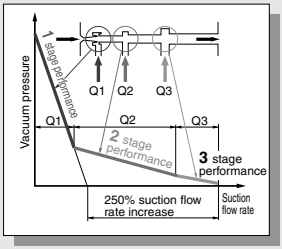
Energy-saving, large flow rate, 3 stage diffuser construction

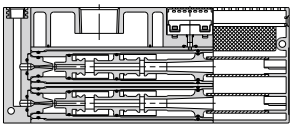
Suction flow rate increased 250% and air consumption reduced 20% with 3 stage diffuser construction
(Versus ø1.3, one stage model)

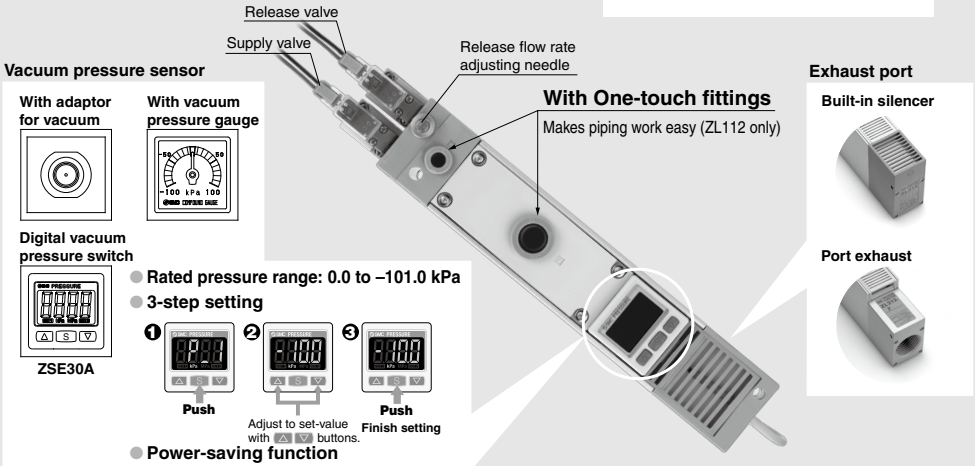


	Suction flow rate (L/min (ANR))	Air consumption (L/min (ANR))
ZL112	**100**	**63**
ZL212	**200**	**126**

ZL212 Series

Diffusers stacked and integrated
Compact size and large flow rate
(Twice the flow rate of the ZL112)





∗ For ZSE30A series, refer to the Best Pneumatics No. 8 for details.

■ Series Variations

Series	Maximum suction flow rate (L/min (ANR))	Air consumption (L/min (ANR))	Exhaust port		With valve		Vacuum pressure sensor option		
			Built-in silencer	Port exhaust	With supply and release valves	With supply valve	With digital vacuum pressure switch ZSE30A	Vacuum pressure gauge	Vacuum adapter
ZL112	100	63	●	●	●	●	●	●	●
ZL212	200	126	●	●			●	●	●

Multistage Ejector
ZL112 Series

How to Order

Without valve ZL1 12 □ □ – □ □ □ □

With valve ZL1 12 □ □ – K1 5 M Z □ – □ □ □ □

Nozzle diameter

12	1.2

Exhaust type

Nil	Built-in silencer
P	Port exhaust

Exhaust port (EXH) thread type (Port exhaust only)

Note 3) The thread ridge shape is conforming to G thread standard (JIS B 0202), but other shapes are not conforming to ISO16030 and ISO1179.

Nil	Rc1/2
F	G1/2[3]
N	1/2-14 NPT
T	1/2-14 NPTF

Supply valve/Release valve combination

K1	With supply and release valves
K2	With supply valve

Rated voltage

DC specifications	
5	24V
6	12V
V	6V
S	5V
R	3V
AC specifications (50/60 Hz)	
1	100V
2	200V
3	110V[115V]
4	220V[230V]

Electrical entry

G	Grommet	Lead wire length 0.3 m
H		Lead wire length 0.6 m
L	L plug connector	Lead wire length 0.3 m
LN		Without lead wires
LO		Without connector
M	M plug connector	Lead wire length 0.3 m
MN		Without lead wires
MO		Without connector

Light/Surge voltage suppressor

Nil	Without light/surge voltage suppressor
S	With surge voltage suppressor
Z	With light/surge voltage suppressor
U	With light/surge voltage suppressor (Non-polar type)

∗ Type U is 24 or 12 VDC only.
∗ Since surge voltage is prevented by a rectifier in the case of AC, there is no type "S".

Manual override

Nil	Non-locking push type
D	Locking slotted type

Lead wire specifications

(Applicable only when the vacuum pressure sensor specification is "D" for digital pressure switch for vacuum)

L	Lead wire with connector (Length 2 m)

∗ This is not available for models without lead wires.

Unit specifications

(Applicable only when the vacuum pressure sensor specification is "D" for digital pressure switch for vacuum)

Nil	With unit switching function
M	SI unit only
P	With unit switching function (Initial value psi)

Note 1) W/ unit switching function is not permitted to sell for the domestic use in Japan, because the new Weight and Measure Act has been implemented since October '99.
Note 2) Fixed unit: kPa

Output specifications

(Applicable only when the vacuum pressure sensor specification is "D" for digital pressure switch for vacuum)

N	NPN open collector 1 output
P	PNP open collector 1 output
A	NPN open collector 2 outputs
B	PNP open collector 2 outputs
C	NPN open collector 1 output + Analog voltage output
D	NPN open collector 1 output + Analog current output
E	PNP open collector 1 output + Analog voltage output
F	PNP open collector 1 output + Analog current output

Vacuum pressure sensor

Nil	None
GN	Vacuum port adaptor Rc 1/8
G	Vacuum pressure gauge
D	Digital pressure switch for vacuum

Standard

With valve

With vacuum pressure gauge

Vacuum port adapter

Port exhaust

Ejector Specifications

Model	ZL112
Nozzle diameter	1.2 mm
Maximum suction flow rate	100 L/min (ANR)
Air consumption	63 L/min (ANR)
Maximum vacuum pressure	–84 kPa
Maximum operating pressure	0.7 MPa
Supply pressure range	0.2 to 0.5 MPa
Standard supply pressure	0.4 MPa
Operating temperature range	5 to 50°C

Supply/Release Valve Specifications

Part no.		SYJ514-□□□□
Type of valve actuation		N.C.
Fluid		Air
Operating pressure range	**Internal pilot type**	0.15 to 0.7 Mpa
Ambient and fluid temperature		–10°C to 50°C (No freezing)
Response time (For 0.5 MPa) (1)		25 ms or less
Maximum operating frequency		5 Hz
Manual override		Non-locking push type/Locking slotted type
Pilot exhaust type		Pilot valve individual exhaust, Main valve/Pilot valve common exhaust
Lubrication		Not required
Mounting position		Unrestricted
Impact/Vibration resistance (2)		150/30 m/s^2
Enclosure		Dust proof

Note 1) Based on JIS B 8374-1981 dynamic performance test. (coil temperature 20°C, at rated voltage, without surge voltage suppressor)

Note 2) Impact resistance: No malfunction when tested with a drop tester in the axial direction and at a right angle to the main valve and armature, one time each in both energized and deenergized states. (initial value)

Vibration resistance: No malfunction when tested with one sweep of 45 to 2000 Hz in the axial direction and at a right angle to the main valve and armature, one time each in both energized and deenergized states. (initial value)

Note 3) Refer to "Best Pneumatics No. 1-2" for details on valves.

Vacuum Pressure Gauge Specifications

Part no.	GZ30S
Fluid	Air
Pressure range	–100 to 100 kPa
Scale range (Angular)	230°
Accuracy	±3% F.S. (Full span)
Class	Class 3
Operating temperature range	0 to 50°C
Material	Housing: Polycarbonate/ABS resin

Weight

ZL112 (Basic)	450 g
Port exhaust	+110 g
Digital pressure switch for vacuum (Excluding lead wire)	+43 g
Digital pressure switch for vacuum (Including 3 cores lead wire)	+81 g
Digital pressure switch for vacuum (Including 4 cores lead wire)	+85 g
Valve (per 1 pc.)	+45 g

Vacuum Pressure Switch Unit/Digital Pressure Switch for Vacuum: ZSE30A-00-□-□□□

Specifications

Rated pressure range			0.0 to −101.0 kPa
Set pressure range			10.0 to −105.0 kPa
Withstand pressure			500 kPa
Minimum unit setting			0.1 kPa
Applicable fluid			Air
Power supply voltage			12 to 24 VDC ±10% (with power supply polarity protection)
Current consumption			40 mA (at no load)
Switch output			NPN or PNP open collector 1 output NPN or PNP open collector 2 outputs (selectable)
	Maximum load current		80 mA
	Maximum applied voltage		28 V (at NPN output)
	Residual voltage		1 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 to variable)
	Window comparator mode		
Analog output	Voltage output (Note 1)	**Output voltage (Rated pressure range)**	1 to 5 V ±2.5% F.S.
		Linearity	±1% F.S. or less
		Output impedance	Approx. 1 kΩ
	Current output (Note 2)	**Output current (Rated pressure range)**	4 to 20 mA ±2.5% F.S.
		Linearity	±1% F.S. or less
		Load impedance	Maximum load impedance: Power supply voltage 12 V: 300 Ω, Power supply voltage 24 V: 600 Ω Minimum load impedance: 50 Ω
Display			4-digit, 7-segment, 2-color LCD (Red/Green) Sampling cycle: 5 times/sec.
Display accuracy			±2% F.S. ±1 digit (Ambient temperature of 25°C)
Indicator light			Lights up when switch output is turned ON. (OUT1: Green, OUT2: Red)
Environment resistance	**Enclosure**		IP40
	Operating temperature range		Operating: 0 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. (Based on 25°C)
Lead wire			Oilproof heavy-duty vinyl cable, 3 cores ø3.5, 2 m 4 cores Conductor area: 0.15 mm^2 (AWG26) Insulator O.D.: 1.0 mm
Standards			CE Marking, UL/CSA, RoHS compliance

Note 1) When analog voltage output is selected, analog current output cannot be used together.
Note 2) When analog current output is selected, analog voltage output cannot be used together.
Note 3) 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.

Vacuum Pressure Switch Replacement

It is impossible to replace only the vacuum pressure switch.
Please replace the suction cover assembly.
For ordering information, refer to How to Order.

∗ The vacuum pressure switch mounted on this product is equivalent to our SMC product, the ZSE30A series compact digital pressure switch.

For details about vacuum pressure switch functions, refer to the ZSE30A series in the Best Pneumatics No. 8.

●Pressure switch correspondence table

Digital pressure switch ZSE30A series
ZSE30A-00-□-□-□

Multistage ejector ZL series
ZL∗12∗∗-∗∗∗∗∗-D□-□-□

Multistage ejector suction cover assembly
ZL∗12-SC-D□-□-□
Output specifications
Unit specifications
Lead wire specifications

How to Order Suction Cover Assembly

ZL□12-SC-□□□□

Ejector size

1	ZL112
2	ZL212

Vacuum pressure sensor

Nil	None
GN	Vacuum port adaptor Rc1/8
G	Vacuum pressure gauge
D	Digital pressure switch for vacuum

Output specifications
(Applicable only when the vacuum pressure sensor specification is "D" for digital pressure switch for vacuum)

N	NPN open collector 1 output
P	PNP open collector 1 output
A	NPN open collector 2 outputs
B	PNP open collector 2 outputs
C	NPN open collector 1 output+Analog voltage output
D	NPN open collector 1 output+Analog current output
E	PNP open collector 1 output+Analog voltage output
F	PNP open collector 1 output+Analog current output

Lead wire specifications
(Applicable only when the vacuum pressure sensor specification is "D" for digital pressure switch for vacuum)

Nil	None
L	Lead wire with connector

Unit specifications
(Applicable only when the vacuum pressure sensor specification is "D" for digital pressure switch for vacuum)

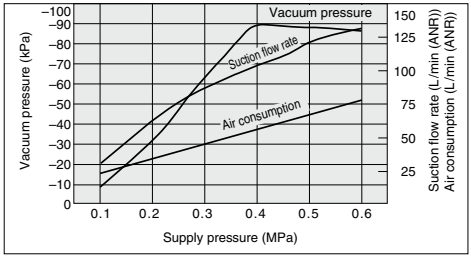
Nil	With unit display switching function
M	Fixed SI unit
P	With unit display switching function

Note 1) W/ unit switching function is not permitted to sell for the domestic use in Japan, because the new Weight and Measure Act has been implemented since October, 99.
Note 2) Fixed unit: kPa

Exhaust Characteristics/Flow Rate Characteristics/Time to Reach Vacuum (Representative value)

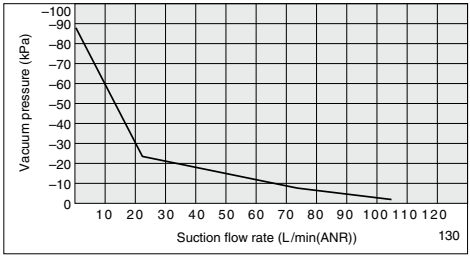
ZL112

Exhaust Characteristics



Flow Rate Characteristics

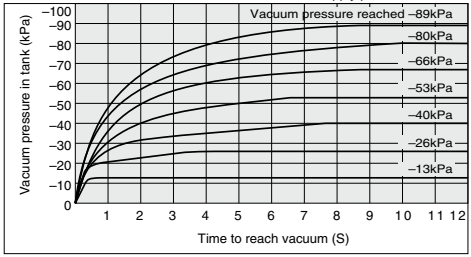
Supply pressure: 0.4 MPa



130

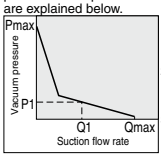
Time to Reach Vacuum

Tank capacity: 1L
Supply pressure: 0.4 MPa



<How to Read the Graph>
The graphics indicate the time required to reach a vacuum pressure determined by adsorption conditions for workpieces, etc., starting from atmospheric pressure in a 1L sealed tank. Approximately 8.8 seconds are necessary to attain a vacuum pressure of –89 kPa.

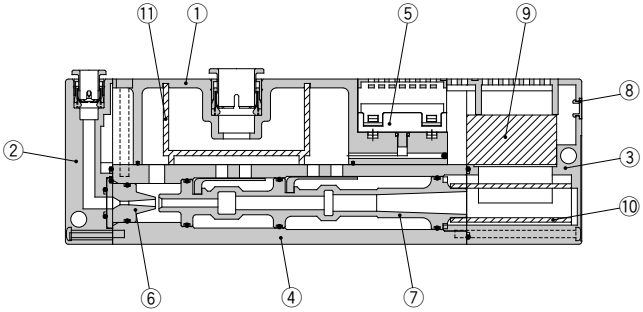
<How to Read the Graph>
The flow rate characteristics indicate the relationship between the vacuum pressure and the suction flow rate of the ejector, and show that when the suction flow rate changes the vacuum pressure also changes. In general, this indicates the relationship at the ejector's standard operating pressure. In the graph, Pmax indicates the maximum vacuum pressure, and Qmax indicates the maximum suction flow rate. These are the values that are published as specifications in catalogs, etc. Changes in vacuum pressure are explained below.



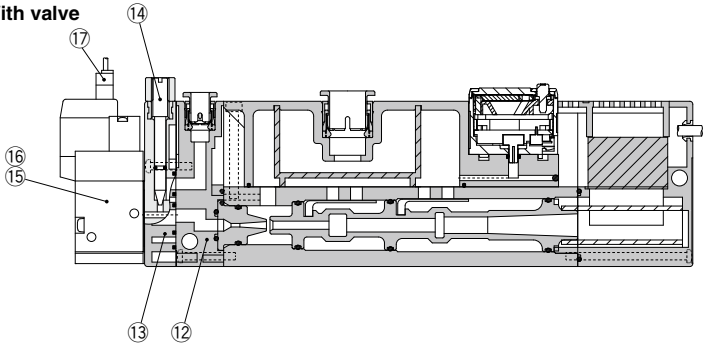
1. If the ejector's suction port is closed and sealed tight, the suction flow rate becomes "0" and the vacuum pressure increases to the maximum (Pmax).
2. If the suction port is opened and air is allowed to flow (the air leaks), the suction flow rate increases and the vacuum pressure decreases. (the condition of P1 and Q1)
3. If the suction port is opened completely, the suction flow rate increases to the maximum (Qmax), while the vacuum pressure then drops almost to "0" (atmospheric pressure). When adsorbing work pieces which are permeable or subject to leakage, etc., caution is required as the vacuum pressure will not be very high.

Construction

Without valve



With valve



Comonent Parts

No.	Description	Part no.	Note
1	Suction cover		
2	Front cover		Without valve
3	End cover		
4	Body		
5	Vacuum sensor unit		
6	Nozzle		
7	Diffuser		
8	Detent plug		Other than vacuum switch
	Lead wire cover		Vacuum switch specifications
12	Front cover B		With valve
13	Valve plate		With valve
14	Needle		With valve
15	Supply valve (N.C.)	SYJ514-□□□	With valve
16	Release valve (N.C.)	SYJ514-□□□	With valve
17	Connector assembly	SYJ100-30-□A-□	With valve (Table1.)

Replacement Parts

No.	Description	Material	Part no.
9	Sound absorbing material B	PVF	ZL112-SP01 (Set no. for 9, 10 & 11)
10	Sound absorbing material A	PVF	
11	Suction filter	PE	

●**Table1. How to order connector assembly**

For DC **SY100-30-4A-□**

For 100 VAC **SY100-30-1A-□**

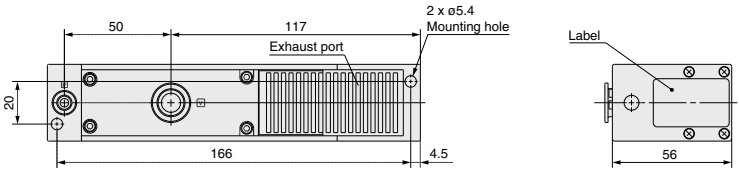
For other AC **SY100-30-3A-□**

Lead wire length

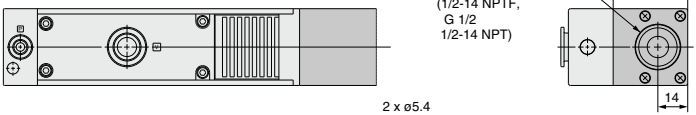
Nil	300mm(Standard)
6	600mm
10	1000mm
15	1500mm
20	2000mm
25	2500mm
30	3000mm
50	5000mm

Dimensions: ZL112 Series (Without Valve)

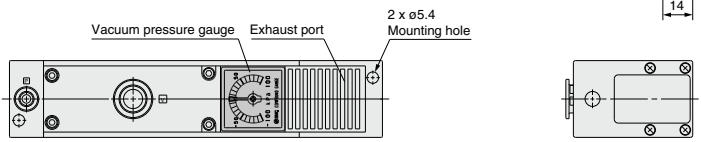
Standard
ZL112



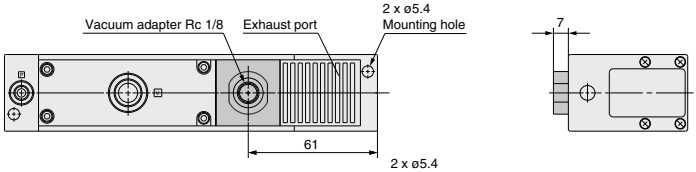
Port exhaust
ZL112P



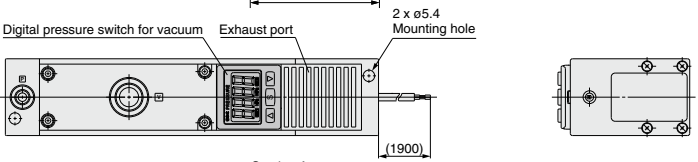
With vacuum pressure gauge
ZL112-G

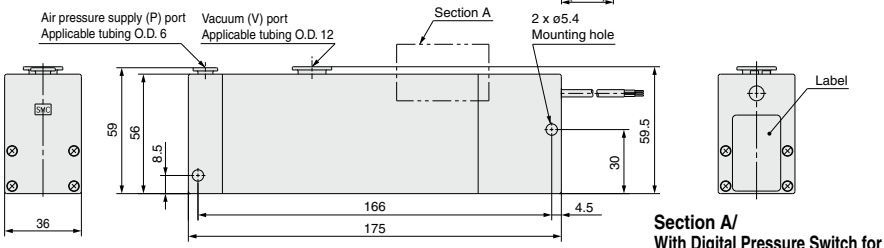


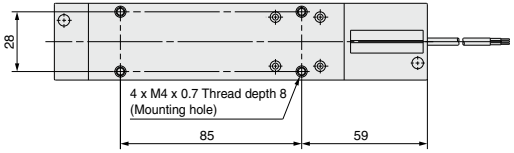
With vacuum adapter
ZL112-GN



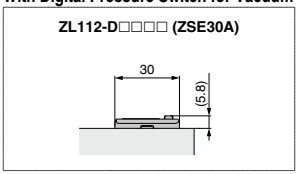
With digital pressure switch for vacuum
ZL112-D□□□



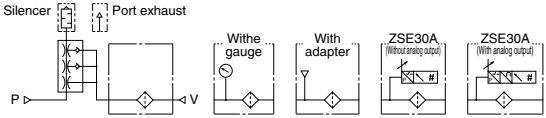




Section A/
With Digital Pressure Switch for Vacuum

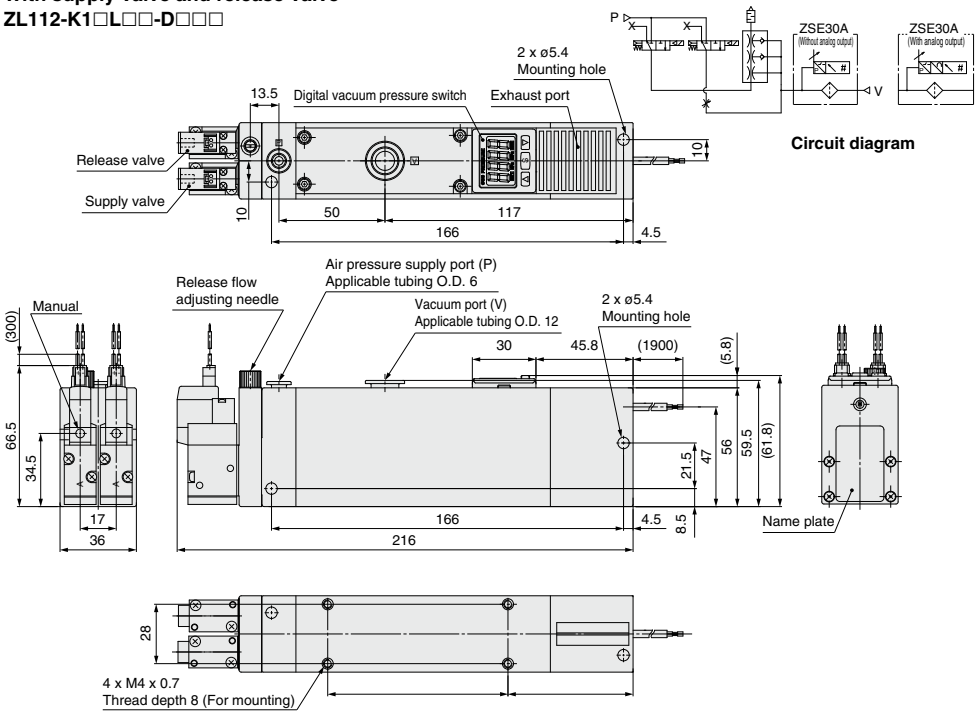


Circuit diagram

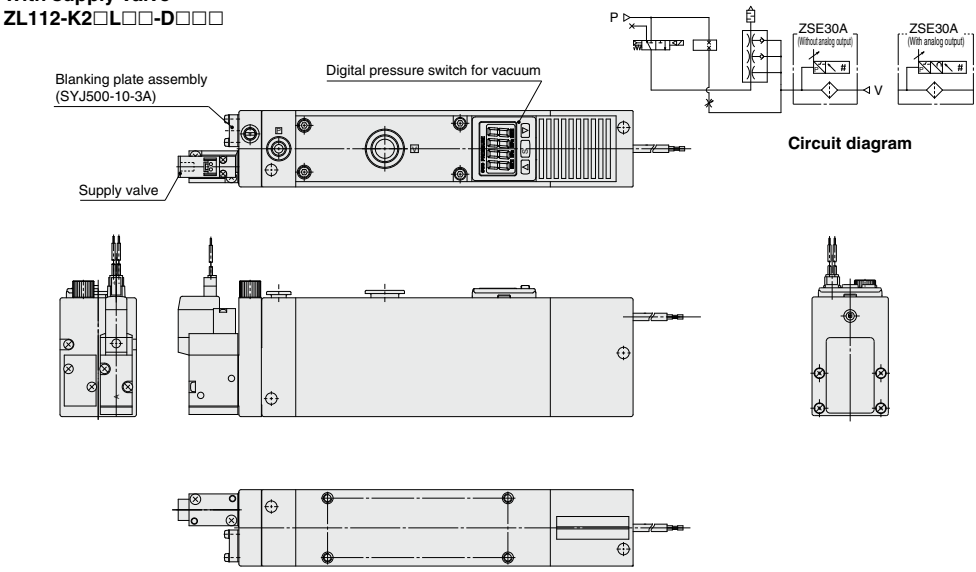


Dimensions: ZL112 Series (With Valve)

With supply valve and release valve
ZL112-K1□L□□-D□□□



With supply valve
ZL112-K2□L□□-D□□□



Multistage Ejector
ZL212 Series

Standard

With vacuum pressure gauge

With digital vacuum pressure switch

With adaptor

Port exhaust

How to Order

ZL2 12 □ – □ □ □ □

Nozzle diameter

12	1.2

Exhaust specifications

Nil	Built-in silencer
P	Port exhaust

Vacuum pressure sensor

Nil	None
GN	Vacuum port adaptor Rc 1/8
G	Vacuum pressure gauge
D	Digital pressure switch for vacuum

Lead wire specifications
(Applicable only when the vacuum pressure sensor specification is "D" for digital pressure switch for vacuum)

L	Lead wire with connector (Length 2 m)

∗ This is not available for models without lead wires.

Unit specifications
(Applicable only when the vacuum pressure sensor specification is "D" for digital pressure switch for vacuum)

Nil	With unit switching function
M	SI unit only
P	With unit switching function (Initial value psi)

Note 1) W/ unit switching function is not permitted to sell for the domestic use in Japan, because the new Weight and Measure Act has been implemented since October '99.
Note 2) Fixed unit: kPa

Output specifications
(Applicable only when the vacuum pressure sensor specification is "D" for digital pressure switch for vacuum)

N	NPN open collector 1 output
P	PNP open collector 1 output
A	NPN open collector 2 outputs
B	PNP open collector 2 outputs
C	NPN open collector 1 output + Analog voltage output
D	NPN open collector 1 output + Analog current output
E	PNP open collector 1 output + Analog voltage output
F	PNP open collector 1 output + Analog current output

Made to Order

Made to Order
(Refer to page 218 for details.)

Symbol	Specifications/Contents
X132	Supply valve/Vacuum release valve

Ejector Specifications

Model	**ZL212**
Nozzle diameter	ø1.2 mm x 2
Maximum suction flow rate	200 L/min (ANR)
Air consumption	126 L/min (ANR)
Maximum vacuum pressure	–84 kPa
Maximum operating pressure	0.7 MPa
Supply pressure range	0.2 to 0.5 MPa
Standard supply pressure	0.4 MPa
Operating temperature range	5 to 50°C

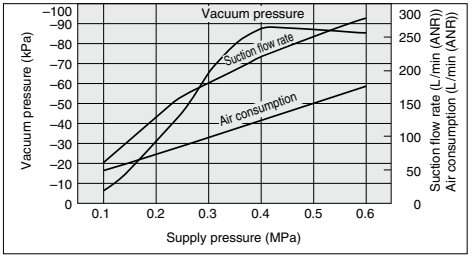
Weight

ZL212	700 g
Port exhaust	+300 g
Digital pressure switch for vacuum (Excluding lead wire)	+43 g
Digital pressure switch for vacuum (Including 3 cores lead wire)	+81 g
Digital pressure switch for vacuum (Including 4 cores lead wire)	+85 g
Valve (per 1 pc.)	+45 g

Exhaust Characteristics/Flow Rate Characteristics/Time to Reach Vacuum (Representative value)

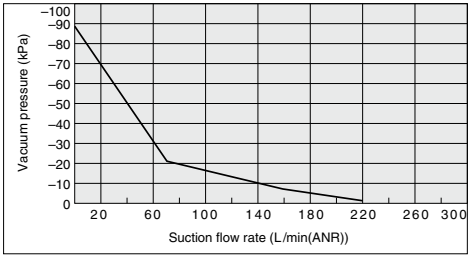
ZL212

Exhaust Characteristics



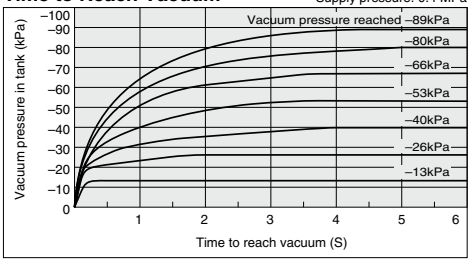
Flow Rate Characteristics

Supply pressure: 0.4 MPa



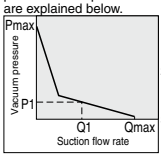
Time to Reach Vacuum

Tank capacity: 1L
Supply pressure: 0.4 MPa



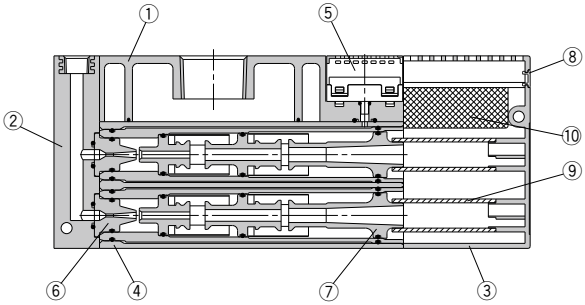
<How to Read the Graph>
The graphics indicate the time required to reach a vacuum pressure determined by adsorption conditions for workpieces, etc., starting from atmospheric pressure in a 1L sealed tank. Approximately 8.8 seconds are necessary to attain a vacuum pressure of –89 kPa.

<How to Read the Graph>
The flow rate characteristics indicate the relationship between the vacuum pressure and the suction flow rate of the ejector, and show that when the suction flow rate 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 maximum vacuum pressure, and Qmax indicates the maximum suction flow rate. These are the values that are published as specifications in catalogs, etc. Changes in vacuum pressure are explained below.



1. If the ejector's suction port is closed and sealed tight, the suction flow rate becomes "0" and the vacuum pressure increases to the maximum (Pmax).
2. If the suction port is opened and air is allowed to flow (the air leaks), the suction flow rate increases and the vacuum pressure decreases. (the condition of P1 and Q1)
3. If the suction port is opened completely, the suction flow rate increases to the maximum (Qmax), while the vacuum pressure then drops almost to "0" (atmospheric pressure). When adsorbing work pieces which are permeable or subject to leakage, etc., caution is required as the vacuum pressure will not be very high.

Construction



Component Parts

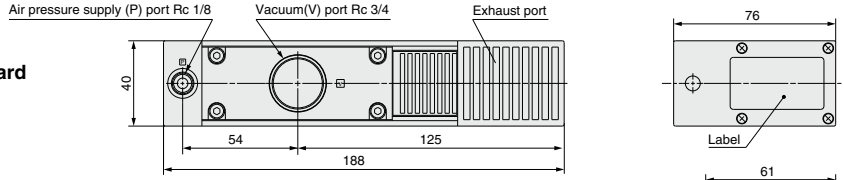
No.	Description	Note
1	Suction cover	
2	Front cover A	
3	End plate	
4	Body	
5	Vacuum sensor unit	
6	Nozzle	
7	Diffuser	
8	Detent plug	Other than vacuum switch
	Lead wire cover	Vacuum switch specifications

Replacement Parts

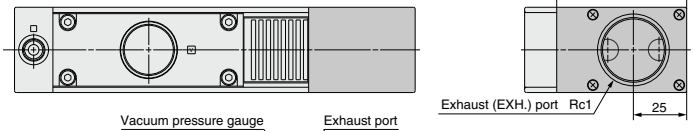
No.	Description	Material	Part no.
9	Sound absorbing material A	PVA sponge	ZL212-SP01 (Set no. for 9 & 10)
10	Sound absorbing material	PVA sponge	

Dimensions: ZL212 Series

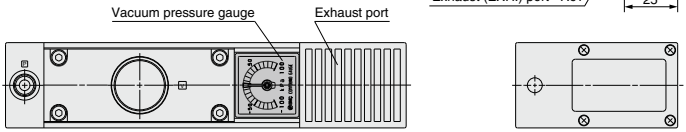
Standard
ZL212



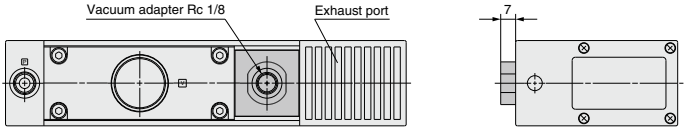
Port exhaust
ZL212P



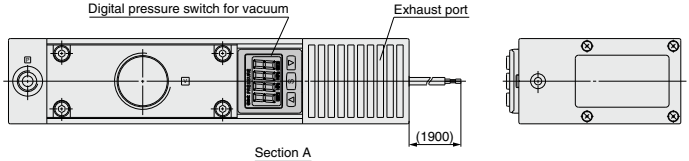
With vacuum pressure gauge
ZL212-G

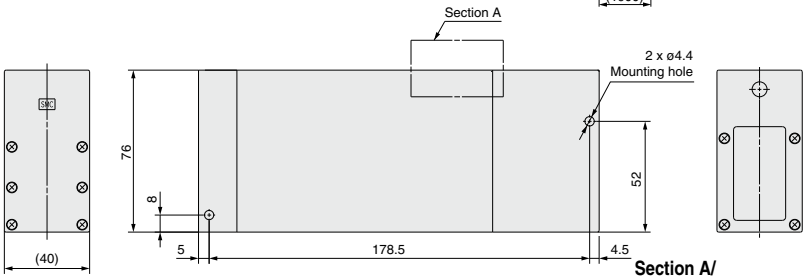


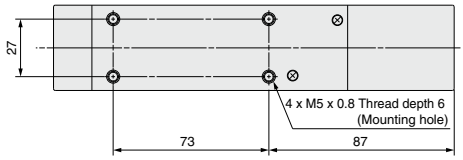
With vacuum adapter
ZL212-GN



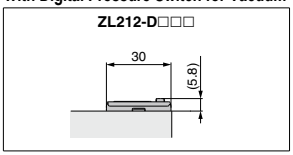
With digital pressure switch for vacuum
ZL212-D□□□



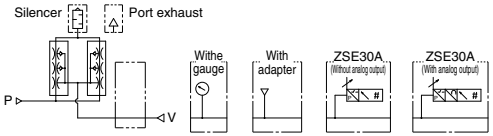




Section A/
With Digital Pressure Switch for Vacuum



Circuit diagram



Made to Order Specifications

Made to Order

Please contact SMC for detailed specifications, dimensions and lead times.

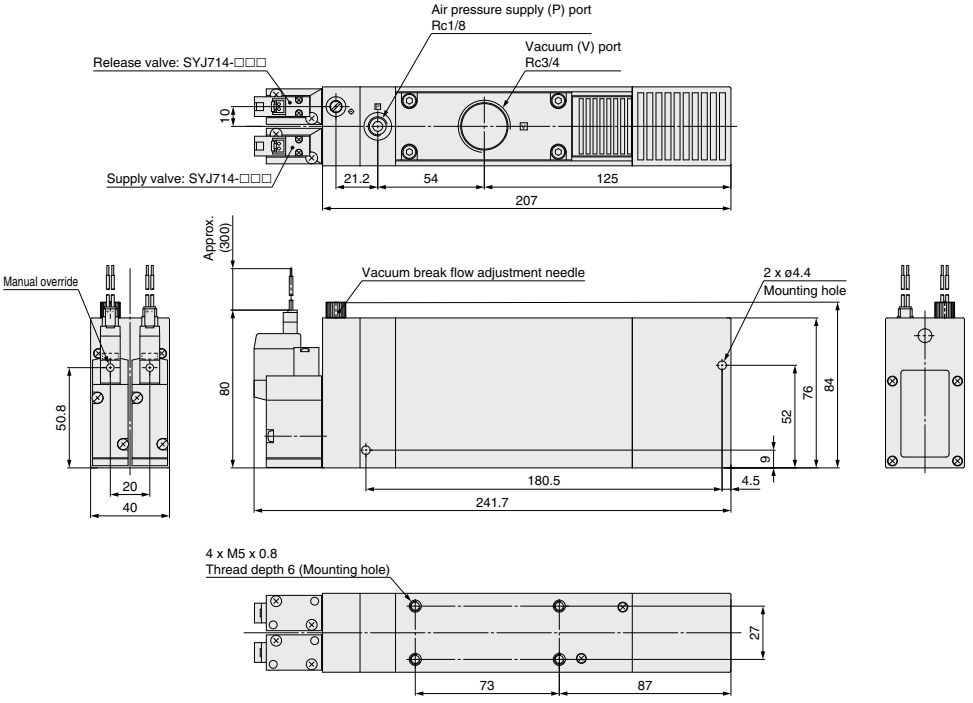
1 With Supply and Release Valves

ZL212 | Valve | Voltage | Electrical entry | – | Vacuum pressure switch | Electrical entry | – **X132**

X132: With supply and release valves

ZL212 type with supply and release valves

Dimensions



SMC

ZL Series
Specific Product Precautions

Be sure to read this before handling the products.
Refer to back page 50 for Safety Instructions and pages 49 to 51 for Vacuum Equipment Precautions.

Operation of Ejector Valves

⚠ Caution

1.When the air supply valve is turned ON, vacuum is generated by the flow of compressed air from the nozzle to the diffuser.
When the vacuum release valve is turned ON, the vacuum is quickly released as air passes through the release flow adjustment needle and flows to the vacuum port.

Operating Environment

⚠ Caution

1. Avoid use exposed to direct sunlight.

Solenoid Valves (ZL112 Series)

⚠ Caution

1. For specific product precuations on solenoid valves, refer to the Best Pneumatics No. 1-2.