Compact Vacuum Unit

New

Ejector System | Vacuum Pump System

New An IO-Link compatible pressure switch has been added.
- Allows for ejector control with a single communication line
- Reading of the device information and parameter batch settings are possible.

Energy saving is possible due to the vacuum pressure switch with energy saving function.

Air consumption **90% reduction**[*1]

*1 Based on SMC's measurement conditions

Even when the suction signal is ON, the ON/OFF operation of the supply valve is performed automatically within the set value.

Power consumption **60% reduction**
1 W (Existing model) ➡ **0.4 W**

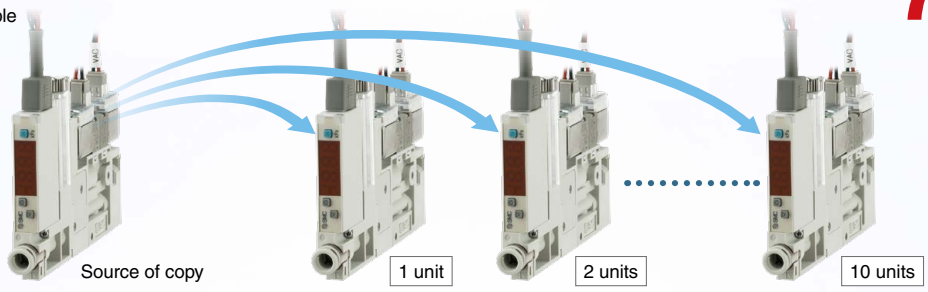
Vacuum release pressure **From 0 MPa**[*2]
From 0.3 MPa (Existing model) ➡ **From 0 MPa**

*2 For the low release pressure specification with a release pressure supply (PD) port

Copy function Reduced setting labor, Minimized risk of setting mistakes

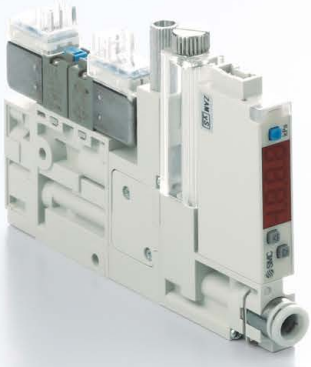
* The copy function is not available for the vacuum pressure switch with energy saving function.

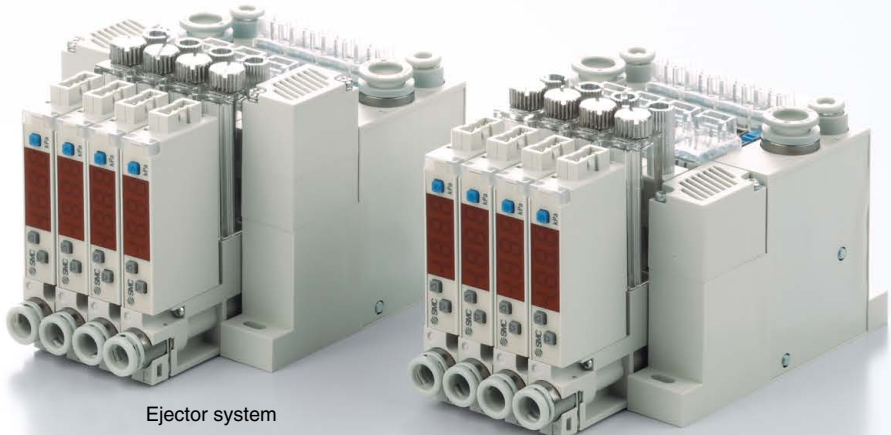
The set value can be copied to up to 10 units simultaneously.



Space saving
Width
10.2 mm

Lightweight
70 g





Ejector system

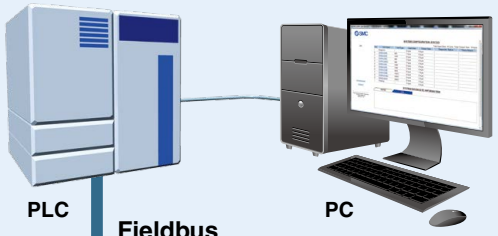
Vacuum pump system

ZQ□A Series

SMC

IO-Link Compatible ZQ□A p. 3-1

Visualization of operation/equipment status/Remote monitoring and control by communication



Configuration File (IODD File*1)

• Manufacturer • Product part no. • Set value

*1 IODD File:
IODD is an abbreviation of IO Device Description. This file is necessary for setting the device and connecting it to a master. Save the IODD file on the PC to be used to set the device prior to use.

IO-Link

IO-Link is an open communication interface technology between the sensor/actuator and the I/O terminal that is an international standard: IEC 61131-9.

Device settings can be set by the master.
- Threshold value
- Operation mode, etc.

Read the device data.
- ON/OFF signal and analog value
- Device information: Manufacturer, Product part number, Serial number, etc.
- Normal or abnormal device status
- Cable breakage

IO-Link Master

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

Input process data	Output process data
4 bytes	2 bytes

Error	Warning	Pressure value diagnosis
• OUT1/2 over current • Outside of zero-clear range • Temperature sensor failure • Master version mismatch	• Valve protection warning • Energy saving operation warning	• Above the upper limit/ below the lower limit of the display range

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	System error	Error	Valve warning	PD_IN forced output	Reservation			Pressure value diagnosis	Release valve output	Supply valve output	Reservation	Pressure confirmation	Pressure confirmation	Release confirmation	Energy saving confirmation	Suction confirmation

Byte	3								2							
Bit offset	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Item	Measured pressure value															

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	Reservation								Reservation			Automatic release forced OFF	Valve protection forced OFF	Energy saving control forced OFF	Release instruction	Vacuum instruction

Display function

Displays the output communication status and indicates the presence of communication data

Operation and Display

Communication with master	Status			Screen display	Description
Yes	IO-Link mode	Normal	Operate	oPE ↔ 0.0 *1	Normal communication status (readout of measured value, command) * Output process data valid
				idLE ↔ 0.0 *1	Normal communication status (readout of measured value) * Output process data invalid
			Start up	Str ↔ 0.0 *1	At the start of communication
			Preoperate	PrE ↔ 0.0 *1	
		Abnormal	Version does not match	E15	The IO-Link version does not match that of the master. *2
No			Communication disconnection	idLE ↔ 0.0 *1 Str ↔ 0.0 *1 PrE ↔ 0.0 *1	Normal communication was not received for 1 s or longer.
	SIO mode*3			SIO ↔ 0.0 *1	General switch output

*1 Displays the measured value *2 When the product is connected to the master with version "V1.0," error E15 is generated. *3 Cannot be used in SIO mode

IO-Link Compatible ZQ□A p. 3-1

Energy saving is possible due to the vacuum pressure switch with energy saving function.

Air consumption 90% reduction[*1]

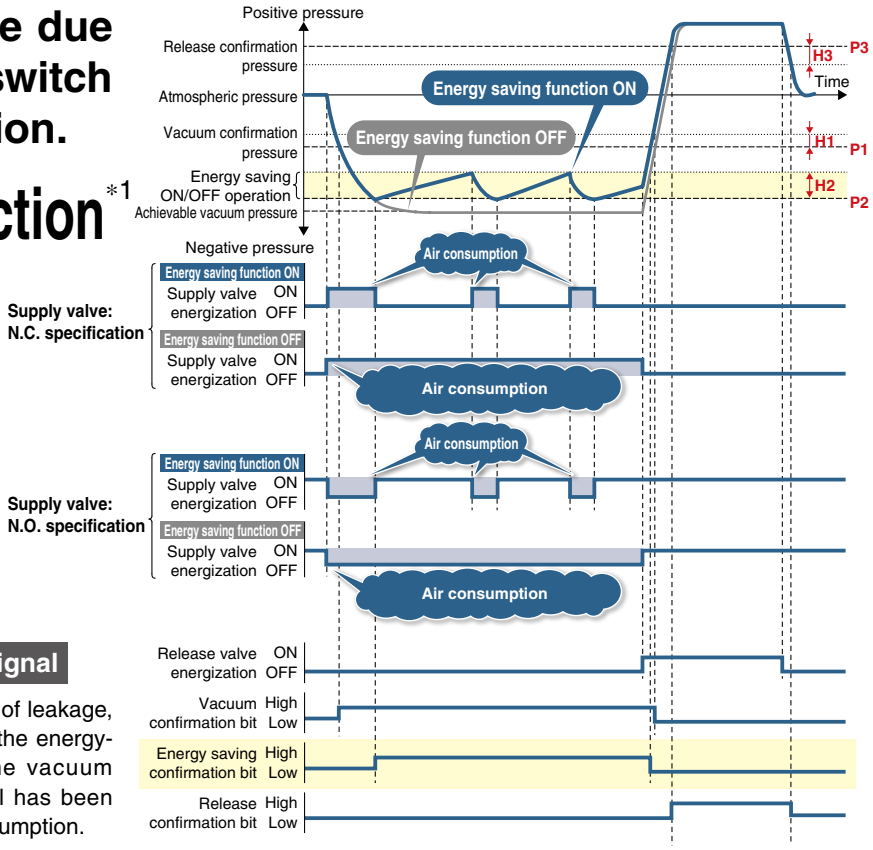
*1 Based on SMC's measurement conditions

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.

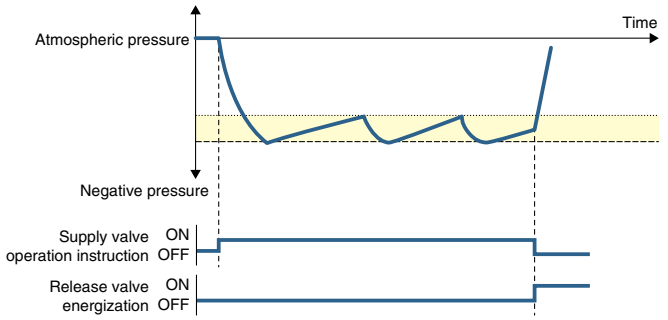


Energy-saving pressure confirmation signal

When adsorbing a workpiece with a large amount of leakage, this signal allows for the confirmation of whether the energy-saving operation is being performed once the vacuum pressure that initiates the energy-saving control has been reached. This contributes to a reduction in air consumption.

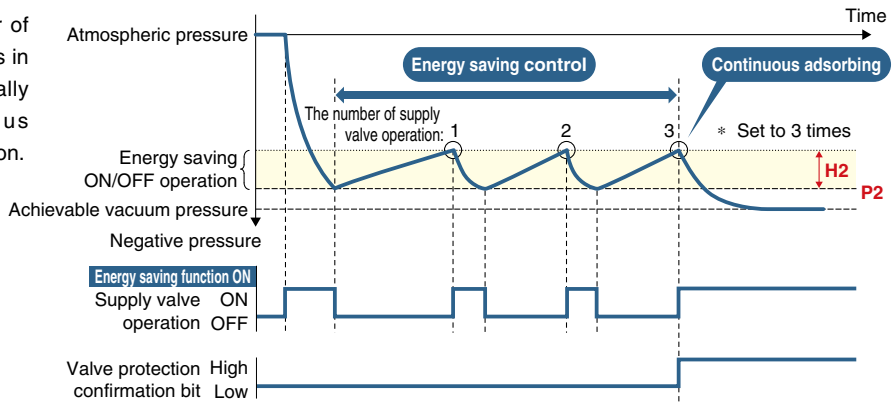
Automatic Release Function

When the supply valve operation instruction is turned OFF, the release valve ON operation is started automatically, reducing the amount of time required for the customer to construct an operating program.



Valve Protection Function

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



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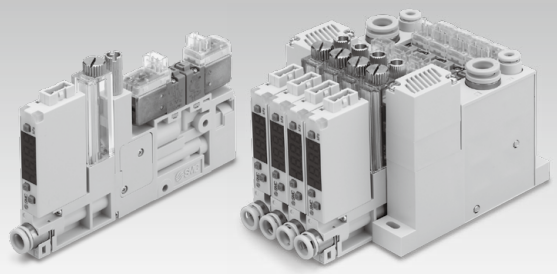
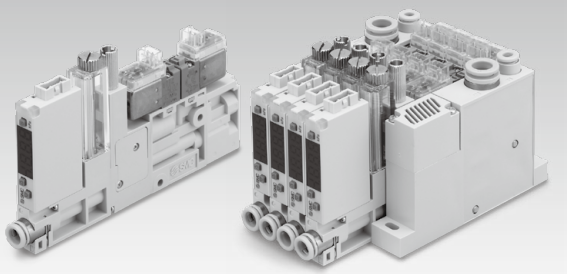
Compact Vacuum Unit *ZQ□A Series*



Ejector system

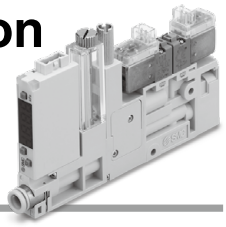


Vacuum pump system

Ejector System **Compact Vacuum Unit**

ZQ□A Series

Single Unit **With** **Energy Saving Function**



How to Order

ZQ [05] [1U] A – [K1] [5] [LO] [ ] – [VA] [M] [W] – [3] [3] – [ ]

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫ ⓬

❶ Nominal nozzle size

05	0.5
07	0.7
10	1.0

❷ Body type

1U	For Single unit
3M	For Manifold

❸ Solenoid valve combination

K1	Supply valve (N.C.), Release valve (N.C.)

❹ Solenoid valve rated voltage

5	24 VDC

❺ Electrical entry

LO	L plug connector (Without connector) With light/surge voltage suppressor

❻ Manual override

Nil	Non-locking push type
B	Locking slotted type

❼ Vacuum pressure switch (With suction filter*1)

Symbol	Pressure range [kPa]	Output
VA	–100 to 100	NPN 1 output + Energy saving function
VB		PNP 1 output + Energy saving function

*1 The filter used in this product is of a simple type, and will become clogged quickly in environments with high quantities of dust or particulates. Please consider using in combination with an air suction filter of the ZFC series, etc.

❽ Unit

Nil*2	With unit switching function
M	SI unit only (kPa)

*2 Under the New Measurement Act, switches with the unit switching function are not permitted for use in Japan (implemented October 1999).

❾ Lead wire

Nil	Without lead wire with connector
W	Lead wire for switch with energy saving function (Length: 2 m) (Included)

❿ Fitting (V port)

Symbol	Applicable tubing O.D.
0	Without fitting (M5 x 0.8)
1	ø3.2 (Straight)
2	ø4 (Straight)
3	ø6 (Straight)
4	ø3.2 (Elbow)
5	ø4 (Elbow)

⓫ Fitting (P port)

Symbol	Applicable tubing O.D.	Specification
Nil	Without port	Manifold
0	Without fitting (M5 x 0.8)	Single unit
2	ø4 (Straight)	
3	ø6 (Straight)	
5	ø4 (Elbow)	

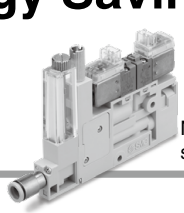
⓬ Option

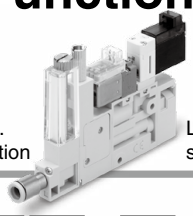
	Bracket for single unit	
	Single unit	Manifold
Nil	With	Without
N	Without	Not available

Ejector System Compact Vacuum Unit

ZQ□A Series

Single Unit Without Energy Saving Function


N.C./N.C. specification


Latching/N.C. specification

How to Order

ZQ ❶ ❷ A – ❸ ❹ ❺ ❻ – ❼ ❽ ❾ ❿ – ⓫ ⓬ – ⓭

❶ Nominal nozzle size

05	0.5
07	0.7
10	1.0

❷ Body type

1U	For Single unit
3M	For Manifold

❸ Solenoid valve combination

K1	Supply valve (N.C.), Release valve (N.C.)
K2	Supply valve (N.O.), Release valve (N.C.)
J1	Supply valve (N.C.)
J2	Supply valve (N.O.)
Q1*1	Supply valve (Latching), Release valve (N.C.)
Q2*1	Supply valve (Latching)

*1 Latching (+ common)

❹ Solenoid valve rated voltage

5	24 VDC

❺ Electrical entry

L	L plug connector (Lead wire length: 0.3 m) With light/surge voltage suppressor
LO	L plug connector (Without connector) With light/surge voltage suppressor

❻ Manual override

Nil	Non-locking push type
	Latching: Push-locking slotted type
B*2	Locking slotted type

*2 When "Q1" is selected in ❸, the locking slotted type is only available in the release valve.
This option cannot be chosen when "Q2" is selected in ❸.

❼ Vacuum pressure switch (With suction filter*3)

Symbol	Pressure range [kPa]	Output
EA	0 to –101	NPN 2 outputs
EB		PNP 2 outputs
EC		NPN 1 output + Analog voltage
EE		PNP 1 output + Analog voltage
FA	–100 to 100	NPN 2 outputs
FB		PNP 2 outputs
FC		NPN 1 output + Analog voltage
FE		PNP 1 output + Analog voltage
F*4	Suction filter only	

*3 The filter used in this product is of a simple type, and will become clogged quickly in environments with high quantities of dust or particulates. Please consider using in combination with an air suction filter of the ZFC series, etc.
*4 It is not necessary to select the items for ❽ and ❾.

❽ Unit

Nil*5	With unit switching function
M	SI unit only (kPa)
P*5	With unit switching function (Initial value: psi)

*5 Under the New Measurement Act, switches with the unit switching function are not permitted for use in Japan (implemented October 1999).

❾ Lead wire

Nil	Without lead wire with connector
G	Lead wire with connector (Length: 2 m) (Included)

❿ Check valve*6

Nil	None
K*7	With check valve

*6 The check valve has a function to prevent the exhaust air from the exhaust unit overflowing to the vacuum port side when a manifold is used, but it cannot prevent overflow of the exhaust air completely. During usage, please inspect thoroughly with actual machine.
Also, in order to completely prevent the overflow of exhaust air, leave plenty of space between the check valve unit and adjacent ejector to avoid interference from the ejector's exhaust unit.
*7 Cannot be selected when ❷ is "1U"
In addition, for the type with a check valve, the air in the adsorption part is not released to the atmosphere when vacuum is stopped. If "J1," "J2," or "Q2" is selected for ❸, be sure to also install a circuit for vacuum release.

⚠Warning

- **Cannot be used for vacuum retention**
- **Use a release valve. Without a release valve, a workpiece may not be released.**

⓫ Fitting (V port)

Symbol	Applicable tubing O.D.
0	Without fitting (M5 x 0.8)
1	ø3.2 (Straight)
2	ø4 (Straight)
3	ø6 (Straight)
4	ø3.2 (Elbow)
5	ø4 (Elbow)

⓬ Fitting (P port)

Symbol	Applicable tubing O.D.	Specification
Nil	Without port	Manifold
0	Without fitting (M5 x 0.8)	Single unit
2	ø4 (Straight)	
3	ø6 (Straight)	
5	ø4 (Elbow)	

⓭ Option

For Single Unit (❷: 1U)

Symbol	Bracket assembly	Converter assembly for solenoid valve*8
Nil	○	—
N	—	—
C	—	○
D	○	○

For Manifold (❷: 3M)

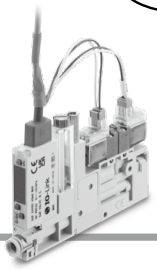
Symbol	Low release pressure specification*9	Converter assembly for solenoid valve*8
Nil	—	—
S	○	—
C	—	○
E	○	○

*8 A converter assembly for attaching the VQ100 lead wire assembly with a connector to the ZQ-A is included. Refer to the "Converter assembly for solenoid valve" on page 27.
"Q2" cannot be selected in ❸. Select "LO" in ❺.
*9 Select "C" for ❹ for the manifold part number on page 4. "J1", "J2", or "Q2" cannot be selected in ❸. For a release pressure supply pressure of 0.3 MPa or lower, select "S" or "E."

Ejector System **Compact Vacuum Unit**

ZQ□A Series

Single Unit **IO-Link Compatible**



IO-Link compatible

How to Order

ZQ 05 1U A – K1 5 LO □ – E L M H □ – 3 3 – □

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫ ⓬ ⓭

❶ Nominal nozzle size

05	0.5
07	0.7
10	1.0

❷ Body type

1U	For Single unit
3M	For Manifold

❸ Solenoid valve combination

K1	Supply valve (N.C.), Release valve (N.C.)
K2	Supply valve (N.O.), Release valve (N.C.)

❹ Solenoid valve rated voltage

5	24 VDC

❺ Electrical entry

LO	L plug connector (Without connector) With light/surge voltage suppressor

❻ Manual override

Nil	Non-locking push type
B	Locking slotted type

❼ IO-Link compatible vacuum pressure switch (With suction filter*1)

Symbol	Pressure range [kPa]	Energy saving function
E	0 to −101	—
F	−100 to 100	—
V		○

*1 The filter used in this product is of a simple type, and will become clogged quickly in environments with high quantities of dust or particulates. Please consider using in combination with an air suction filter of the ZFC series, etc.

❽ Unit

Nil*2	With unit switching function
M	SI unit only (kPa)

*2 Under the New Measurement Act, switches with the unit switching function are not permitted for use in Japan (implemented October 1999).

❾ Lead wire

Nil	Without lead wire with connector
H	Lead wire with connector for IO-Link (With M12 connector): 300 mm (Included)

❿ Check valve*3

Nil	None
K*4	With check valve

*3 The check valve has a function to prevent the exhaust air from the exhaust unit overflowing to the vacuum port side when a manifold is used, but it cannot prevent overflow of the exhaust air completely. During usage, please inspect thoroughly with actual machine.
Also, in order to completely prevent the overflow of exhaust air, leave plenty of space between the check valve unit and adjacent ejector to avoid interference from the ejector's exhaust unit.

*4 This option cannot be selected if "1U" is selected for ❷ or if "V" is selected for ❼.

⚠ Warning

• Cannot be used for vacuum retention

⓫ Fitting (V port)

Symbol	Applicable tubing O.D.
0	Without fitting (M5 x 0.8)
1	ø3.2 (Straight)
2	ø4 (Straight)
3	ø6 (Straight)
4	ø3.2 (Elbow)
5	ø4 (Elbow)

⓬ Fitting (P port)

Symbol	Applicable tubing O.D.	Specification
Nil	Without port	Manifold
0	Without fitting (M5 x 0.8)	Single unit
2	ø4 (Straight)	
3	ø6 (Straight)	
5	ø4 (Elbow)	

⓭ Option

For Single Unit (❷: 1U)

Symbol	Bracket assembly
Nil	○
N	—

For Manifold (❷: 3M)

Symbol	Low release pressure specification*5
Nil	—
S*6	○

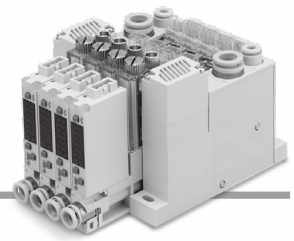
*5 Select "C" for ❹ for the manifold part number on page 4.
For a release pressure supply pressure of 0.3 MPa or lower, select "S."

*6 This option cannot be selected if "V" is selected for ❼.

Ejector System **Compact Vacuum Unit**

ZQ□A Series

Manifold Part Number



How to Order

ZZQ1 [08] A – [B] [S] [C] – [A]

❶ ❷ ❸ ❹ ❺

❶ Stations*1

01	1 station
02	2 stations
⋮	⋮
08	8 stations

*1 Number of stations varies according to nominal nozzle size during simultaneous operation. (Table 1)

Table 1. Max. Number of Stations that Can Operate Simultaneously*2

Nominal nozzle size	Max. number of stations that can operate simultaneously
0.5	8 stations
0.7	6 stations
1.0	4 stations

*2 For any of the nominal nozzle sizes, the max. number of stations that can be mounted is 8. However, please ensure that the max. number of stations that are operated simultaneously comply with the values above.

❷ Air pressure supply (P) port location

B	Both sides

❸ Exhaust

S	Silencer exhaust (Both sides)
P	Port exhaust (Both sides)

❹ Release pressure supply (PD) port

B	None (Release pressure: Commonly supplied from the P port)
C*3	Provided (Release pressure: Supplied from the PD port)

*3 For a release pressure supply pressure of 0.3 MPa or lower (for an individual unit without the energy-saving function), select "S" or "E" for ⓭ for the single unit part number on page 3.

❺ Shipping configuration

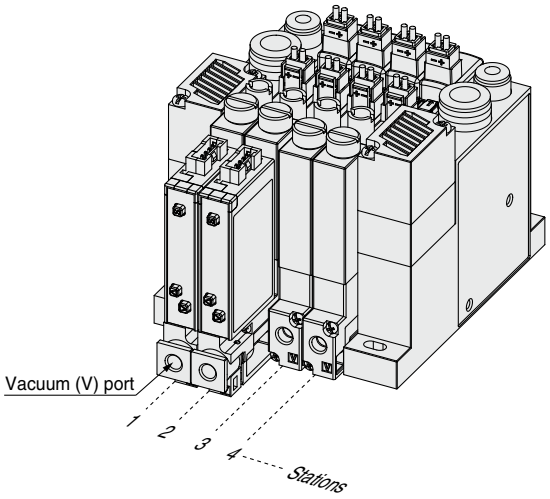
Nil	Assembled as a vacuum unit
A*4	Manifold unit only

*4 A set of end blocks and the clamp rod assembly is included in this manifold unit. (Used for the maintenance of the end block)

Manifold Order Example

ZZQ104A-BSB ····· 1 pc.
∗ ZQ053MA-K15L-EAG-0 ····· 2 pcs. → Stations 1 and 2
∗ ZQ103MA-K15L-F-0 ····· 2 pcs. → Stations 3 and 4

∗ When the manifold is viewed from the vacuum (V) port, the first station starts from the left.
ZQ053MA-K15L-EAG-0 (2 pcs.) and ZQ103MA-K15L-F-0 (2 pcs.) are arranged from the first station.



⚠ Caution when ordering manifold

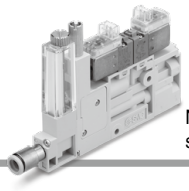
- The asterisk (∗) denotes the symbol for the assembly.
- Prefix it to the single unit part number.
- If "∗" is not entered, the manifold and single unit will be shipped without being assembled.
- When the manifold and the units are not assembled, please assemble them by referring to "How to increase/decrease manifold stations" on page 16.
- There is nothing else to arrange additionally.

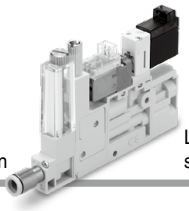
Vacuum Pump System **Compact Vacuum Unit**

ZQ□A Series

CE UK CA RoHS

Single Unit


N.C./N.C. specification


Latching/N.C. specification

How to Order

ZQ000 U A – K1 5 L □ – EA M G – 3 3 – □

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫

❶ Body type

U	For Single unit
M	For Manifold

❷ Solenoid valve combination

K1	Supply valve (N.C.), Release valve (N.C.)
K2	Supply valve (N.O.), Release valve (N.C.)
J1∗1	Supply valve (N.C.)
J2∗1	Supply valve (N.O.)
Q1∗2	Supply valve (Latching), Release valve (N.C.)
Q2∗1 ∗2	Supply valve (Latching)

∗1 The air in the adsorption section of this product is not released to the atmosphere at the vacuum suspension state. Devise the circuit for the vacuum release additionally.
∗2 Latching (+ common)

❸ Solenoid valve rated voltage

5	24 VDC

❹ Electrical entry

L	L plug connector (Lead wire length: 0.3 m) With light/surge voltage suppressor
LO	L plug connector (Without connector) With light/surge voltage suppressor

❺ Manual override

Nil	Non-locking push type
	Latching: Push-locking slotted type
B∗3	Locking slotted type

∗3 When "Q1" is selected in ❷, the locking slotted type is only available in the release valve.
This option cannot be chosen when "Q2" is selected in ❷.

❻ Vacuum pressure switch (With suction filter∗4)

Symbol	Pressure range [kPa]	Output
EA	0 to –101	NPN 2 outputs
EB		PNP 2 outputs
EC		NPN 1 output + Analog voltage
EE		PNP 1 output + Analog voltage
FA	–100 to 100	NPN 2 outputs
FB		PNP 2 outputs
FC		NPN 1 output + Analog voltage
FE		PNP 1 output + Analog voltage
F∗5	Suction filter only	

∗4 The filter used in this product is of a simple type, and will become clogged quickly in environments with high quantities of dust or particulates. Please consider using in combination with an air suction filter of the ZFC series, etc.
∗5 It is not necessary to select the items for ❼ and ❽.

❼ Unit

Nil∗6	With unit switching function
M	SI unit only (kPa)
P∗6	With unit switching function (Initial value: psi)

∗6 Under the New Measurement Act, switches with the unit switching function are not permitted for use in Japan (implemented October 1999).

❽ Lead wire

Nil	Without lead wire with connector
G	Lead wire with connector (Length: 2 m) (Included)

❾ Fitting (V port)

Symbol	Applicable tubing O.D.
0	Without fitting (M5 x 0.8)
1	ø3.2 (Straight)
2	ø4 (Straight)
3	ø6 (Straight)
4	ø3.2 (Elbow)
5	ø4 (Elbow)

❿ Fitting (PS/PV port)

Symbol	Applicable tubing O.D.	Specification
Nil	Without port	Manifold
0	Without fitting (M5 x 0.8)	Single unit
2	ø4 (Straight)	
3	ø6 (Straight)	
5	ø4 (Elbow)	

⓫ Option

For Single Unit (❶: U)

Symbol	Bracket assembly	Converter assembly for solenoid valve∗7
Nil	○	—
N	—	—
C	—	○
D	○	○

For Manifold (❶: M)

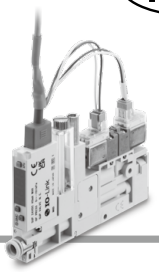
Symbol	Low release pressure specification∗8	Converter assembly for solenoid valve∗7
Nil	—	—
S	○	—
C	—	○
E	○	○

∗7 A converter assembly for attaching the VQ100 lead wire assembly with a connector to the ZQ-A is included. Refer to the "Converter Assembly for Solenoid Valve" on page 27.
"Q2" cannot be selected in ❷. Select "LO" in ❹.
∗8 Select "C" for ❸ for the manifold part number on page 6. "J1", "J2", or "Q2" cannot be selected in ❷.
For a release pressure supply pressure of 0.3 MPa or lower, select "S" or "E."

Vacuum Pump System **Compact Vacuum Unit**

ZQ□A Series

Single Unit **IO-Link compatible**



IO-Link Compatible

How to Order

ZQ000 U A − K1 5 LO □ − E L M H − 3 3 − □

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫

❶ Body type

U	For Single unit
M	For Manifold

❷ Solenoid valve combination

K1	Supply valve (N.C.), Release valve (N.C.)
K2	Supply valve (N.O.), Release valve (N.C.)

❸ Solenoid valve rated voltage

5	24 VDC

❹ Electrical entry

LO	L plug connector (Without connector) With light/surge voltage suppressor

❺ Manual override

Nil	Non-locking push type
B	Locking slotted type

❻ IO-Link compatible vacuum pressure switch (With suction filter∗1)

Symbol	Pressure range [kPa]
E	0 to −101
F	−100 to 100

∗1 The filter used in this product is of a simple type, and will become clogged quickly in environments with high quantities of dust or particulates. Please consider using in combination with an air suction filter of the ZFC series, etc.

❼ Unit

Nil∗2	With unit switching function
M	SI unit only (kPa)

∗2 Under the New Measurement Act, switches with the unit switching function are not permitted for use in Japan (implemented October 1999).

❽ Lead wire

Nil	Without lead wire with connector
H	Lead wire with connector for IO-Link (With M12 connector): 300 mm (Included)

❾ Fitting (V port)

Symbol	Applicable tubing O.D.
0	Without fitting (M5 x 0.8)
1	ø3.2 (Straight)
2	ø4 (Straight)
3	ø6 (Straight)
4	ø3.2 (Elbow)
5	ø4 (Elbow)

❿ Fitting (PS/PV port)

Symbol	Applicable tubing O.D.	Specification
Nil	Without port	Manifold
0	Without fitting (M5 x 0.8)	Single unit
2	ø4 (Straight)	
3	ø6 (Straight)	
5	ø4 (Elbow)	

⓫ Option

For Single Unit (❶: U)

Symbol	Bracket assembly
Nil	○
N	—

For Manifold (❶: M)

Symbol	Low release pressure specification∗3
Nil	—
S∗4	○

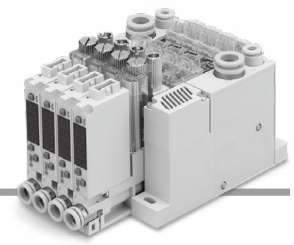
∗3 Select “C” for ❸ for the manifold part number on page 6.

∗4 For a release pressure supply pressure of 0.3 MPa or lower, select “S.”

Vacuum Pump System **Compact Vacuum Unit**

ZQ□A Series

Manifold Part Number



How to Order

ZZQ1 [08] A – [L] O [C] – [A]

❶ ❷ ❸ ❹

❶ Stations

01	1 station
02	2 stations
⋮	⋮
08	8 stations

❷ Vacuum pressure supply (PV) port location*1

L	Left side
R	Right side

*1 The position of the vacuum pressure supply (PV) port when the vacuum (V) port is facing front. The pilot pressure supply (PS) port is on the opposite side.
Refer to the "Table 1" for details.

❸ Release pressure supply (PD) port

B	None (Release pressure: Commonly supplied from the PS port)
C*2	Provided (Release pressure: Supplied from the PD port)

*2 For a release pressure supply pressure of 0.3 MPa or lower, select "S" or "E" for ⓫ for the single unit part number on page 5.

❹ Shipping configuration

Nil	Assembled as a vacuum unit
A*3	Manifold unit only

*3 A set of end blocks and the clamp rod assembly is included in this manifold unit. (Used for the maintenance of the end block)

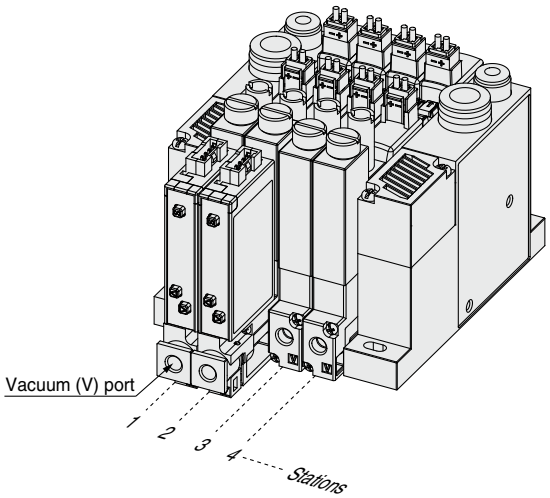
Table 1. Location of Each Port

❷ PV port location	❸ PD port	Left side with the V port facing the front			Right side with the V port facing the front		
		PS port	PV port	PD port	PS port	PV port	PD port
L	**B**	—	●	—	●	—	—
	C	—	●	●	●	—	●
R	**B**	●	—	—	—	●	—
	C	●	—	●	—	●	●

Manifold Order Example

ZZQ104A-ROB····· 1 pc.
＊ ZQ000MA-K15L-EAG-0 ····· 2 pcs. → Stations 1 and 2
＊ ZQ000MA-K15L-F-0 ····· 2 pcs. → Stations 3 and 4

＊ When the manifold is viewed from the vacuum (V) port, the first station starts from the left.
ZQ000MA-K15L-EAG-0 (2 pcs.) and ZQ000MA-K15L-F-0 (2 pcs.) are arranged from the first station.



⚠ Caution when ordering manifold

The asterisk (＊) denotes the symbol for the assembly.
Prefix it to the single unit part number.
If "＊" is not entered, the manifold and single unit will be shipped without being assembled.
When the manifold and the units are not assembled, please assemble them by referring to "How to increase/decrease manifold stations" on page 16.
There is nothing else to arrange additionally.

Specifications

General Specifications

Item	ZQ series
Operating temperature range [°C]	5 to 50 (No condensation)
Fluid	Air
Vibration resistance [m/s²]∗1	20
Impact resistance [m/s²]∗2	100
Standards	CE/UKCA marking (EMC directive, RoHS directive)

∗1 10 to 150 Hz for 2 hours in each direction of X, Y, and Z (De-energized, Initial value)
∗2 3 times in each direction of X, Y, and Z (De-energized, Initial value)

Vacuum Ejector System Specifications

Item			ZQ05□A	ZQ07□A	ZQ10□A
Nozzle size [mm]			0.5	0.7	1.0
Standard supply pressure [MPa]			0.35	0.43	
Max. vacuum pressure [kPa]∗1			–80		
Max. suction flow rate [L/min (ANR)]∗1			5	10	22
Air consumption [L/min (ANR)]∗1			15	25	47
Supply pressure range [MPa]	**Air pressure supply (P) port**		0.3 to 0.5		
	Release pressure supply (PD) port∗2	**Low release pressure specification**	0 to 0.45∗3		
		Other than low release pressure specification	0.3 to 0.45		
Withstand pressure [MPa]			0.75		
Number of manifold stations that can operate simultaneously			8	6	4
Noise level [dB(A)]∗4	**For Single unit**		65	68	70
	For Manifold (Max. number of stations that can operate simultaneously)		64	66	68
Main valve response time [ms]			25 or less		

∗1 Piping size: ø6, at the standard supply pressure. Values are based on SMC's measurement standards. They depend on atmospheric pressure (weather, altitude, etc.) and the measurement method.
∗2 Release pressure must be lower than P port pressure by at least 0.05 MPa.
∗3 0.1 MPa or more when the pressure switch with energy saving function is used
∗4 Actual values under SMC's measurement conditions (Not guaranteed values)

Vacuum Pump System Specifications

Item		ZQ000□A
Flow rate characteristics of V (ø6 Straight) ⇒ PV (ø6 Straight) (Vacuum side)∗1	**C [dm³/(s·bar)]**	0.31
	b	0.23
	Cv	0.09
Flow rate characteristics of PS (ø6 Straight) ⇒ V (ø6 Straight) (Release side)∗1, ∗2	**C [dm³/(s·bar)]**	0.24
	b	0.26
	Cv	0.08
Main valve response time [ms]		25 or less
Supply pressure range	**Vacuum pressure supply (PV) port [kPa]**	0 to –101.3
	Pilot pressure supply (PS) port [MPa]	0.3 to 0.5
	Release pressure supply (PD) port [MPa]∗3	0 to 0.45

∗1 Piping size: ø6
∗2 When the vacuum release flow adjusting needle is fully open
∗3 Release pressure must be lower than PS port pressure by at least 0.05 MPa.

Weight

Single Unit Part Number

Model/Additional specifications	Weight [g]
ZQ□□UA-K15L-F-00-N (Basic type for Single unit)	70
ZQ□□MA-K15L-F-0 (Basic type for Manifold)	70
Without release valve	–10
Supply valve (N.O.)	+2
Supply valve (Latching)	+5
With vacuum pressure switch (Excluding lead wire)	+20
Lead wire with connector for vacuum pressure switch	+45
Lead wire with connector for pressure switch with energy saving function	+50
Lead wire with connector for IO-Link	+20
With bracket assembly (ZQ1-BK-A)	+25

Manifold Part Number

Model/Additional specifications	Weight [g]
ZZQ101A-BSB	115
ZZQ101A-BSC	130
ZZQ101-BPB	150
ZZQ101-BPC	155
ZZQ101A-□OB	105
ZZQ101A-□OC	120
1 station	+2

Calculation of weight for the manifold type
(Single unit weight x Number of stations) + (Manifold part number weight) + (1 station x Number of stations)

Supply Valve / Release Valve Specifications

Type	Normally closed	Normally open	Latching type
Model	**ZQ1-V114-5LU-A**	**ZQ1-V124-5MU-A**	**ZQ1-VQ110L-5L-A**
Manual override	Non-locking push type/Locking slotted type		Locking slotted type
Rated coil voltage	24 VDC		
Allowable voltage range	−10 to 10%		
Power consumption	0.4 W		1 W
Electrical entry	L plug connector (With light/surge voltage suppressor)	M plug connector (With light/surge voltage suppressor)	L plug connector (With light/surge voltage suppressor)
Lead wire	Conductor cross section: 0.2 to 0.33 mm^2, Max. O.D. of covering: 1.7 mm		

∗ For details on the V100 and VQ100 series, please refer to the **Web Catalog**.

Vacuum Pressure Switch Specifications

Model			ZSE10		
			Vacuum pressure switch	Compound pressure switch	Vacuum pressure switch with energy saving function
Rated pressure range			0 to −101 kPa	−100 to 100 kPa	
Set pressure range/Display pressure range			10 to −105 kPa	−105 to 105 kPa	
Withstand pressure			500 kPa		
Smallest settable increment			0.1 kPa		
Applicable fluid			Air, Non-corrosive gas, Non-flammable gas		
Power supply voltage			12 to 24 VDC ±10%, Ripple (p-p) 10% or less (with power supply polarity protection)		
Current consumption			40 mA or less		
Switch output			NPN or PNP open collector 2 outputs (Selectable)		NPN or PNP open collector OUT1: General purpose OUT2: Valve control
	Max. load current		80 mA		
	Max. applied voltage		28 V (at NPN output)		26.4 V (at NPN output)
	Residual voltage		2 V or less (with load current of 80 mA)		
	Response time		2.5 ms or less (with anti-chattering function: 20, 100, 500, 1000, 2000 ms)		
	Short-circuit protection		Yes		
Repeatability			±0.2% F.S. ±1 digit		
Hysteresis	**Hysteresis mode**		Variable (0 or above)∗1		
	Window comparator mode		Variable (0 or above)∗1		—
Analog output	Voltage output	Output voltage (Rated pressure range)	1 to 5 V ±2.5% F.S.		—
		Linearity	±1% F.S.		—
		Output impedance	Approx. 1 kΩ		—
Display			3 1/2 digit, 7-segment LED, 1-color display (Red)		
Display accuracy			±2% F.S. ±1 digit (at an ambient temperature of 25 ±3°C)		
Indicator light			Lights up when switch output is turned ON. OUT1: Green, OUT2: Red		
Environmental resistance	**Enclosure**		IP40		
	Operating temperature range		Operating: −5 to 50°C Stored: −10 to 60°C (No freezing or condensation)		
	Operating humidity range		Operating/Stored: 35 to 85%RH (No condensation)		
	Withstand voltage		1000 VAC for 1 minute between terminals and housing		
	Insulation resistance		50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing		
Temperature characteristics			±2% F.S. (at 25°C in an ambient temperature of −5 and 50°C)		
Lead wire			Oilproof heavy-duty vinyl cable 5 cores, ø3.5, 2 m, Conductor cross section: 0.15 mm^2 (AWG26) Insulator O.D.: 1.0 mm		
Standards			CE/UKCA marking (EMC directive, RoHS directive)		

∗1 If the applied pressure fluctuates around the set value, the hysteresis must be set to a value more than the fluctuating width. Otherwise, chattering will occur.

IO-Link Compatible Vacuum Pressure Switch Specifications

IO-Link Compatible Vacuum Pressure Switch (For details, refer to the **ZQ-ZS□L□□□□-□-A** operation manual on the SMC website.)

Model		ZSE10	
		For vacuum pressure	For compound pressure (Includes energy saving function)
Rated pressure range		0 to −101 kPa	−100 to 100 kPa
Set pressure range		10 to −105 kPa	−105 to 105 kPa
Proof pressure		500 kPa	
Smallest settable increment		0.1 kPa	
Power supply voltage		24 VDC ±10%, Ripple (p-p) 10% or less (with power supply polarity protection)	
Current consumption		40 mA	
Switch output	**Output type**	PNP open collector OUT1, OUT2: For valve control	
	Residual voltage	2 V or less (with load current of 80 mA)	
	Short-circuit protection	Yes	
Repeatability		±0.2% F.S. ±1 digit	
Hysteresis		Variable (0.1 or above)	
Display		3 1/2 digit, 7-segment LED, 1-color display (Red)	
Display accuracy		±2% F.S. ±1 digit (at an ambient temperature of 25 ±3°C)	
Indicator light		Lights up when solenoid valve output is turned ON. Release valve output (OUT1): Green, Supply valve output (OUT2): Red	
Digital filter		Variable from 0 to 10 s (0.01 s increments)	
Environmental resistance	**Enclosure**	IP40	
	Withstand voltage	1000 VAC for 1 min between terminals and housing	
	Insulation resistance	50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing	
	Operating temperature range	Operating: −5 to 50°C, Stored: −10 to 60°C (No condensation or freezing)	
	Operating humidity range	Operating/Stored: 35 to 85% RH (No condensation)	
Temperature characteristics		±2% F.S. (25°C standard)	
Lead wire		Cable 3 cores, ø3.4, 300 mm Valve connector lead wire Insulator O.D.: 1.5 mm, 100 mm	

∗ **The vacuum pressure switch mounted on this product is equivalent to our SMC product, the ZSE10 series compact digital pressure switch.**

For details on vacuum pressure switch functions, please refer to the ZSE10 series in the Web Catalog.

● **Pressure switch correspondence table**

Vacuum ejector ZQ□A series **ZQ□□A-□□□□□-□□□□-□□-□**

Vacuum pressure switch for the ZQ□A **ZQ-ZS□□□□-□-A**

Compact digital pressure switch ZSE10 series **ZSE10□-□-□-□□□□**

Rated pressure range/Output specification (Refer to the table below.)

Vacuum pressure switch lead wire specification

Vacuum pressure switch unit specification

Rated Pressure Range/Output Specifications Correspondence Table

Vacuum pressure switch for the ZQ	ZSE10 series	Pressure range [kPa]	Output specifications
ZQ-ZSEA□□□-□-A	ZSE10-□-A-□□□□	0 to −101	NPN 2 outputs
ZQ-ZSEB□□□-□-A	ZSE10-□-B-□□□□		PNP 2 outputs
ZQ-ZSEC□□□-□-A	ZSE10-□-C-□□□□		NPN 1 output + Analog voltage
ZQ-ZSEE□□□-□-A	ZSE10-□-E-□□□□		PNP 1 output + Analog voltage
ZQ-ZSFA□□□-□-A	ZSE10F-□-A-□□□□	−100 to 100	NPN 2 outputs
ZQ-ZSFB□□□-□-A	ZSE10F-□-B-□□□□		PNP 2 outputs
ZQ-ZSFC□□□-□-A	ZSE10F-□-C-□□□□		NPN 1 output + Analog voltage
ZQ-ZSFE□□□-□-A	ZSE10F-□-E-□□□□		PNP 1 output + Analog voltage
ZQ-ZSVA□□□-□-A	Not available		NPN 1 output + Energy saving control
ZQ-ZSVB□□□-□-A	Not available		PNP 1 output + Energy saving control
ZQ-ZSEL1□□□-□-A	Not available	0 to −101	IO-Link (For N.C. supply valve)
ZQ-ZSEL2□□□-□-A	Not available		IO-Link (For N.O. supply valve)
ZQ-ZSFL1□□□-□-A	Not available	−100 to 100	IO-Link (For N.C. supply valve)∗1
ZQ-ZSFL2□□□-□-A	Not available		IO-Link (For N.O. supply valve)∗1

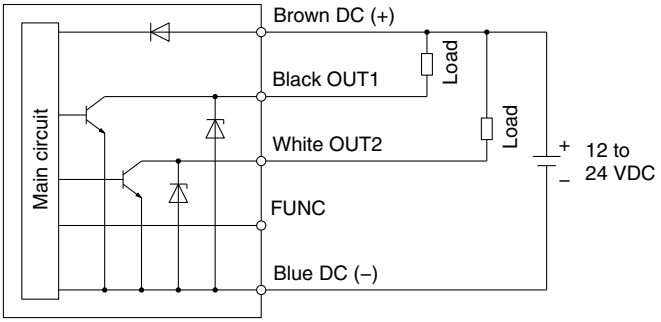
∗1 The energy-saving function can be turned ON or OFF via the parameter settings.

Refer to page 14 for how to order the vacuum pressure switch.

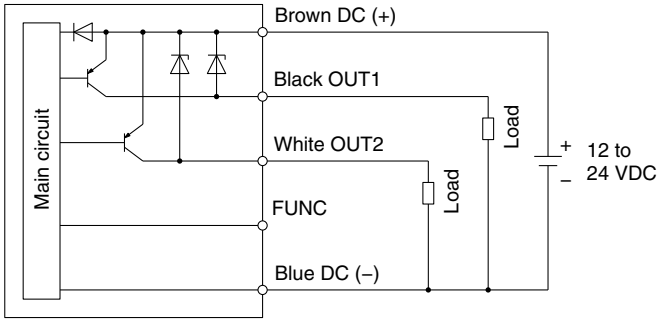
Internal Circuits and Wiring Examples

■ Vacuum pressure switch

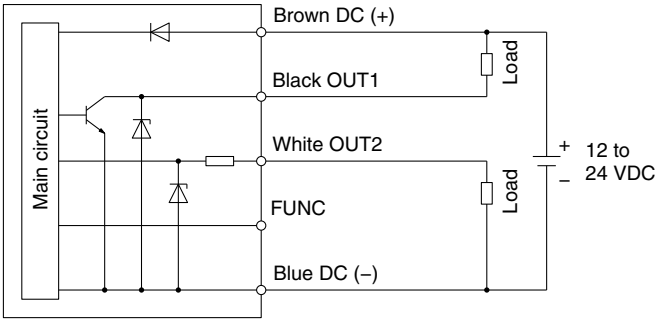
EA, FA
NPN open collector (2 outputs)



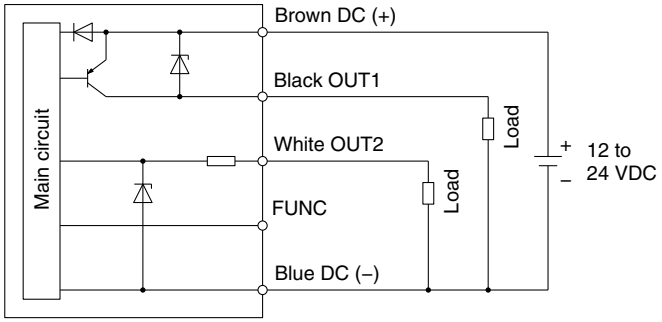
EB, FB
PNP open collector (2 outputs)



EC, FC
NPN open collector (1 output) + Analog voltage output



EE, FE
PNP open collector (1 output) + Analog voltage output

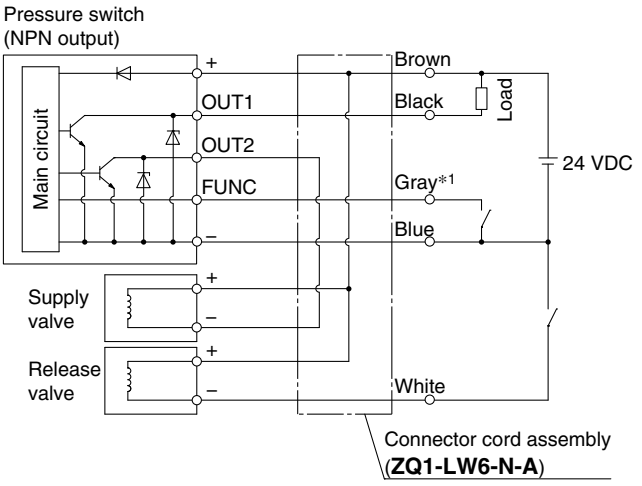


Max. 28 V, 80 mA
Residual voltage: 2 V or less

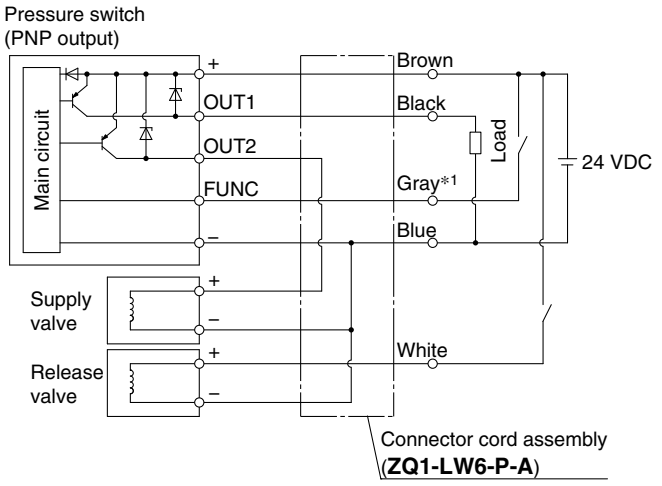
∗ The FUNC terminal is connected when using the copy function.
(For details, please refer to the Operation Manual for the ZSE10/ISE10 on the SMC website.)

■ Vacuum pressure switch with energy saving function

NPN (1 output)



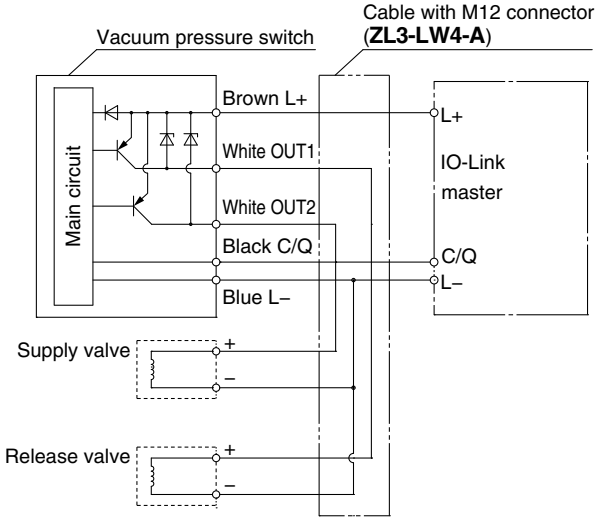
PNP (1 output)



∗1 The gray wire (FUNC) is connected when operating the supply valve by energy saving control (for workpiece adsorption). (For details, please refer to the Operation Manual for the ZQ-ZSV□-□-A series on the SMC website.)

Internal Circuits and Wiring Examples

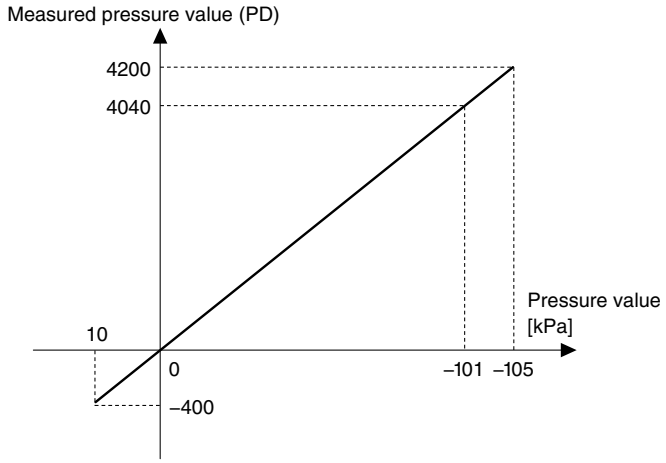
■IO-Link compatible vacuum pressure switch



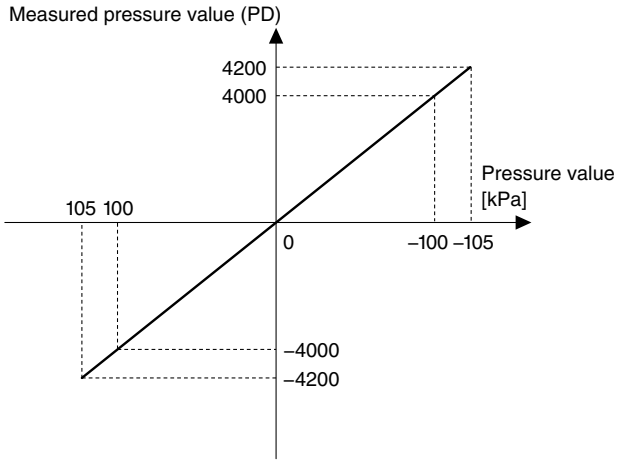
IO-Link: Process Data

Relationship between the process data and pressure value

ZQ-ZSEL½□□□-□-A (For 0 to –101 kPa)

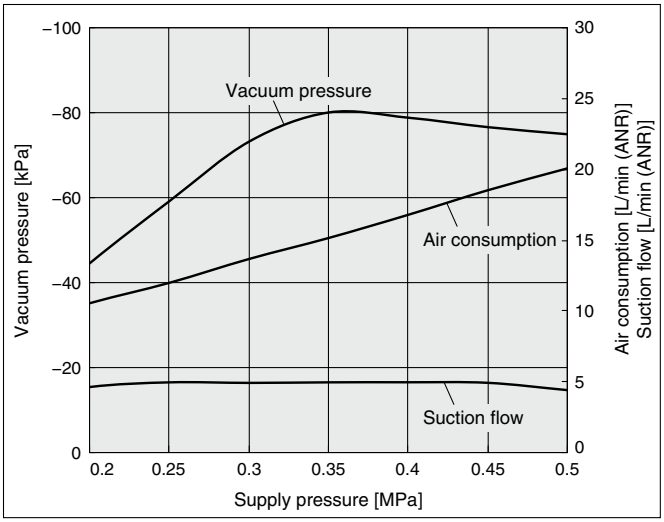


ZQ-ZSFL½□□□-□-A (For –100 to 100 kPa)



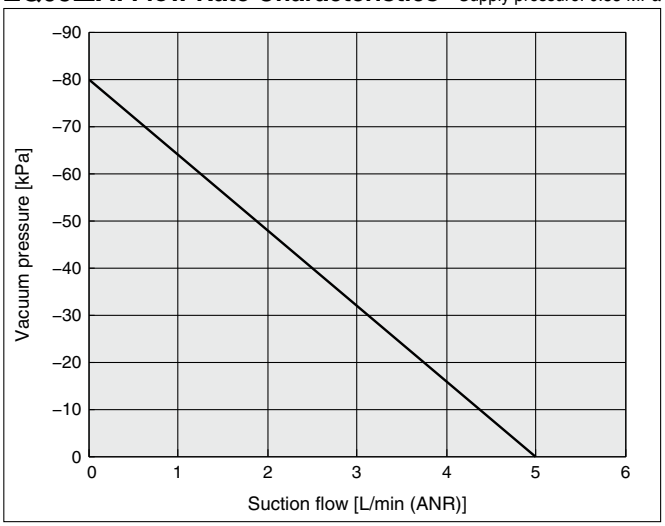
Exhaust Characteristics / Flow Rate Characteristics

ZQ05□A: Exhaust Characteristics

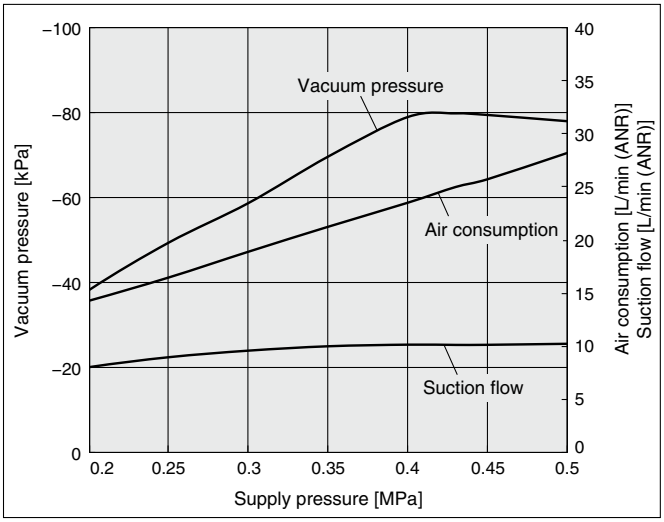


ZQ05□A: Flow Rate Characteristics

Supply pressure: 0.35 MPa

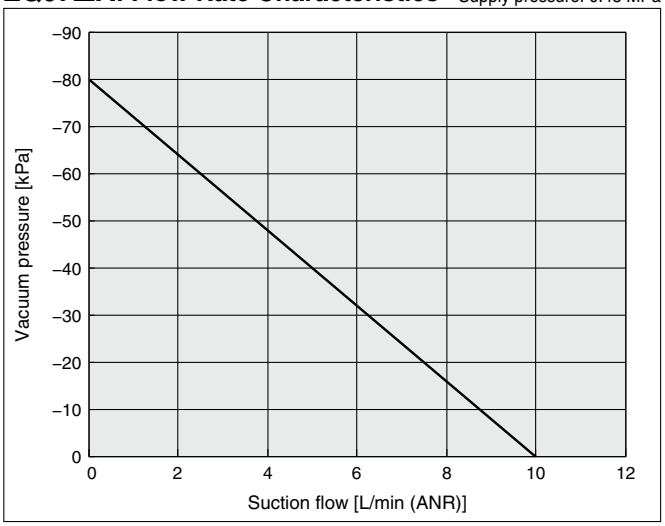


ZQ07□A: Exhaust Characteristics

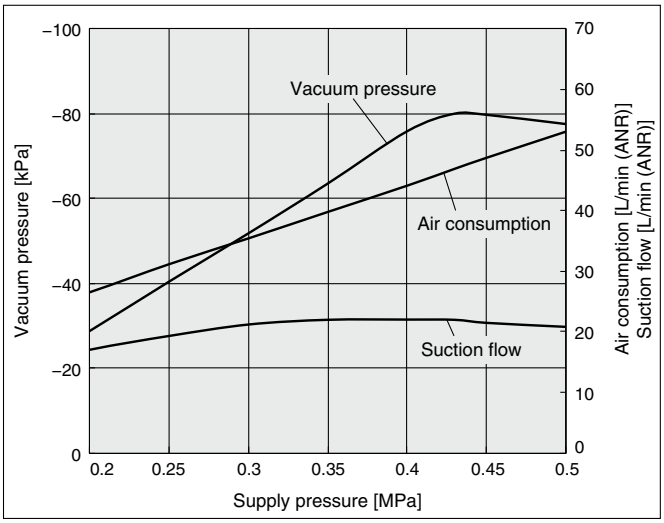


ZQ07□A: Flow Rate Characteristics

Supply pressure: 0.43 MPa

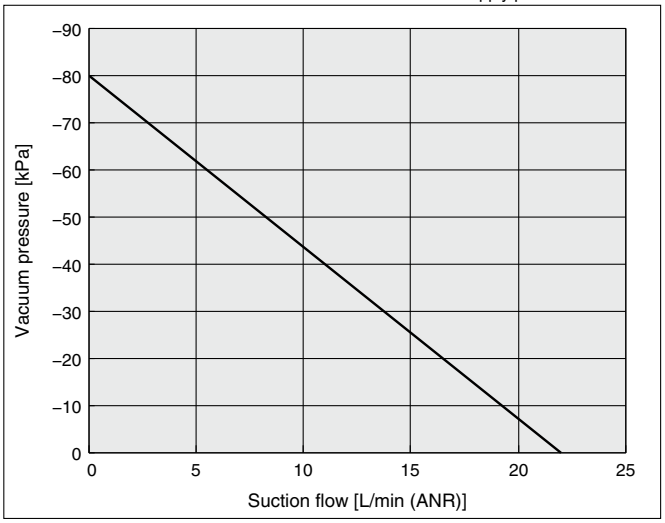


ZQ10□A: Exhaust Characteristics



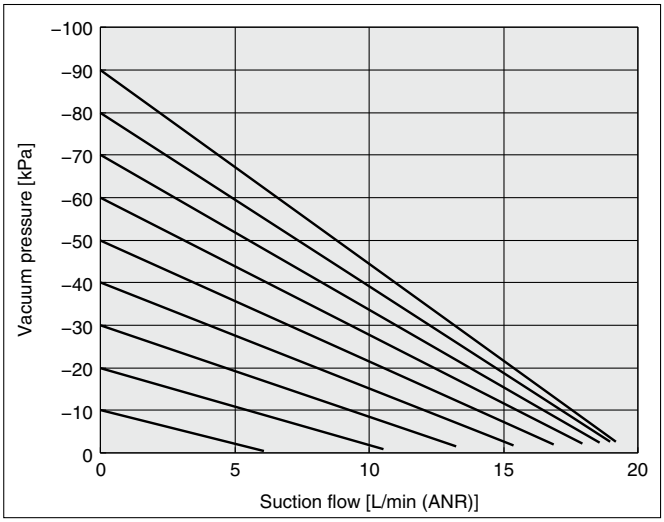
ZQ10□A: Flow Rate Characteristics

Supply pressure: 0.43 MPa



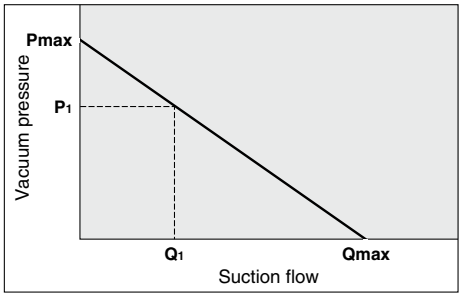
Vacuum Pump System: Flow Rate Characteristics

ZQ000A



The actual suction flow at the point of suction varies depending on the piping conditions to the vacuum port. (The above graph shows the value when V port is ø6.)

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 catalogs, 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 $\mathbf{P_1}$ and $\mathbf{Q_1}$)
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 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 max. 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.

Max. Release Flow

The table below shows vacuum release flow rate when the opening of the vacuum release flow adjustment needle is fully open (Shown by V port size).

[L/min (ANR)]

V port size	Without release pressure supply (PD) port*1					Low release pressure specification with release pressure supply (PD) port*2				
	P/PS port pressure [MPa]	ZQ05□A	ZQ07□A	ZQ10□A	ZQ000□A	PD port pressure [MPa]	ZQ05□A	ZQ07□A	ZQ10□A	ZQ000□A
ø3.2	0.1	—	—	—	—	0.05	11	10	8	16
	0.2	—	—	—	—	0.15	22	10	17	32
	0.3	38 (29)	34 (26)	27 (22)	53	0.25	31	29	24	46
	Standard supply pressure*3	44 (35)	46 (41)	36 (33)	66	0.35	44	39	31	60
	0.5	59 (54)	52 (49)	41 (39)	79	0.45	54	48	38	74
ø4	0.1	—	—	—	—	0.05	11	11	9	16
	0.2	—	—	—	—	0.15	24	22	18	33
	0.3	40 (30)	37 (29)	31 (23)	54	0.25	34	32	27	48
	Standard supply pressure*3	46 (37)	49 (44)	41 (36)	68	0.35	46	42	35	62
	0.5	63 (57)	57 (51)	46 (43)	82	0.45	57	52	44	76
ø6	0.1	—	—	—	—	0.05	12	11	9	16
	0.2	—	—	—	—	0.15	25	24	20	33
	0.3	43 (34)	39 (30)	35 (28)	54	0.25	37	34	30	47
	Standard supply pressure*3	49 (41)	53 (50)	47 (43)	68	0.35	49	45	39	63
	0.5	67 (64)	61 (59)	54 (51)	81	0.45	61	56	48	77

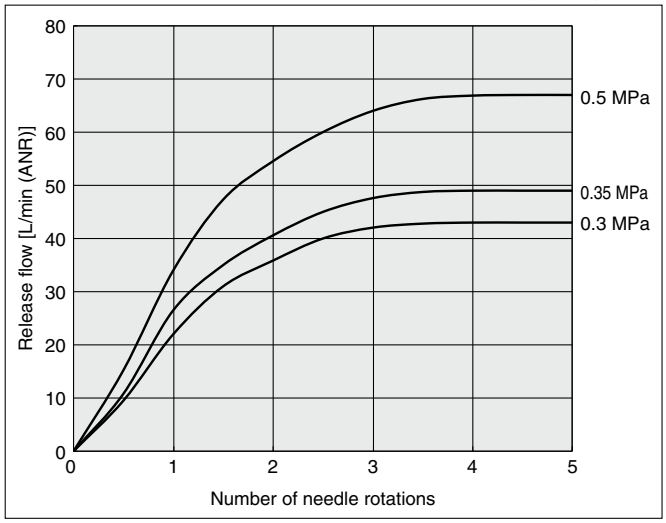
*1 The values in ( ) are for models with a pressure switch with energy saving function.
*2 There is no difference in vacuum release flow rate depending on the presence of the pressure switch with energy saving function.
*3 ZQ05□A: 0.35 MPa, ZQ07□A and ZQ10□A: 0.43 MPa, ZQ000□A: 0.4 MPa

Vacuum Release Flow Rate Characteristics (V Port Size: ø6)

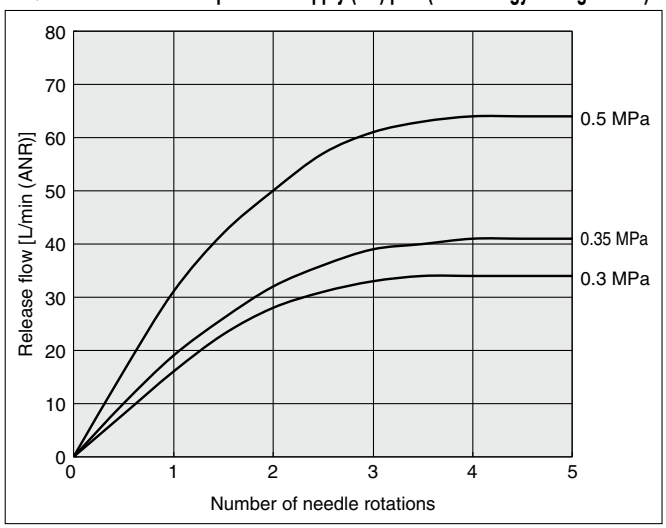
The graph shows the flow rate characteristics at different supply pressures when the break flow adjusting needle is open from the fully closed state.

Ejector System

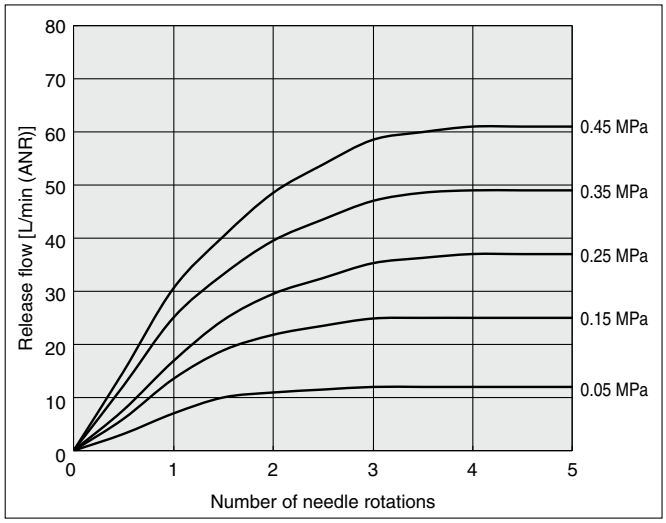
ZQ□A Without release pressure supply (PD) port (Without energy saving switch)



ZQ□A Without release pressure supply (PD) port (With energy saving switch)



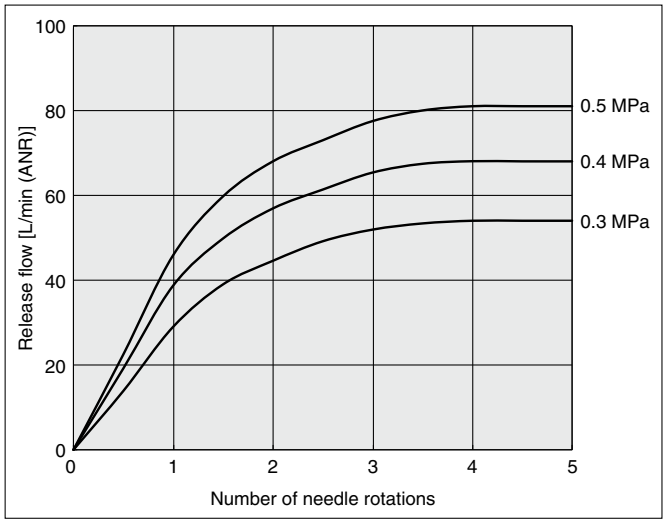
ZQ□A Low release pressure specification with release pressure supply (PD) port*1



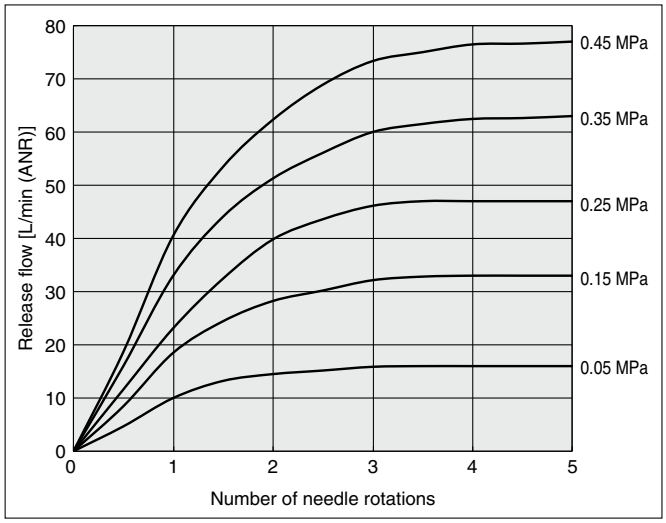
*1 There is no difference in vacuum release flow rate depending on the presence of the pressure switch with energy saving function.

Pump System

ZQ000□A Without release pressure supply (PD) port

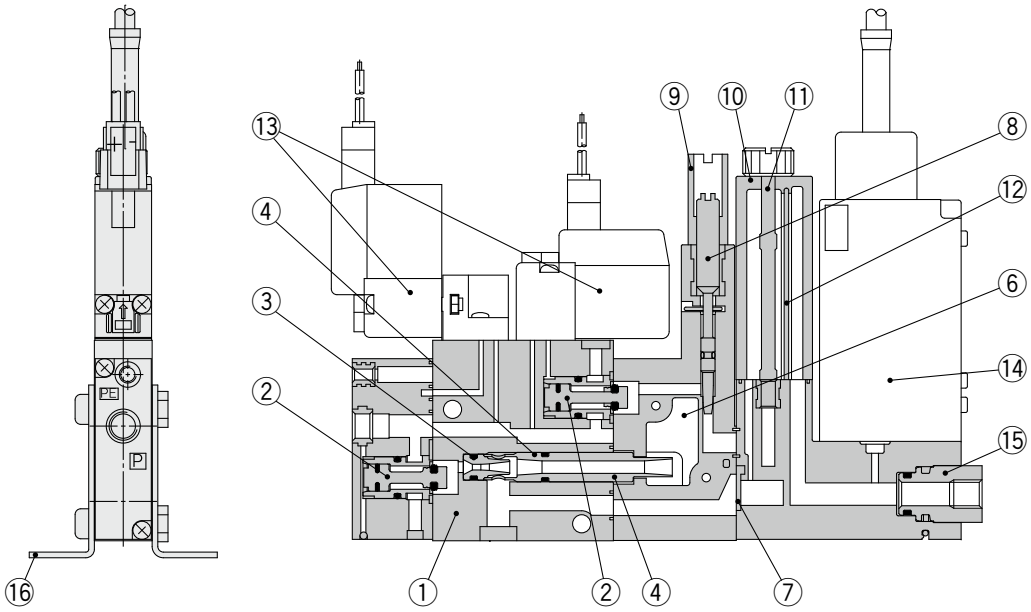


ZQ000□A Low release pressure specification with release pressure supply (PD) port

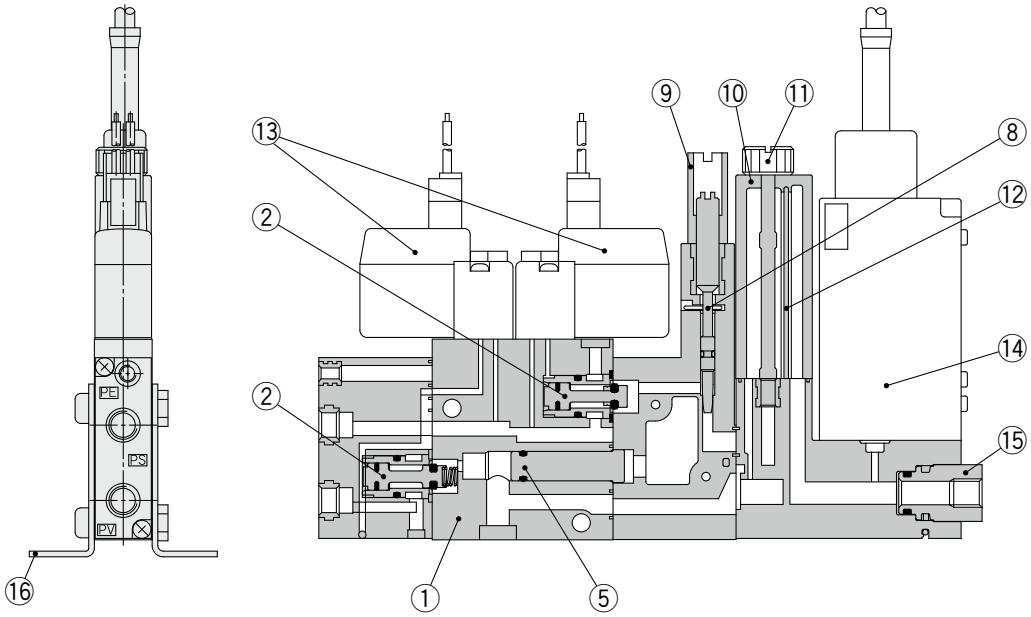


Construction

Vacuum ejector (N.O. specification)



Vacuum pump system (N.C. specification)



Component Parts

No.	Description	Material	Note
1	**Body**	PBT	Brass and aluminum alloy are also used.
2	**Supply valve / Release valve assembly**	POM/Aluminum alloy/Stainless steel	
3	**Nozzle**	PBT	
4	**Diffuser**	PBT	
5	**Bushing**	Aluminum alloy	
6	**Sound absorbing material**	Non-woven fabric (PET)	Refer to 3 on page 15 for how to order. (When replacing the sound absorbing material, order a silencer plate assembly.)
7	**Check valve**	HNBR	Refer to 6 on page 15 for how to order.
8	**Vacuum release flow adjusting needle**	Stainless steel	
9	**Lock nut**	Aluminum alloy (Anodized)	
10	**Filter case**	PC (Refer to the precautions on page 26.)	Refer to 4 on page 15 for how to order.
11	**Tension bolt**	Stainless steel	
12	**Filter element**	PVA sponge	Refer to 5 on page 15 for how to order.
13	**Pilot supply valve / Pilot valve (for release)**	—	Refer to 1 on page 14 for how to order.
14	**Vacuum pressure switch**	—	Refer to 2 on page 14 for how to order.
15	**Vacuum (V) port fitting**	—	Refer to 7 on page 15 for how to order.
16	**Bracket assembly**	Steel (Nickel plating)	Refer to 9 on page 15 for how to order.
—	**Seal material (O-ring, etc.)**	NBR/HNBR	
—	**Screws for assembly**	Steel (Zinc chromating/Nickel plating)	

How to Order Replacement Parts for Single Unit

1 Solenoid Valve

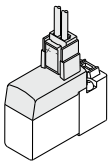
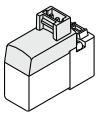
(Recommended torque for replacement: 0.054 to 0.08 N·m)

N.C. Pilot Supply Valves, Pilot Valves (for Release)

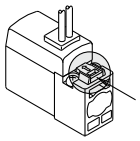
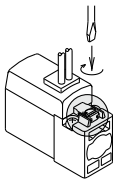
ZQ1 − V114 − 5 L U □ − A

❶ ❷

❶ Electrical entry

L	LO
With lead wire (300 mm)	Without connector
	

❷ Manual override

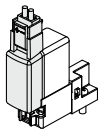
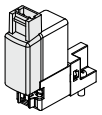
Nil	B
Non-locking push type	Locking slotted type
	

N.O. Pilot Supply Valves

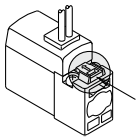
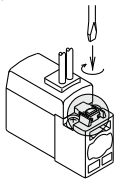
ZQ1 − V124 − 5 M U □ − A

❶ ❷

❶ Electrical entry

M	MO
With lead wire (300 mm)	Without connector
	

❷ Manual override

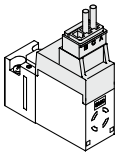
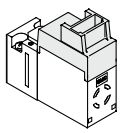
Nil	B
Non-locking push type	Locking slotted type
	

Latching Pilot Supply Valves

ZQ1 − VQ110L − 5 L − A

❶

❶ Electrical entry

L	LO
With lead wire (300 mm)	Without connector
	

Lead Wire with Connector Assembly for Solenoid Valve

For N.C./N.O. Pilot Valves, Pilot Valves (for Release)

SY100 − 30 − 4 A − 6

For Latching Pilot Valves

AXT661 − 13A − 6

❶

❶ Lead wire length

Nil	300 mm
6	600 mm
10	1000 mm
15	1500 mm
20	2000 mm
30	3000 mm
50	5000 mm

Connector and Socket for Solenoid Valve

For N.C/N.O. Pilot Valves, Pilot Valves (for Release)

SY100 − 30 − A

(Number of sockets: 2)

For Latching Pilot Valves

AXT661 − 12A

(Number of sockets: 3)

∗ With connector and sockets only

2 Vacuum Pressure Switch (With Suction Filter)

(Recommended torque for replacement: 0.11 to 0.13 N·m)

ZQ − ZS EA M G □ − 2 − A

❶ ❷ ❸ ❹ ❺

❶ Vacuum pressure switch

Symbol	Pressure range [kPa]	Output
EA	0 to −101	NPN 2 outputs
EB		PNP 2 outputs
EC		NPN 1 output + Analog voltage
EE		PNP 1 output + Analog voltage
FA	−100 to 100	NPN 2 outputs
FB		PNP 2 outputs
FC		NPN 1 output + Analog voltage
FE		PNP 1 output + Analog voltage
VA∗1		NPN 1 output + Energy saving control
VB∗1		PNP 1 output + Energy saving control
EL1∗1	0 to −101	IO-Link (For N.C. supply valve)
EL2∗1		IO-Link (For N.O. supply valve)
FL1∗1	−100 to 100	IO-Link (For N.C. supply valve)∗2
FL2∗1		IO-Link (For N.O. supply valve)∗2

∗1 It is not possible to replace a vacuum pressure switch without an energy-saving function with one with an energy-saving function. Similarly, it is not possible to replace a vacuum pressure switch without IO-Link with one with IO-Link.

∗2 The energy-saving function can be turned ON or OFF via the parameter settings.

❷ Unit

Nil∗3	With unit switching function
M	SI unit only (kPa)
P∗3, ∗4	With unit switching function (Initial value: psi)

∗3 Under the New Measurement Act, switches with the unit switching function are not permitted for use in Japan (implemented October 1999).

∗4 This option cannot be selected if "VA," "VB," "EL1," "EL2," "FL1," or "FL2" is selected for ❶.

❸ Lead wire

Nil	Without lead wire with connector
G	Lead wire with connector (Length: 2 m) (Included)
W	Lead wire for switch with energy saving function (Length: 2 m) (Included)
H	Lead wire with connector for IO-Link compatible vacuum pressure switch (With M12 connector, Length: 300 mm) (Included)

❹ Check valve∗5

Nil	None
K∗6	With check valve

∗5 The check valve has a function to prevent the exhaust air from the exhaust unit overflowing to the vacuum port side when a manifold is used, but it cannot prevent overflow of the exhaust air completely. During usage, please inspect thoroughly with actual machine.
Also, in order to completely prevent the overflow of exhaust air, leave plenty of space between the check valve unit and adjacent ejector to avoid interference from the ejector's exhaust unit.

∗6 When "VA" or "VB" is specified for ❶, the check valve is already built in. To use the energy-saving function with the IO-Link specification, select option "K."

⚠ Warning

1. Cannot be used for vacuum retention

2. Use a release valve. Without a release valve, a workpiece may not be released.

How to Order Replacement Parts for Single Unit

❺ Fitting (V port)

Symbol	Applicable tubing O.D.
0	Without fitting (M5 x 0.8)
1	ø3.2 (Straight)
2	ø4 (Straight)
3	ø6 (Straight)
4	ø3.2 (Elbow)
5	ø4 (Elbow)

Lead Wire with Connector Assembly for Vacuum Pressure Switch

(When an individual lead wire is necessary, order with the part numbers below.)

· **Lead wire with connector for vacuum pressure switch**

ZS − 39 − 5G

· **Lead wire with connector for pressure switch with energy saving function**

ZQ1 − LW6 − [N] − A

❶

❶ **Output**

N	NPN open collector
P	PNP open collector

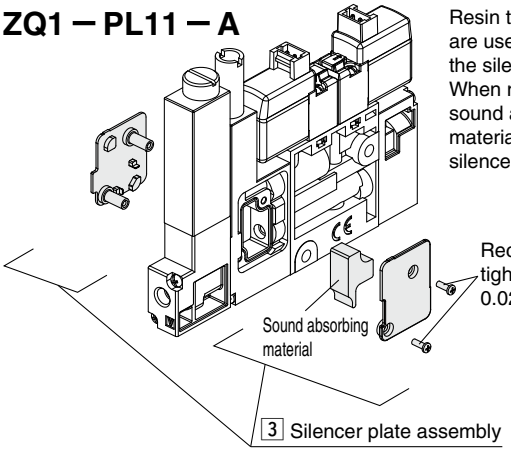
· **Lead wire with connector for IO-Link compatible vacuum pressure switch (With M12 connector)**

ZL3 − LW4 − A

How to Order Replacement Parts for Single Unit

3 Silencer Plate Assembly

ZQ1 — PL11 — A



4 Filter Case Assembly * One filter element is included.

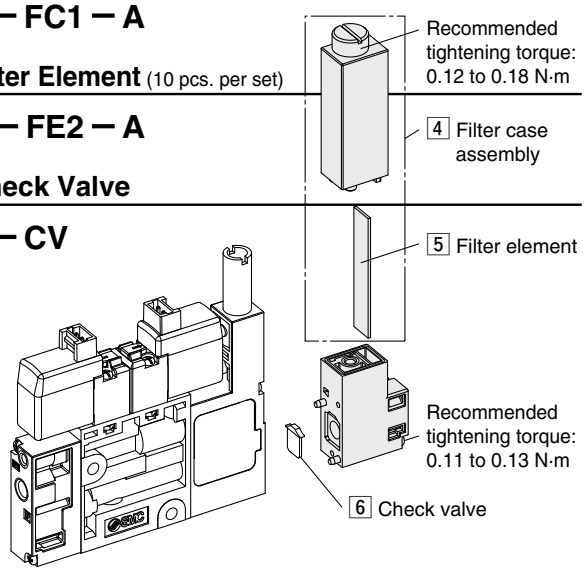
ZQ1 — FC1 — A

5 Filter Element (10 pcs. per set)

ZQ1 — FE2 — A

6 Check Valve

ZQ1 — CV



7 V Port Fitting

VVQ1000 — 50A-C4

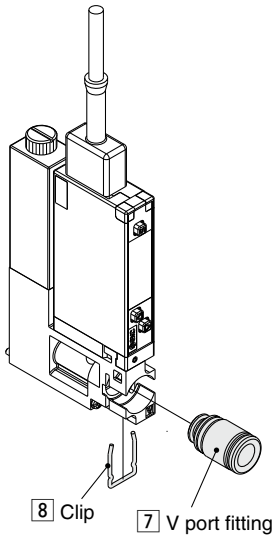
❶

❶ Specifications

50A-M5	M5 female thread
50A-C3	Straight, ø3.2
50A-C4	Straight, ø4
50A-C6	Straight, ø6
F1-LC3	Elbow, ø3.2
F1-LC4	Elbow, ø4

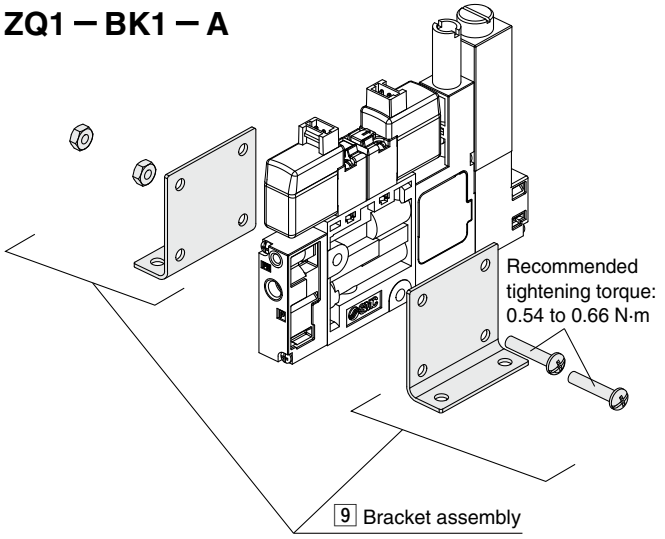
8 Clip (10 pcs. per set)

ZK1 — CP — A

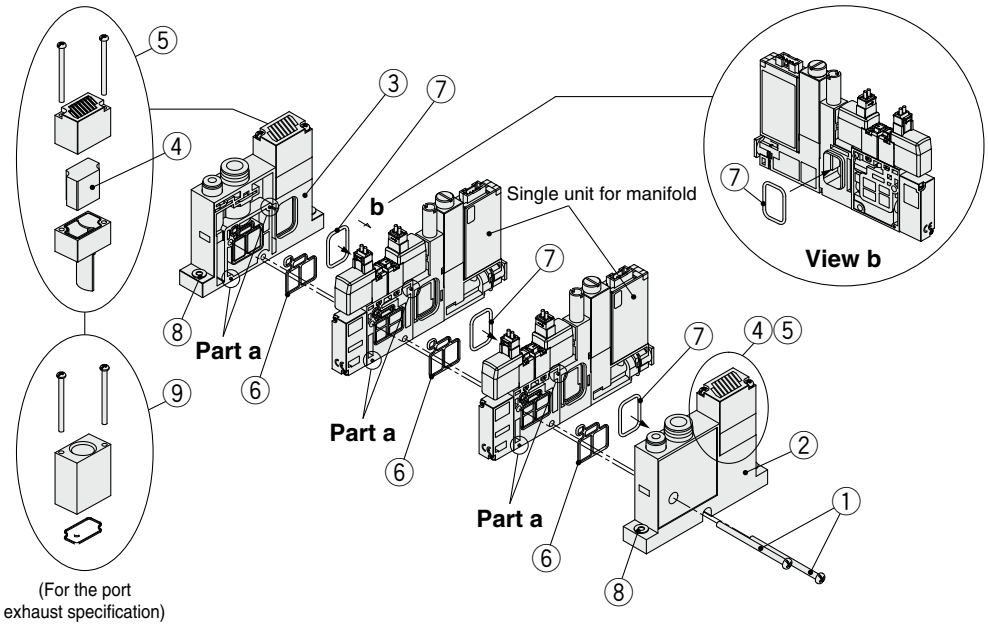


9 Bracket Assembly

ZQ1 — BK1 — A



Manifold Exploded View



How to increase/decrease manifold stations

Disassembly

1. Remove 2 clamp rods ①.
2. Remove end block L ②. (Be careful not to drop the gasket.)

Assembly

1. Confirm that the body gasket for manifold ⑥ is attached to the gasket groove on each single unit and that the exhaust block gasket ⑦ is also attached to the outer side of the raised part. (See View b.)
2. Confirm that the body gasket for manifold ⑥ is attached to the gasket groove on end block R ③.
3. Confirm that the exhaust block gasket ⑦ is attached to the outer side of the raised part on end block L ②.
4. Put together the single units for manifold, end block R ③, and end block L ② using the positioning pins (at two "a" locations), and assemble them using the clamp rods ①. Tightening torque: 0.54 to 0.66 N·m

Component Parts

No.	Description	Material	Note
1	**Clamp rod assembly**	Steel (Zinc chromating)	Refer to 1 below for how to order.
2	**End block L**	PBT, POM, PET, Steel, Aluminum alloy, Brass, Stainless steel	Left side with the vacuum (V) port facing the front
3	**End block R**	PBT, POM, PET, Steel, Aluminum alloy, Brass, Stainless steel	Right side with the vacuum (V) port facing the front
4	**Sound absorbing material (For Manifold)**	Non-woven fabric (PET)	Refer to 2 below for how to order.
5	**Silencer block assembly**	PBT	Refer to 3 below for how to order.
6	**Body gasket for manifold**	NBR	Refer to 4 below for how to order.
7	**Exhaust block gasket**	NBR	Refer to 5 below for how to order.
8	**Washer assembly**	Steel (Zinc chromating)	Refer to 6 below for how to order.
9	**Port block assembly**	Aluminum alloy, Steel (Zinc chromating), NBR	Refer to 7 below for how to order.

How to Order Replacement Parts for Manifold

1 Clamp Rod Assembly (2 pcs. per set)

ZQ1 — SR1 — 04 — A

❶

❶ **Stations**

01	For 1 station
02	For 2 stations
⋮	⋮
08	For 8 stations

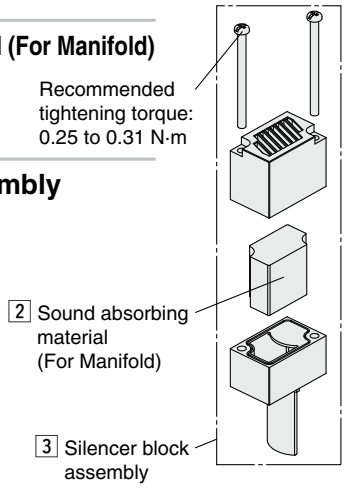
2 Sound Absorbing Material (For Manifold) (2 pcs. per set)

ZQ1 — SE2 — A

Recommended tightening torque: 0.25 to 0.31 N·m

3 Silencer Block Assembly (2 pcs. per set)

ZQ1 — SC1 — A



4 Body Gasket for Manifold (10 pcs. per set)

ZQ — 3 — 005 — 10AS

5 Exhaust Block Gasket (10 pcs. per set)

ZQ — 3 — 009 — 10AS

6 Washer Assembly (4 pcs. per set)

ZQ1 — WS 3 — A

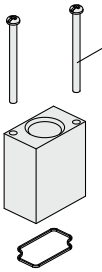
❶

❶ **Size**

3	For M3 (Without release pressure supply port)
4	For M4 (With release pressure supply port)

7 Port Block Assembly (2 pcs. per set)

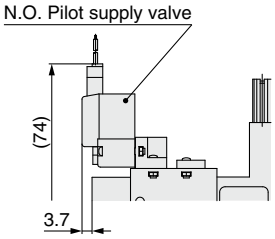
ZQ1 — EP2 — A



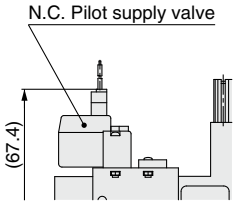
Dimensions

Vacuum ejector: Single unit specification
ZQ□1UA-□5L□-□□□-00

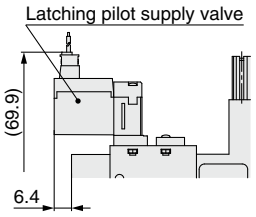
Supply valve (N.O.), Without release valve (Type J2)



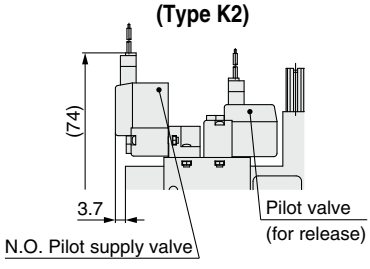
Supply valve (N.C.), Without release valve (Type J1)



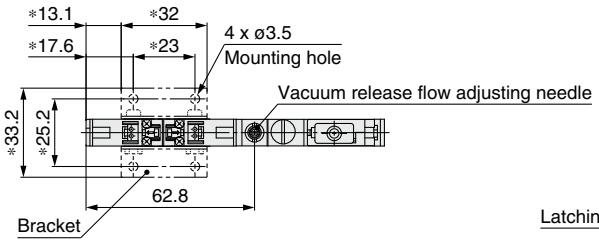
Supply valve (Latching), Without release valve (Type Q2)



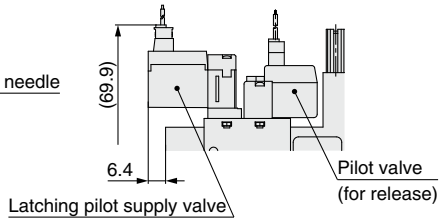
Supply valve (N.O.), With release valve (Type K2)

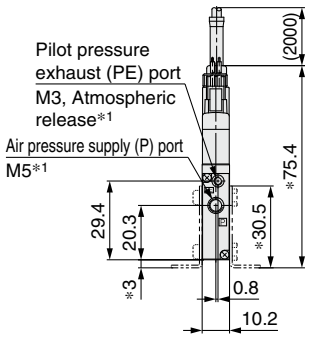


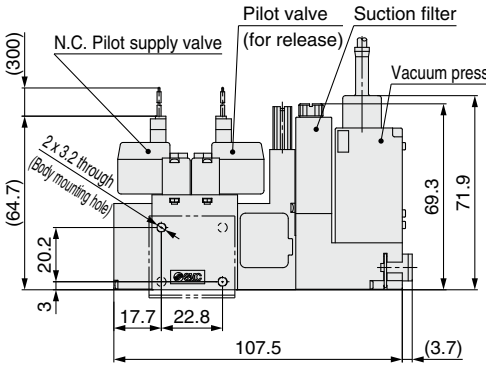
Supply valve (N.C.), With release valve (Type K1)

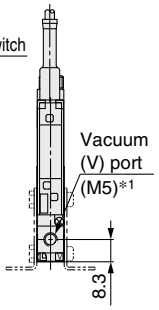


Supply valve (Latching), With release valve (Type Q1)

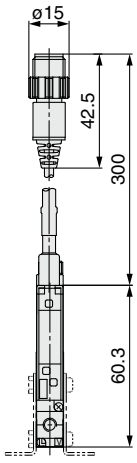




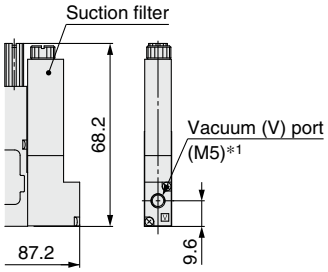




With IO-Link compatible vacuum pressure switch



Without vacuum pressure switch

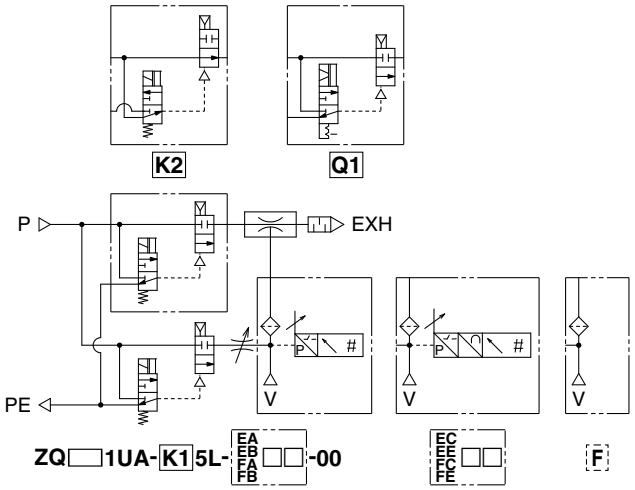


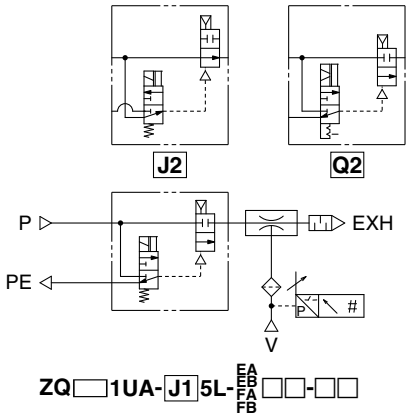
*1 The pitches of P, PE, and V ports are determined assuming the use of One-touch fittings.
If used with other fittings, these may cause interference depending on their type and size. Please refer to the catalog to confirm the sizes of the fittings to be used.

* Dimensions marked with "*" are those after the bracket is mounted.
* Recommended tightening torque for body mounting: 0.54 to 0.66 N·m
* When the release valve is not used, design the circuit for vacuum release separately in order to release a workpiece.

Dimensions

Circuit diagram

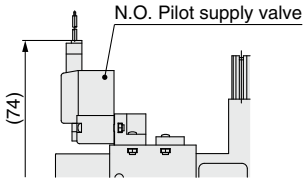




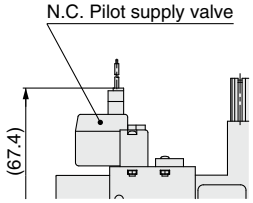
Dimensions

Vacuum pump system: Single unit specification
ZQ000UA-□5L□-□□□-00

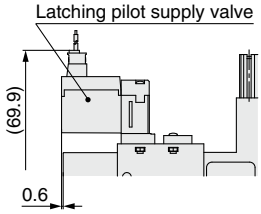
Supply valve (N.O.), Without release valve (Type J2)



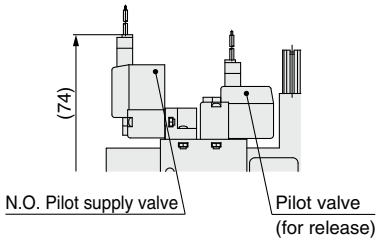
Supply valve (N.C.), Without release valve (Type J1)



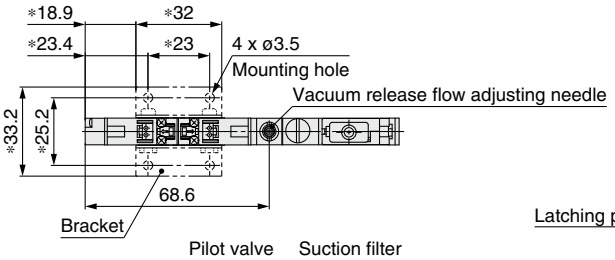
Supply valve (Latching), Without release valve (Type Q2)



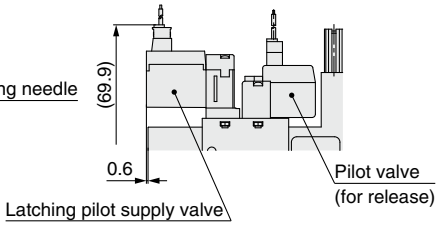
Supply valve (N.O.), With release valve (Type K2)

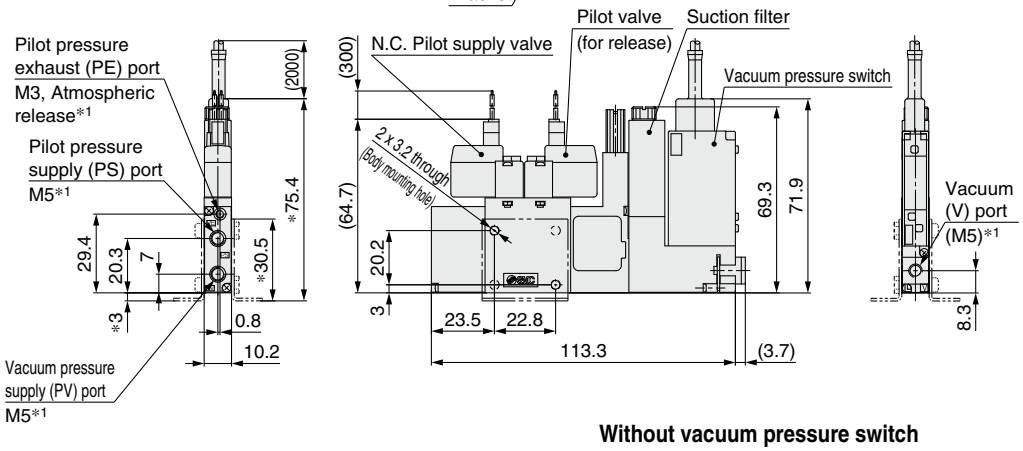


Supply valve (N.C.), With release valve (Type K1)

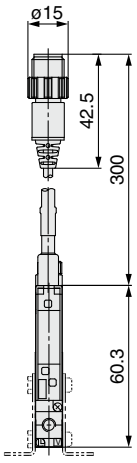


Supply valve (Latching), With release valve (Type Q1)

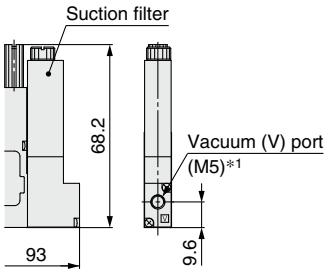




With IO-Link compatible vacuum pressure switch



Without vacuum pressure switch



∗1 The pitches of PV, PS, PE, and V ports are determined assuming the use of One-touch fittings.
If used with other fittings, these may cause interference depending on their type and size. Please refer to the catalog to confirm the sizes of the fittings to be used.

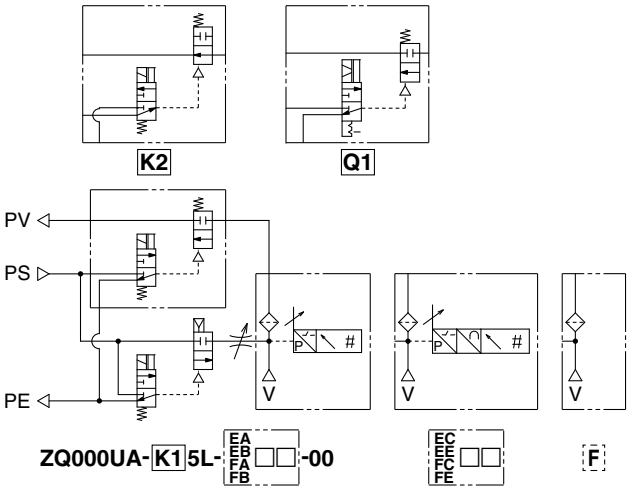
∗ Dimensions marked with "∗" are those after the bracket is mounted.

∗ Recommended tightening torque for body mounting: 0.54 to 0.66 N·m

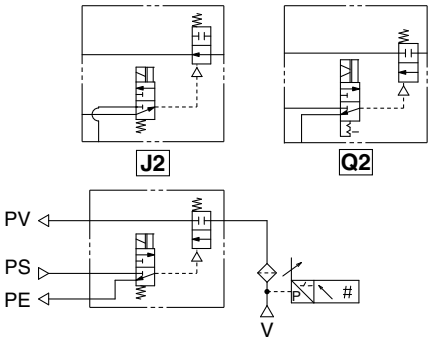
∗ When the release valve is not used, design the circuit for vacuum release separately in order to release a workpiece.

Dimensions

Circuit diagram



ZQ000UA-K1 5L- EA EB FA FB □□ -00 EC EE FC FE □□ F



ZQ000UA-J1 5L- EA EB FA FB □□ -00

Dimensions

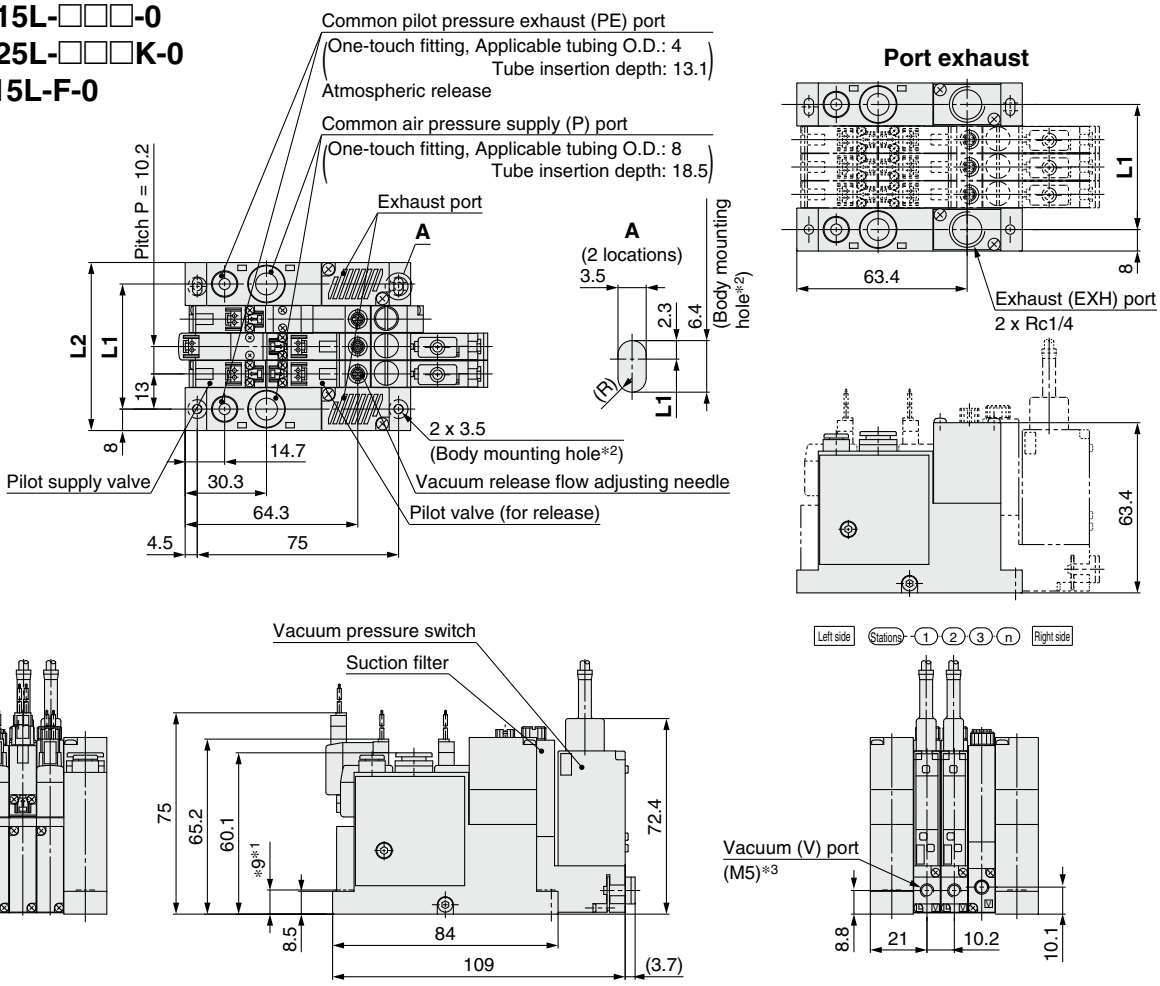
Vacuum ejector: Manifold specification (Without PD port)

ZZQ1□A-B$^{S}_{P}$B

∗ZQ□3MA-K15L-□□□-0

∗ZQ□3MA-K25L-□□□K-0

∗ZQ□3MA-J15L-F-0

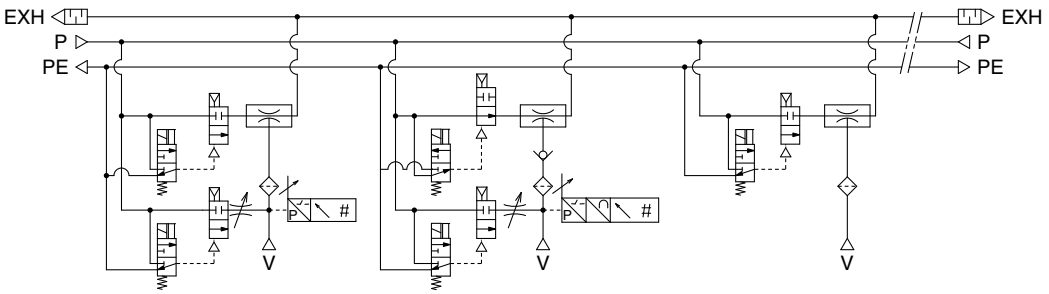


Dimensions

n: Stations	1	2	3	4	5	6	7	8
L1	26.2	36.4	46.6	56.8	67.0	77.2	87.4	97.6
L2	42.2	52.4	62.6	72.8	83.0	93.2	103.4	113.6

∗1 Dimensions marked with "∗" are those after the attached washer is mounted.
∗2 Recommended tightening torque for body mounting: 0.28 to 0.34 N·m
∗3 The pitches of V ports are determined assuming the use of One-touch fittings.
If used with other fittings, these may cause interference depending on their type and size. Please refer to the catalog to confirm the sizes of the fittings to be used.
∗ Use the attached washer when installing the product.

Circuit diagram



∗ZQ□3MA-K1 5L- EA EB FA FB □□ -0

∗ZQ□3MA-K2 5L- EC EE FC FE □□-K -0

∗ZQ□3MA-J1 5L- F -0

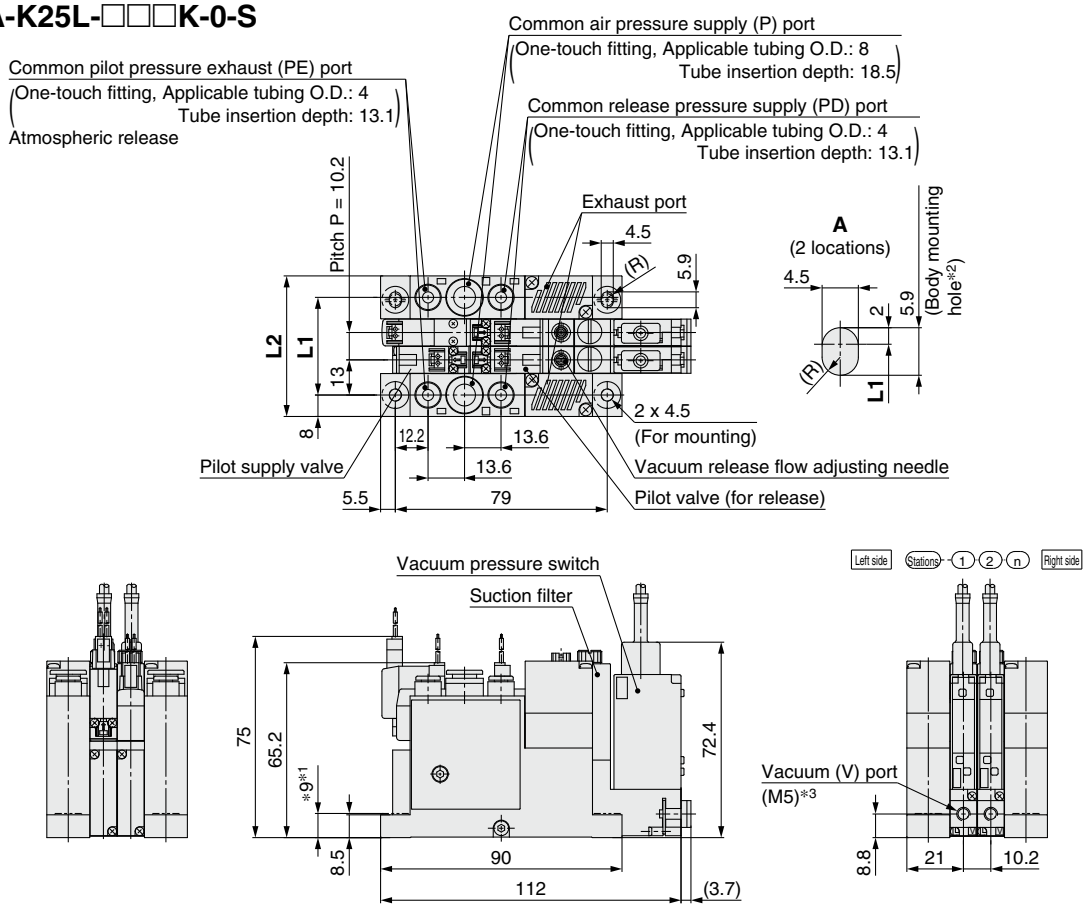
Dimensions

Vacuum ejector: Manifold specification (With PD port)

ZZQ1□A-B$^{S}_{P}$C

∗ZQ□3MA-K15L-□□□-0-S

∗ZQ□3MA-K25L-□□□K-0-S

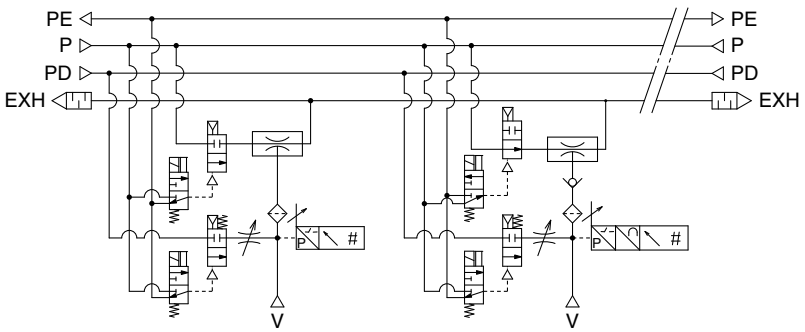


Dimensions

n: Stations	1	2	3	4	5	6	7	8
L1	26.2	36.4	46.6	56.8	67.0	77.2	87.4	97.6
L2	42.2	52.4	62.6	72.8	83.0	93.2	103.4	113.6

∗1 Dimensions marked with "∗" are those after the attached washer is mounted.
∗2 Recommended tightening torque for body mounting: 0.68 to 0.83 N·m
∗3 The pitches of V ports are determined assuming the use of One-touch fittings.
If used with other fittings, these may cause interference depending on their type and size. Please refer to the catalog to confirm the sizes of the fittings to be used.
∗ Use the attached washer when installing the product.

Circuit diagram



∗ZQ□3MA-K15L-
EA EB FA FB □□ **-0-S**

∗ZQ□3MA-K25L-
EC EE FC FE □□ **-K -0-S**

Dimensions

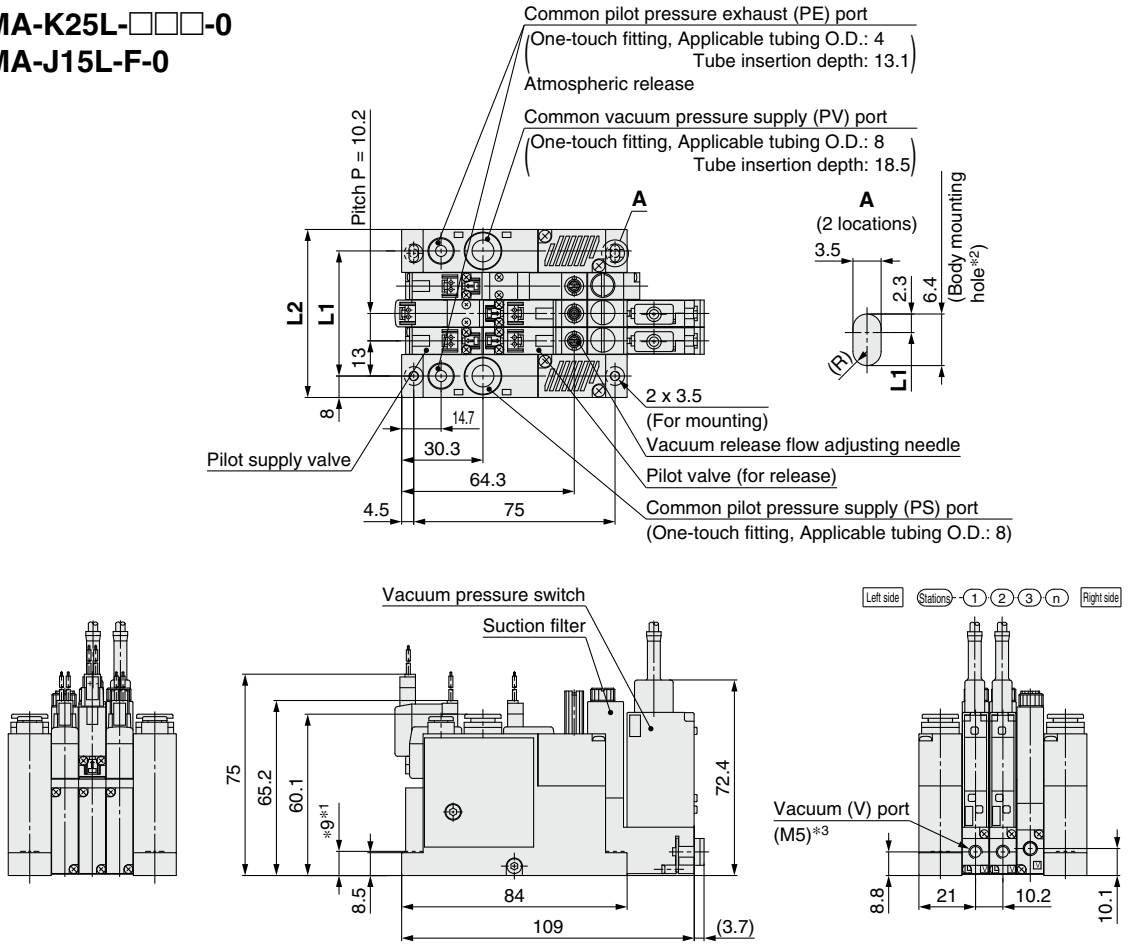
Vacuum pump system: Manifold specification (Without PD port)

ZZQ1□A-□OB

∗ZQ000MA-K15L-□□□-0

∗ZQ000MA-K25L-□□□-0

∗ZQ000MA-J15L-F-0

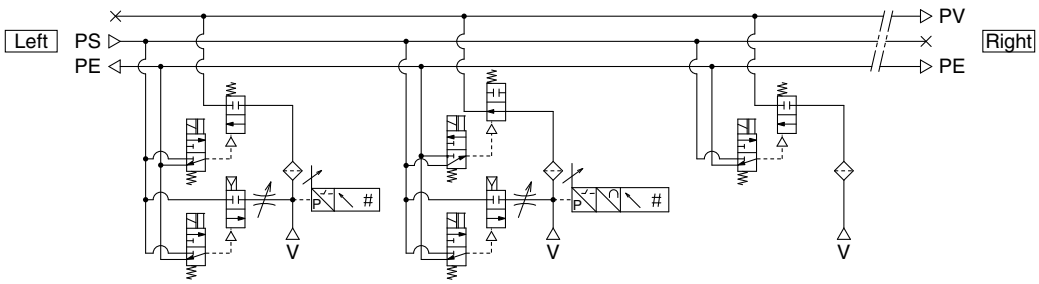


Dimensions

n: Stations	1	2	3	4	5	6	7	8
L1	26.2	36.4	46.6	56.8	67.0	77.2	87.4	97.6
L2	42.2	52.4	62.6	72.8	83.0	93.2	103.4	113.6

∗1 Dimensions marked with "∗" are those after the attached washer is mounted.
∗2 Recommended tightening torque for body mounting: 0.28 to 0.34 N·m
∗3 The pitches of V ports are determined assuming the use of One-touch fittings.
If used with other fittings, these may cause interference depending on their type and size. Please refer to the catalog to confirm the sizes of the fittings to be used.
∗ Use the attached washer when installing the product.
∗ When the release valve is not used, design the circuit for vacuum release separately in order to release a workpiece.

Circuit diagram



∗ZQ000MA-K15L-

EA EB FA FB □□ **-0**

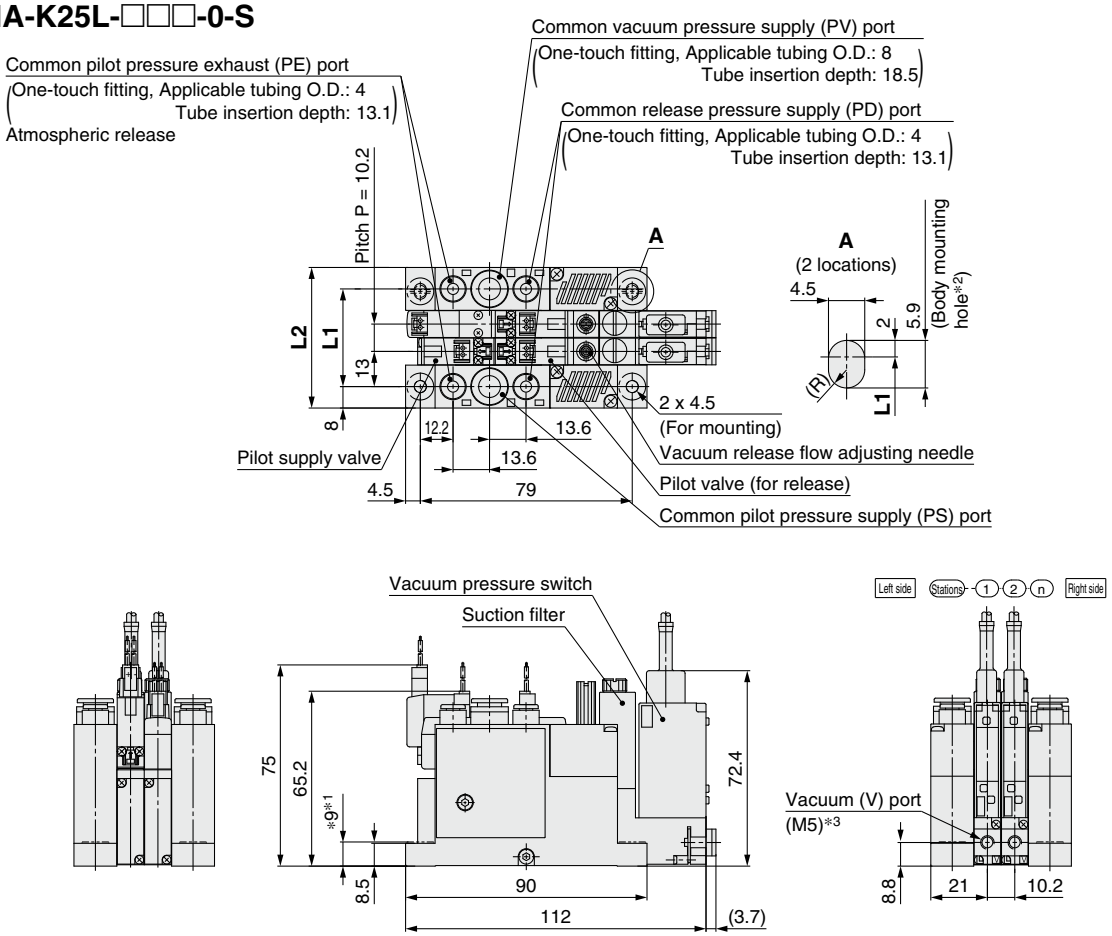
∗ZQ000MA-K25L-

EC EE FC FE □□ **-0**

∗ZQ000MA-J15L-F-0

Dimensions

Vacuum pump system: Manifold specification (With PD port)
ZZQ1□A-□OC
∗ZQ000MA-K15L-□□□-0-S
∗ZQ000MA-K25L-□□□-0-S

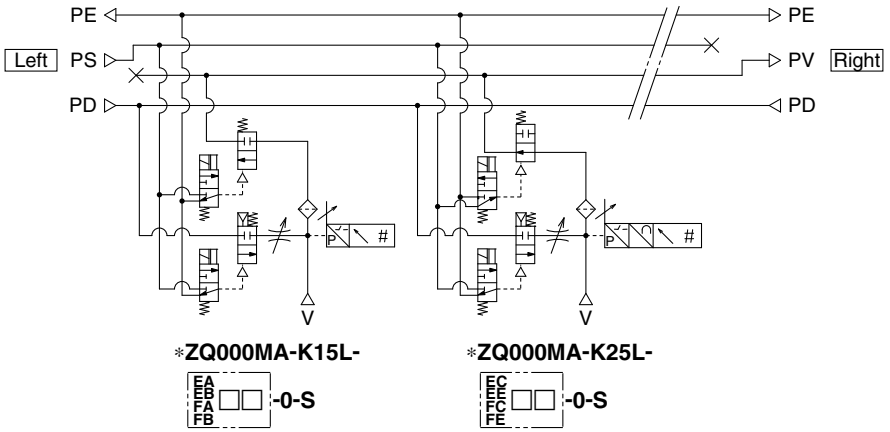


Dimensions

n: Stations	1	2	3	4	5	6	7	8
L1	26.2	36.4	46.6	56.8	67.0	77.2	87.4	97.6
L2	42.2	52.4	62.6	72.8	83.0	93.2	103.4	113.6

∗1 Dimensions marked with "∗" are those after the attached washer is mounted.
∗2 Recommended tightening torque for body mounting: 0.68 to 0.83 N·m
∗3 The pitches of V ports are determined assuming the use of One-touch fittings.
If used with other fittings, these may cause interference depending on their type and size. Please refer to the catalog to confirm the sizes of the fittings to be used.
∗ Use the attached washer when installing the product.

Circuit diagram



∗ZQ000MA-K15L-□□-0-S (EA, EB, FA, FB)

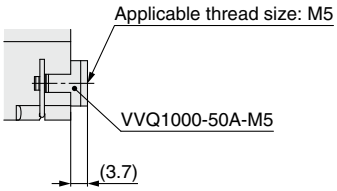
∗ZQ000MA-K25L-□□-0-S (EC, EE, FC, FE)

Dimensions

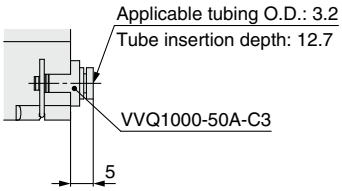
Fitting dimensions after installation

V port

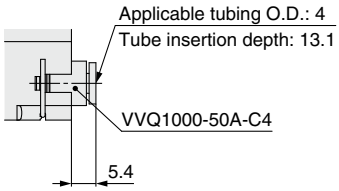
<With vacuum pressure switch>



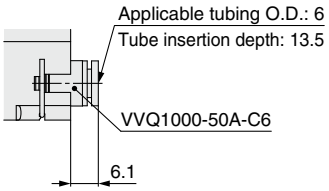
ZQ□□A-□□□-□□□-0□



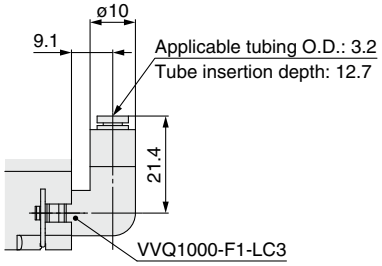
ZQ□□A-□□□-□□□-1□



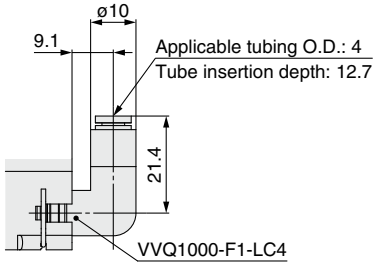
ZQ□□A-□□□-□□□-2□



ZQ□□A-□□□-□□□-3□



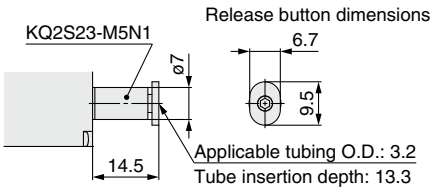
ZQ□□A-□□□-□□□-4□



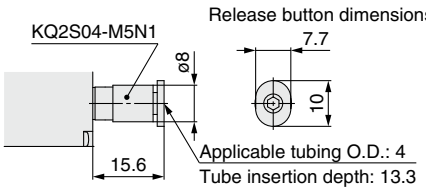
ZQ□□A-□□□-□□□-5□

V port

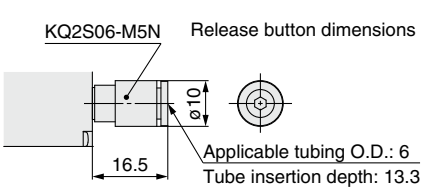
<Suction filter only>



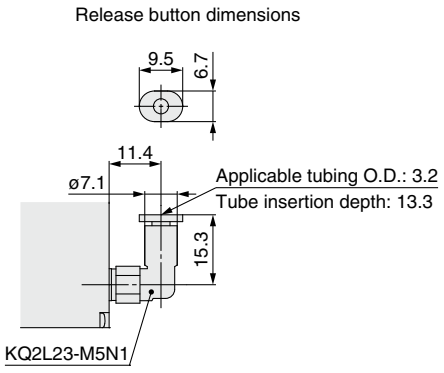
ZQ□□A-□□□-F(K)-1□



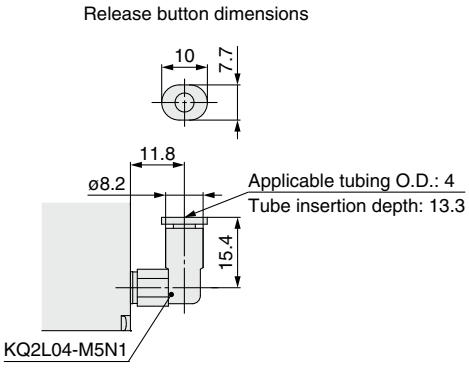
ZQ□□A-□□□-F(K)-2□



ZQ□□A-□□□-F(K)-3□



ZQ□□A-□□□-F(K)-4□

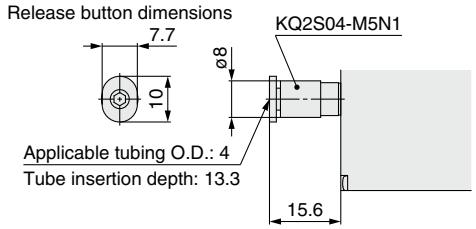


ZQ□□A-□□□-F(K)-5□

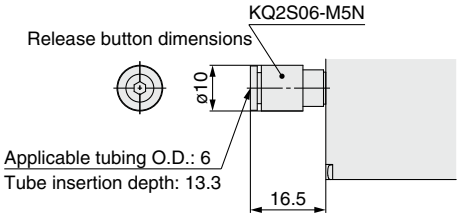
Dimensions

Fitting dimensions after installation

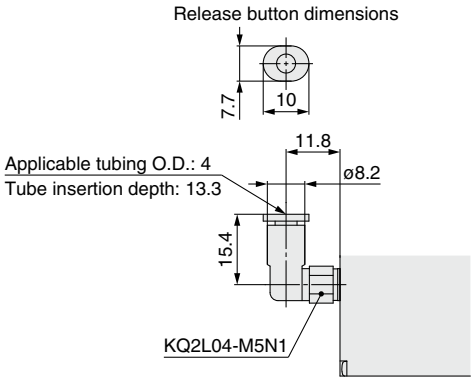
P port



ZQ□1UA-□□□-□□□-□2

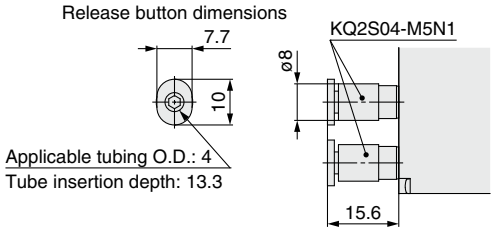


ZQ□1UA-□□□-□□□-□3



ZQ□1UA-□□□-□□□-□5

PS/PV port



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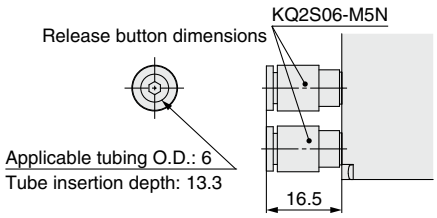

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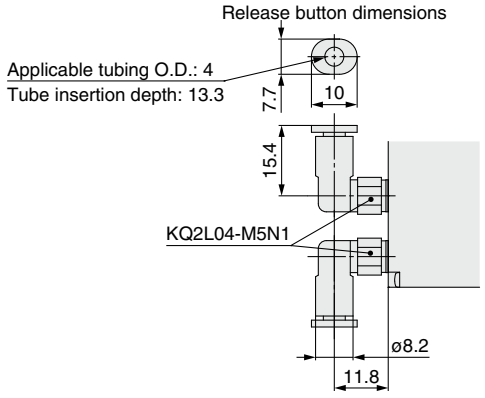


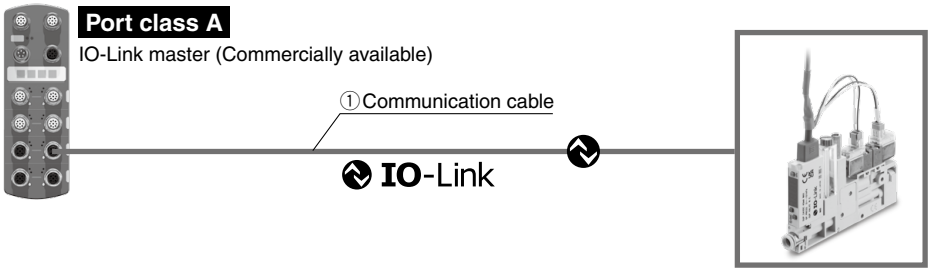
ZQ000UA-□□□-□□□-□5

Accessories

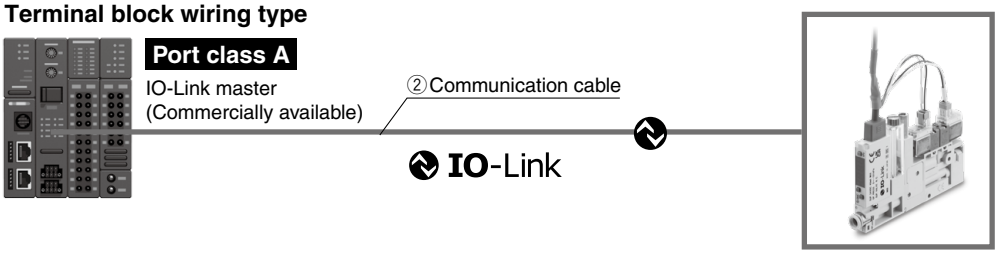
Communication Cable

For IO-Link

Connection examples



Terminal block wiring type

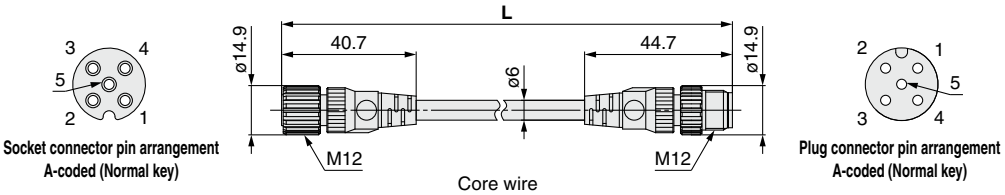


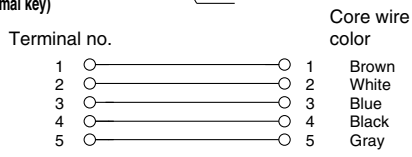
①Communication cable

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





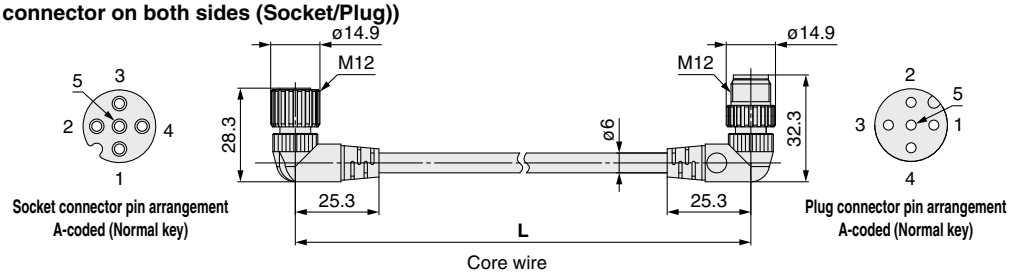
Connections

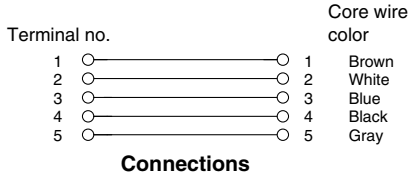
Item	Specifications
Cable O.D.	ø6 mm
Conductor nominal cross section	0.3 mm²/AWG22
Wire O.D. (Including conductor)	1.5 mm
Min. bending radius (Fixed)	40 mm

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





Connections

Item	Specifications
Cable O.D.	ø6 mm
Conductor nominal cross section	0.3 mm²/AWG22
Wire O.D. (Including conductor)	1.5 mm
Min. bending radius (Fixed)	40 mm

Communication Cable

For IO-Link

② Communication cable

EX500-AP 050 - S

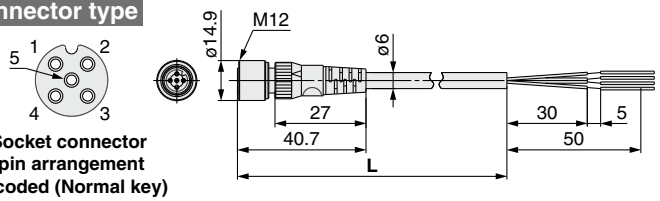
Cable length (L)

010	1000 mm
050	5000 mm

Connector specification

S	Straight
A	Angled

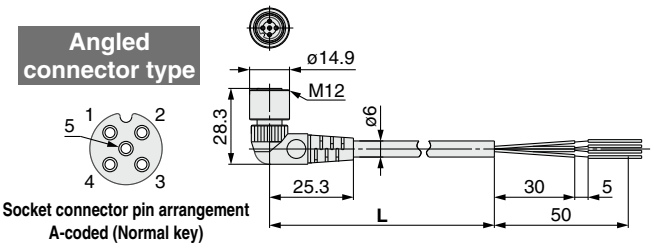
Straight connector type



Socket connector pin arrangement
A-coded (Normal key)

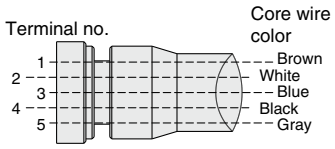
Item	Specifications
Cable O.D.	ø6 mm
Conductor nominal cross section	0.3 mm²/AWG22
Wire O.D. (Including insulator)	1.5 mm
Min. bending radius (Fixed)	40 mm

Angled connector type



Socket connector pin arrangement
A-coded (Normal key)

Item	Specifications
Cable O.D.	ø6 mm
Conductor nominal cross section	0.3 mm²/AWG22
Wire O.D. (Including insulator)	1.5 mm
Min. bending radius (Fixed)	40 mm



Connections

Specific Product Precautions 1

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For vacuum equipment precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: https://www.smcworld.com

■ Handling of Products

Handling / Mounting

⚠ 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

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.

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. With the vacuum pump system, since air is not released to the atmosphere from a silencer, the applied air for vacuum release increases the internal pressure of the vacuum port. Select the vacuum pad which shape allows smooth exhaust of release air to the atmosphere and avoid clogging.

Other Tubing Brands

⚠ Caution

1. When using tubing from a manufacturer other than SMC, be careful of the tolerance of the tubing O.D.
1) Nylon tubing: Within ±0.1 mm
2) Soft nylon tubing: Within ±0.1 mm
3) Polyurethane tubing: Within +0.15 mm, within –0.2 mm
Do not use tubing which does not satisfy the specified tubing O.D. accuracy. It may cause difficulty when connecting the tubing, air leakage after connection, or the disconnection of the tubing.

■ Vacuum Release Flow Adjusting Needle

Vacuum Release Air

⚠ 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 will vary due to the range of the specifications of the product.

2. Even if the needle is fully closed, vacuum release air may be output when the vacuum release valve is turned on. Excessive tightening of the needle can cause damage.

■ Vacuum Release Flow Adjusting Needle

Operation of Vacuum Release Flow Adjusting Needle

⚠ Caution

1. The needle has a retaining mechanism, so it will not continue to rotate after it reaches the rotation stop position.
The needle may break if it is turned with a 0.4 N·m or greater torque.

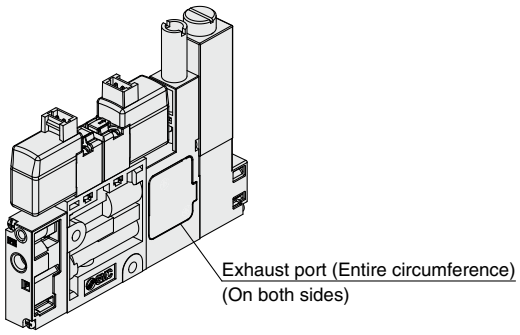
2. Do not overtighten the lock nut.
When tightening the lock nut, tighten it by approx. 15 to 30 degrees. Pay attention not to cause breakage by over tightening.

Ejector Exhaust / Exhaust Noise

⚠ Caution

■ Ejector Exhaust

- The exhaust resistance should be as small as possible to obtain max. ejector performance. There should be no shield around the exhaust port for the silencer exhaust specification. When the product is installed, one of the exhaust ports should be open to atmosphere.



For the port exhaust specification, back pressure may increase depending on the size and length of the piping connected to the exhaust (EXH) port. Ensure that the back pressure does not exceed 0.005 MPa (5 kPa). 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.

- If the sound absorbing material is clogged, it will cause reduced 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.)

Specific Product Precautions 2

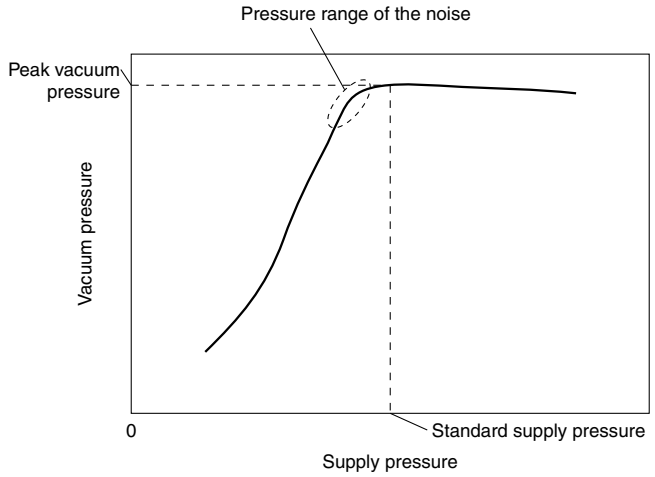
Be sure to read this before handling the products. Refer to the back cover for safety instructions. For vacuum equipment precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: https://www.smcworld.com

Ejector Exhaust / Exhaust Noise

⚠ Caution

■ Exhaust Noise

- When the 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 the vacuum pressure unstable. If the vacuum pressure range is adequate for adsorption, there should be no problem. If the noise causes a problem or affects the setting of the pressure switch, change the supply pressure slightly to avoid the pressure range of the noise.



■ Solenoid Valve / Pressure Switch

Wiring and Connection of Solenoid Valves and Vacuum Pressure Switches

⚠ Caution

1. Incorrect wiring can damage the solenoid valve and vacuum pressure switch, and cause a failure or malfunction. Connections should only be made when the power supply is turned OFF.

2. Do not attempt to insert or pull out the connector while the power is ON. Doing so may cause malfunction.

3. Malfunctions stemming from noise may occur if the wire is installed in the same route as that of the power cable or another high-voltage cable. Wire the switch independently.

4. Be sure to ground the frame ground (FG) terminal when using a commercially available switching power supply. (Pressure switch)

5. Do not apply a load such as tension directly to the lead wire of the solenoid valve and vacuum pressure switch. Load on the lead wire may cause a failure. Hold the body when handling the product.

6. Avoid repeatedly bending or stretching the lead wire of the solenoid valve or vacuum pressure switch. Lead wires will break if bending stress or tensile force is applied to them repeatedly. If the lead wire moves around, secure it near the body of the product.

■ Solenoid Valve / Pressure Switch

Environment

⚠ Warning

1. The solenoid valve and vacuum pressure switch are not designed to be explosion proof, dustproof, or drip proof. Never use in atmospheres which contain flammable or explosive gases.

⚠ Caution

1. The vacuum pressure switch and solenoid valve are CE/UKCA-compliant but not immune to lightning strikes. Take measures against lightning strikes in your system.

2. Do not use the product in places where static electricity is a problem. Doing so may result in system failure or malfunction.

Design

⚠ Caution

1. Avoid energizing the solenoid valve for long periods of time.

If a solenoid valve is continuously energized for an extended period of time, the heat generated by the coil assembly may reduce the performance and life of the valve or have adverse effects on peripheral equipment.

Therefore, if the solenoid valve is to be continuously energized for an extended period of time or if the energized period per day will be longer than the de-energized period, use an N.O. (normally open) type product.

When the valve is mounted onto a control panel, take measures to radiate heat in order to keep the product temperature within the specified range.

2. For specific product precautions on solenoid valves, please refer to the solenoid valve (V100 series, VQ100 series) catalog.

3. For specific product precautions on vacuum pressure switches, please refer to the pressure switch (ZSE10 series) catalog.

■ Filter Case

Filter Case

⚠ Caution

1. The filter case of this product is made of polycarbonate. Avoid chemicals such as thinner, carbon tetrachloride, chloroform, acetic ester, aniline, cyclohexane, trichloroethylene, sulfuric acid, lactic acid, water base cutting fluid (alkaline).

2. Do not expose the filter case to direct sunlight for long periods of time.

Specific Product Precautions 3

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For vacuum equipment precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: https://www.smcworld.com

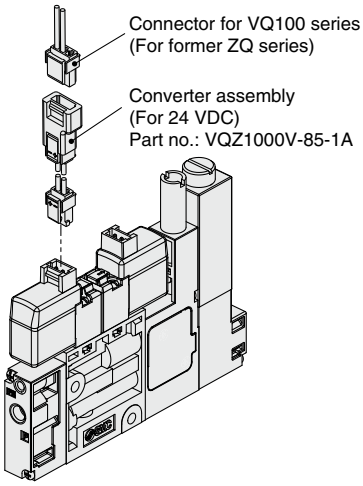
Converter Assembly for Solenoid Valve

⚠ Caution

1. When replacing the former ZQ series (with the VQ100 series installed) with the ZQ-A due to maintenance or other reasons, the "converter assembly" that converts the solenoid valve connecting terminal from a 3-terminal type to a 2-terminal type is required.
This option can be selected when ordering the product or can be ordered separately (see the figure below).
The required amount of converter assemblies (included in the package) according to the combined solenoid valve types are shown in the table below.

Required Amount of Converter Assemblies According to Product Type

Model	Necessity of a converter assembly		Required amount of converter assemblies (included in the package)
	Pilot supply valve	Pilot valve (for release)	
ZQ□□A-K15LO-□□□□-□□-□	Yes	Yes	2
ZQ□□A-K25LO-□□□□-□□-□	Yes	Yes	2
ZQ□□A-J15LO-□□□□-□□-□	Yes	No	1
ZQ□□A-J25LO-□□□□-□□-□	Yes	No	1
ZQ□□A-Q15LO-□□□□-□□-□	No	Yes	1
ZQ□□A-Q25LO-□□□□-□□-□	No	No	Cannot be included



⚠ 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 catalog 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 catalog.
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 catalog 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 the "Handling Precautions for SMC Products" (M-E03-3) and "Operation Manual" before use.

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