operate at pressures, temperatures, etc., beyond the range of specifications, as this can cause damage or malfunction. (Refer to the specifications.)

Please contact SMC when using a fluid other than compressed air (including vacuum).

We do not guarantee against any damage if the product is used outside of the specification range.

**2. Do not use the product to drive an actuator such as a cylinder (when release pressure is constantly applied).**

Failure to do so may lead to performance issues or damage to the body of the product.

**3. Vacuum pressure**

Since valves are subject to air leakage, they cannot be used for applications such as holding vacuum in a pressure vessel. SMC can issue no guarantees regarding the maintenance of workpiece adsorption when using check valves. Take separate safety measures to prevent workpieces from dropping in the case of an electrical power outage, etc.

**4. Cannot be used as an emergency shutoff valve, etc.**

The valves presented in this catalogue are not designed for safety applications such as an emergency shutoff valve. If the valves are used in this type of system, other reliable safety assurance measures should also be adopted.

**5. Release of residual pressure**

For maintenance and inspection purposes, ensure to install the residual pressure release system when piping.

**6. Workpiece adsorption**

When adsorbing the workpiece, ensure to turn on the vacuum instruction signal. Failure to do so may result in foreign matter sticking to the adsorption pad or air leakage, causing the workpiece to drop.

**7. Ventilation**

Provide ventilation when using a vacuum ejector in a confined area, such as in a closed control panel. For example, install a ventilation opening, etc., in order to prevent pressure from increasing inside of the confined area and to release the heat generated by the valve.

**8. Extended periods of continuous energization**

If a valve will be continuously energised for an extended period of time, the temperature of the valve will increase due to the heat generated by the coil assembly. This will likely adversely affect the performance of the valve and any nearby peripheral equipment. Therefore, if the valve is to be energised for periods of longer than 30 minutes at a time, or if during the hours of operation the energised period per day is longer than the de-energised period, we advise using a N.O. (normally open) valve.

**9. Resumption after a long period of holding time**

When resuming operation after a long period of holding time, there are cases in which, regardless of whether the product is in an ON or OFF state, there is a delay in the initial response time due to adhesion. Conducting several cycles of running-in operation will solve this problem. Please consider implementing this before resumption.

## Design / Selection

## ⚠ Caution

**1. For specific product precautions on solenoid valves, refer to the solenoid valve (JSY3000 series) catalogue.**

**2. For specific product precautions on pressure sensors, refer to the pressure sensor (PSE54□ series) catalogue.**
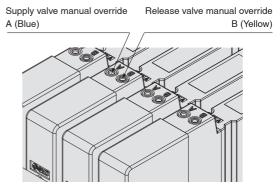
## Supply Valve / Release Valve

## ⚠ Warning

**1. Manual override operation**

Regardless of an electric signal for the valve, the manual override is used for switching the main valve. Connected actuator is started by manual operation. A diagnosis information may occur when using the manual override during fieldbus communication. Use the manual override when the power supply is turned off.

Manual override is non-locking push type. Push the manual override with a screwdriver of a diameter smaller than indicated in the diagram until it reaches the end.

Supply valve manual override
A (Blue)

Release valve manual override
B (Yellow)



**2. Energization**

When workpiece is being adsorbed, please keep generating the vacuum pressure to prevent the workpiece from dropping. Do not perform the operation to generate vacuum and release pressure at the same time as this may cause malfunction.
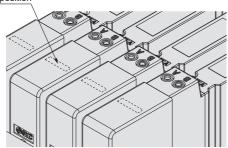
## Supply Valve / Release Valve

## ⚠ Warning

### 3. LED indication

Red LED turns on when supply valve is energised. Green LED turns on when release valve is energised.

LED light position

### 4. Air leakage
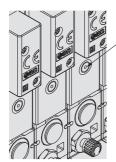
Zero air leakage is not guaranteed for the supply valve or release valve.

Be aware that because there is a chance of air and vacuum leakage, the pressure may change if the V port side is tightly sealed.

## Manual Override for Residual Pressure Release

## ⚠ Warning

V port is released to atmosphere when performing the manual override for residual pressure release. Please perform after ensuring measured are in place to prevent the workpieces from dropping, etc.

Manual override for
residual pressure release
Option
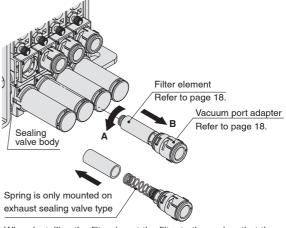
## Replacement Procedure

## ⚠ Caution
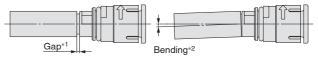
Be sure to install the filter element. If the filter element is not installed, this can result reduced performance.

### 1. Replacement Procedure for Filter Element

1) To pull out the vacuum port adapter, rotate the adapter by about 90 degrees in direction A and pull in direction B. The adapter can be removed with the filter element from the sealing valve body.
2) Remove the filter element from the vacuum port adapter and replace it with a new filter element. When the ejector is exhaust sealing valve type, be careful not to drop the spring from the vacuum port adapter.

Filter element
Refer to page 18.

Vacuum port adapter
Refer to page 18.

B

A

Sealing
valve body

Spring is only mounted on
exhaust sealing valve type
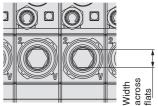
3) When installing the filter, insert the filter to the end so that there is no gap$*1$ or bending$*2$ between the filter and the vacuum port adapter. A gap or bending will cause interference with internal parts, the filter element to deform and deterioration of the performance.

Gap$*1$

Bending$*2$

4) Put the filter element back into the sealing valve body following this procedure in reverse.
● To mount the vacuum port adapter into the sealing valve body, turn the adapter so that the mark of the adapter is on top (rotation stops there.).

Mark

● If it is difficult to remove the vacuum port adapter, you can remove the adapter with a hexagon wrench using the hexagonal hole in V port. The table shows the port size and the width across flats.

Width
across
flats

| V port size | Width across flats |
|---|---|
| Ø 6 | 4 |
| Ø 8, Ø 5/16" | 6 |
| Ø 1/4" | 4.76 |
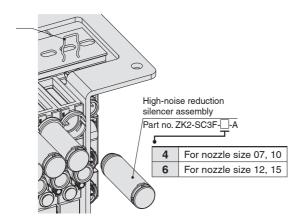
**SMC**

## Replacement Procedure

### ⚠ Caution

**2. Replacement Procedure for High-noise Reduction Silencer Assembly**

1) Flip the ejector.
2) To remove the clip that holds the High-noise reduction silencer, insert a precision screwdriver. Move the screwdriver to pull out the clip.



High-noise reduction silencer assembly
Part no. ZK2-SC3F-☐-A

| 4 | For nozzle size 07, 10 |
| 6 | For nozzle size 12, 15 |

3) Remove the high-noise reduction silencer.
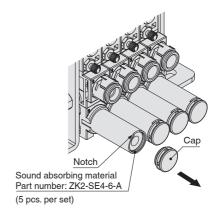
**(Procedure to put parts back together)**

4) Insert the High-noise reduction silencer and insert the clip into the groove. (Push completely to the end.)

  ∗ Do not pull or bend the two projections at the end surface of the diffuser. These are spacers to prevent the displacement of the diffuser and they may break if force is applied.

## Replacement Procedure

### ⚠ Caution

**3. When only replacing the sound absorbing material (for high-noise reduction silencer exhaust)**

1) Use the notch to remove the cap.
2) Use a precision screwdriver to remove the sound absorbing material.
3) Insert the new sound absorbing material, and return the cap.



Cap

Notch
Sound absorbing material
Part number: ZK2-SE4-6-A
(5 pcs. per set)

## Ejector Exhaust / Exhaust Noise

### ⚠ Caution

**1. Ejector exhaust**

The exhaust resistance should be as small as possible to obtain the full ejector performance. There should be no shield around the exhaust slit for silencer exhaust type.

For port exhaust type, ensure that the back pressure does not exceed 5 kPa. Increased back pressure may lead to the reduction of suction flow and delays in the transport cycle time. Do not operate the ejector or apply pressure to the exhaust port with the exhaust port closed. This increases the pressure in the product and can damage the vacuum ejector.

**2. Sound absorbing material**

If the sound absorbing material is clogged, it will cause a reduction in the ejector performance.

Sometimes, if the operating environment contains a lot of particles or mist, the replacement of the filter element only is not enough to recover vacuum performance - as the sound absorbing material may be clogged.

Replace the sound absorbing material. (Regular replacement of the filter element and the sound absorbing material is recommended.)

## Ejector Exhaust / Exhaust Noise

### ⚠ Caution

**3. 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 SI unit, change the supply pressure slightly to avoid the pressure range of the noise.



Models with a large nozzle diameter generate a large exhaust noise if the exhaust (EXH) port is opened. Install piping or a silencer to the exhaust port to reduce the exhaust noise.

**4. Exhaust air**

If solid substances are sucked in through the vacuum (V) port, they will be discharged from the exhaust port at a high speed if the exhaust (EXH) port is opened. Therefore, do not look into the exhaust port or direct the exhaust port toward a person when the ejector is operating.
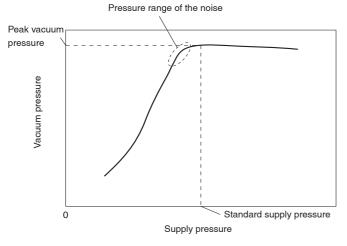
## Operating Supply Pressure

### ⚠ Caution

Use the product within the specified supply pressure range.

Operation over the max. operating pressure can cause damage to the product.
The parts around the vacuum port of this product are designed to be used with vacuum pressure.

## Port Size

### ⚠ Caution

**1. Air pressure supply (P) port**

P port (End plate U) and P port (Ejector) are connected inside. For an adequate performance, the number of stations when operated simultaneously depends on the nozzle diameter.
Refer to page 11 for the number of stations that can operate simultaneously for each ejector size.

## How to Mount a Manifold

### ⚠ Caution

**1. Do not drop, hit, or apply excessive impact to the product when handling it.**
Even if the body looks undamaged, the internal components may be damaged, leading to a malfunction.

**2. Load to the body**

Do not lift the product by holding the One-touch fitting or high-noise reduction silencer. This may cause damage to the body. The product body is made of resin; therefore, do not apply load to the port after mounting. Prevent any kind of operation which generates moment as this may cause reduced performance or damage to the body.

**3. Installation**

Manifold can be mounted onto the floor using M6 holes on the end plate. The DIN rail installed in the product is used for connecting the ejectors. Do not use mounting holes of the DIN rail to mount the product.

**4. Ensure sufficient space for maintenance activities.**

When installing the products, allow access for maintenance and inspection.

## Vacuum Break Flow Adjusting Needle

### ⚠ Caution

**1. The flow rate characteristics show the representative values of the product itself.**

They may change depending on piping, circuit and pressure conditions, etc. The flow rate characteristics and the number of needle rotations vary due to the range of the specifications of the product.

**2. 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.

**3. Do not tighten the handle with tools such as nippers.**

This can result in breakage due to idle turning.

**4. Do not over tighten the lock nut.**

It is possible to tighten the standard lock nut (hexagon) manually.
When tightening further with tools, tighten by approximately 15° to 30°. Over tightening may cause breakage.

**5. When vacuum break flow adjusting needle screwdriver operation type (-E) is selected as option, make sure the lock nut is not loose to prevent the nut from coming off due to vibration.**

**■Vacuum Release Air**

When fully closed, leakage cannot be prevented completely. There is an allowance for a certain amount of leakage in the product's specifications. Tightening the needle to reduce leakage to zero may result in equipment damage.

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## Operating Environment

### ⚠ Warning

1. **Do not use in an atmosphere containing corrosive gases, chemicals, sea water, water, water steam, or where there is direct contact with any of these.**

2. **IP65 enclosure: The protection structure against solid foreign objects is dust-tight type and the protection structure against water is water-jet-proof type.**
   Dust-tight means that no dust can enter the inside of the equipment. Water-jet-proof means that the product is not adversely affected by direct water jets from any direction. That is, even when direct water jets are applied to the product for 3 minutes by means of the pre-determined method, there is no water entry that hinders the correct operation inside the equipment. Be sure to take appropriate protective measures if the product is to be used in an environment where it will be constantly exposed to water or fluids other than water splash. In particular, the product cannot be used in environments where oils, such as cutting oil or cutting fluid, are present.

3. **IP65 is achieved when the following conditions are met.**
   1) Provide appropriate wiring between the SI units using electrical wiring cables, communication connectors, and cables with M12 connectors.
   2) Suitable connecting of connectors for supply valve and release valve assembly, pressure sensor assembly and the control unit.
   3) Suitable mounting of SI Unit, control unit and vacuum ejectors.
   4) Be sure to fit a seal cap on any unused connectors.

4. **When the high performance silencer is used for an IP65 compliant manifold, prevent water from splashing onto the silencer outlet.**

## Piping

### ⚠ Caution

When piping to the product, be careful not to confuse a vacuum port with an exhaust port. Otherwise this can result in damage or reduced performance. Apply compressed air after confirming that the piping is connected correctly.
If each exhaust piping for the port exhaust ejectors are connected and made into centralised piping, the exhausted air will flow back into the exhaust path which is not operating, and will then be exhausted from the vacuum port. Exhaust individually.

## Adjustment / Operation

### ⚠ Caution

1. **Please refer to the PLC manufacturer's manual, etc. for details of the SI unit programming and addresses.**
   The programming content related to the protocol is designed by the manufacturer of the PLC used.

2. **For the first operation, always perform zero clear with no pressure applied.**

# ⚠ 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) [1], and other safety regulations.

| ⚠ **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. |

1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines.
    (Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots - Safety.
etc.

## ⚠ Warning

**1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**
Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalogue information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

**2. Only personnel with appropriate training should operate machinery and equipment.**
The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

**3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.**
1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

**4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.**
1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalogue.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

## ⚠ Caution

**1. The product is provided for use in manufacturing industries.**
The product herein described is basically provided for peaceful use in manufacturing industries.
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
If anything is unclear, contact your nearest sales branch.

# Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".Read and accept them before using the product.

## Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first. [2] Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided. This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.

2) Vacuum pads are excluded from this 1 year warranty.
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered. Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.
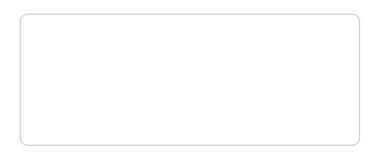
## Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

## ⚠ Caution

**SMC products are not intended for use as instruments for legal metrology.**
Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country.
Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

| ⚠ Safety Instructions | Be sure to read "Handling Precautions for SMC Products" (M-E03-3) before using. |
|---|---|

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