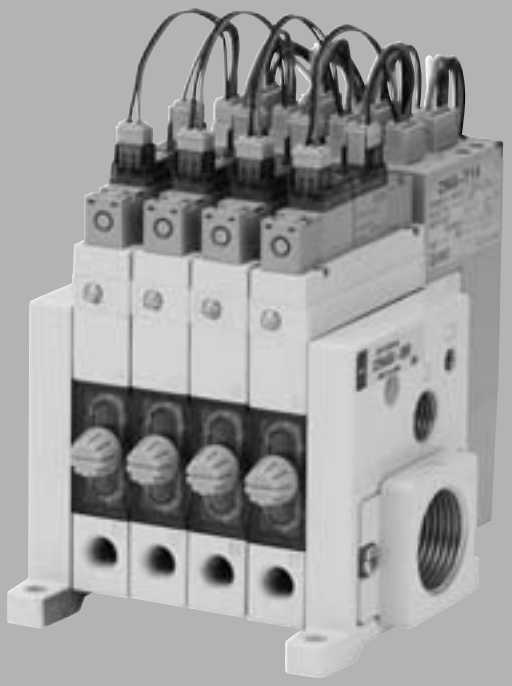
Vacuum Ejector with Solid State Timer

Series ZMA

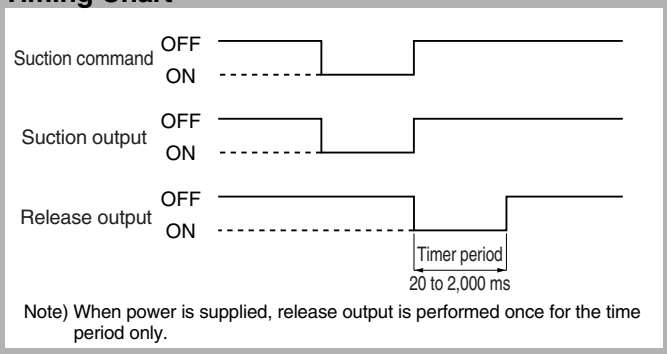


Incorporates solid state timer function for release valve control (Timer setting with PLC is unnecessary)

Allows sharing of switch/valve power supply, and single line for suction signal (Valve wiring is unnecessary)

Timer can be easily adjusted without programming (Reduction of the load of PLC)

Timing Chart



Note) When power is supplied, release output is performed once for the time period only.

Vacuum Ejector
With Solid State Timer
Series ZMA

How to Order

ZMA 07 1 H □ – K 5 – T14 C – L

Release flow rate adjusting needle

Nil	Without lock nut
L	With lock nut

Nozzle diameter

05	0.5 mm
07	0.7 mm
10	1.0 mm
13	1.3 mm
15	1.5 mm

Electrical entry of vacuum switch (Connector type)

C	Lead wire length 0.6 m
CL	Lead wire length 3 m
CN	Without lead wire

∗ Refer to "Table (2)" for lead wire with 4-wire connecor.

Body type

1	For single unit
3 Note)	Common SUP for manifold
5 Note)	Individual SUP for manifold

Note) When the product is used for the manifold, the exhaust air of the operating ejector may enter the vacuum port (V) of the non-operating ejector and be released if there are an operating and non-operating ejector. In order to reduce the exhaust intrusion, consider using a special double check valve (-X107).

Switch model

T14	1 point setting, No analog output available 3 turns, NPN output
T54	1 point setting, No analog output available 3 turns, PNP output

Solenoid valve rated voltage

5	24 VDC

Valve

K	With air supply valve, Vacuum release valve

Thread type

Nil	Rc
T	NPTF
F	G∗

∗ G thread
The thread ridge shape is compatible with the G thread standard (JIS B0203), but other shapes are not conforming to ISO16030 and ISO1179.

Standard supply pressure

M	0.35 MPa
S	0.45 MPa
H	0.5 MPa

∗ Refer to "Table (1)" for selection of standard supply pressure and nozzle diameter.

Table (1)
Combination of Nozzle Diameter and Standard Supply Pressure

Nozzle diameter	Standard supply pressure (MPa)		
	M (0.35)	**S** (0.45)	**H** (0.5)
0.5 mm	—	—	●
0.7 mm	●	—	●
1.0 mm	●	—	●
1.3 mm	●	●	●
1.5 mm	—	●	—

Table (2)

Lead wire with 4-wire connector	P5022-6-1 (0.6 m)
	P5022-6-2 (3 m)

Model

Nozzle diameter (mm)	Model	Standard supply pressure			Maximum suction flow rate ℓ/min (ANR)	Air consumption ℓ/min (ANR)	Diffuser construction
		H	M	S			
0.5	**ZMA05□H**	0.5 MPa	—	—	15	17	Double diffuser
0.7	**ZMA07□H**				30	30	
1.0	**ZMA10□H**				50	60	
1.3	**ZMA13□H**				66	90	
0.7	**ZMA07□M**	—	0.35 MPa	—	23	33	
1.0	**ZMA10□M**				38	60	
1.3	**ZMA13□M**				44	85	
1.3	**ZMA13□S**	—	—	0.45 MPa	37	88	Single diffuser
1.5	**ZMA15□S**				45	110	

Vacuum Ejector Specifications

Fluid	Air
Max. operating pressure	0.7 MPa
Max. vacuum pressure	–84 kPa
Supply pressure range	0.25 to 0.55 MPa
Operating temperature range	5 to 50°C
Suction filter	Polyethylene sintered metal (30 μm)

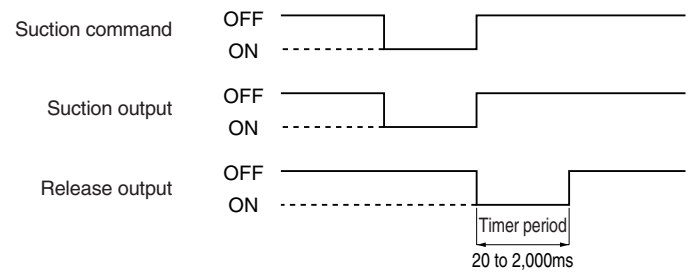
Valve Specifications

How to operate	Pilot type
Main valve	Poppet
Effective area (Cv factor)	3 mm² (0.17)
Operating pressure range	0.25 to 0.6 MPa
Electrical entry	Plug connector
Max. operating frequency	5 Hz
Voltage	24 VDC

Vacuum Switch with Timer Specifications (for controlling solenoid valve)

Power source	Operating voltage	24 VDC ±10%
	Consumption current per one unit	1.1 W (at switch output OFF)
Sensor switch output	Number of output	1
	Output	NPN/PNP open collector
	Setting trimmer	3 turns
	Operation indicator light	Red LED lighting
	Temperature characteristics	±3% FS or less
	Hysteresis	3% FS or less (fixed)
Part of timer	Timer period	20 to 2,000 ms
	Setting trimmer	3 turns
	Temperature characteristics	±3% FS or less

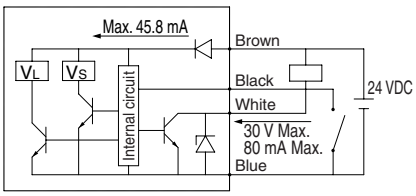
Timing Chart



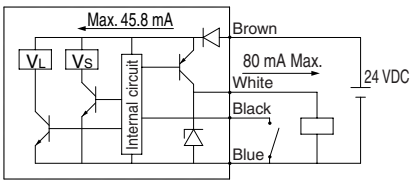
Note) When power is supplied, release output is performed once for the time period only.

Connection Example

T14



T54



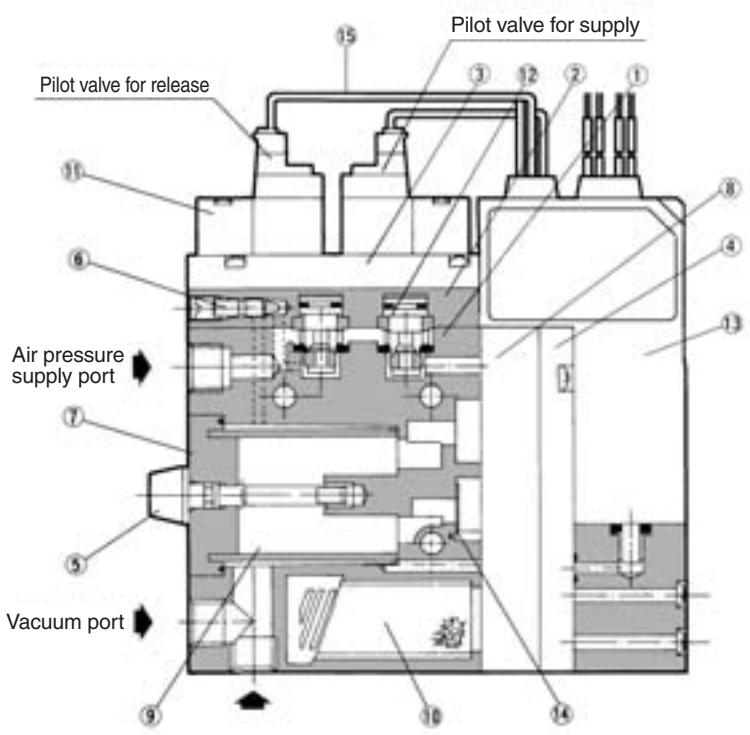
VL: Pilot valve for release
Vs: Pilot valve for supply

Wiring

Brown	DC (+)
Black	Suction command
White	Switch output
Blue	DC (–)

ZA
ZX
ZR
ZM
ZMA
ZQ
ZH
ZU
ZL
ZY□
ZF□
ZP□
SP
ZCUK
AMJ
AMV
AEP
HEP
Related Equipment

Construction: ZMA□1□-K□L-E□



Component Parts

No.	Description	Material	Note
1	**Body**	Aluminum die-casted	
2	**Valve cover**	Resin	
3	**Adapter plate**	Resin	
4	**Cover**	Zinc die-casted	ZMA-HCB
5	**Tension bolt**	Stainless steel/Polyacetal	
6	**Release flow rate adjusting needle**	Brass	Electroless nickel plated

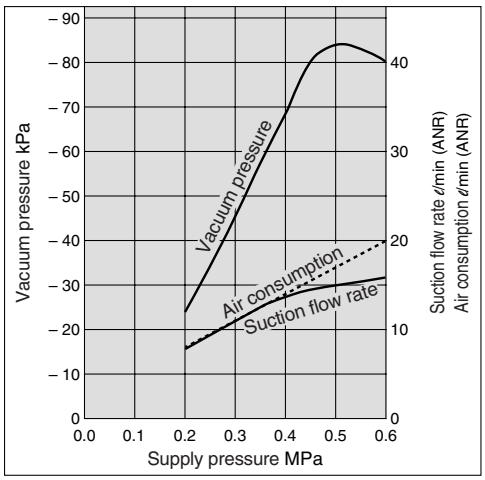
Replacement Parts

No.	Description	Material	Part no.
7	**Filter cover assembly**	—	ZMA-FCB-0
8	**Diffuser assembly**	—	ZMA□□0□-0
9	**Suction filter**	Polyethylene	ZM-SF
10	**Silencer assembly**	—	ZM-SA
11	**Pilot valve**	—	SY114-5LOZ
12	**Poppet valve assembly**	—	ZMA-PV
13	**Vacuum switch with timer**	—	ZMA-T14CN #1 (NPN) ZMA-T54CN #1 (PNP)
14	**Check valve**	NBR	ZM-CV
15	**Connector assembly**	—	ZMA-VC-1A #1

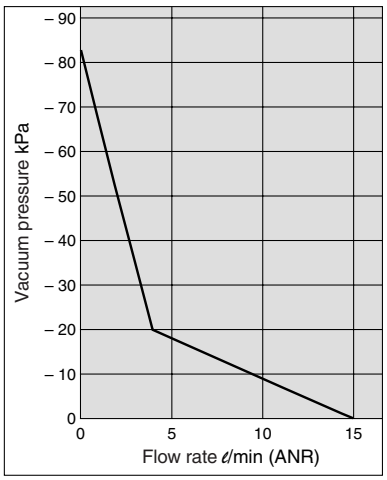
Exhaust Characteristics/Flow Characteristics, Standard Supply Pressure: H ··· 0.5 MPa

ZMA05□H

Exhaust Characteristics

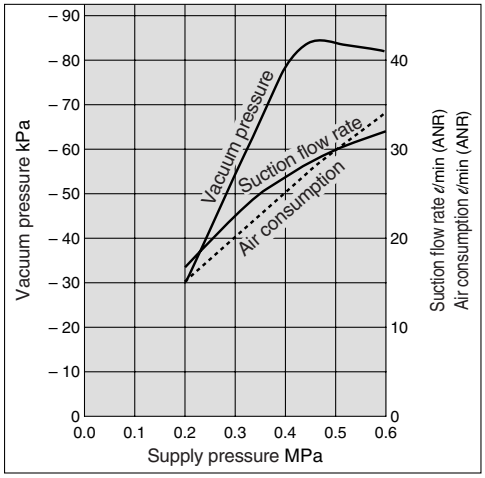


Flow Characteristics

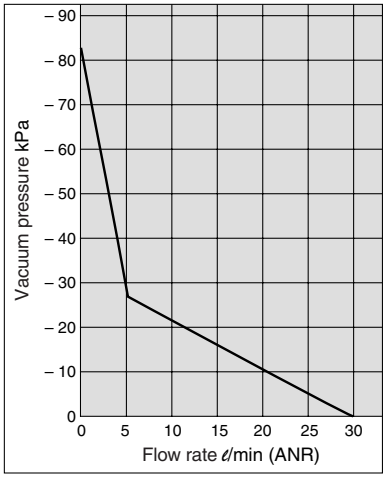


ZMA07□H

Exhaust Characteristics

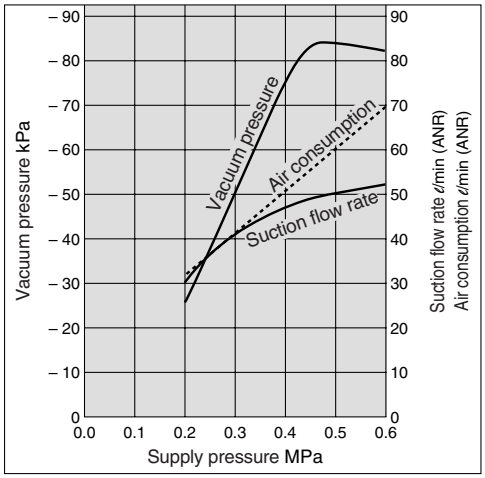


Flow Characteristics

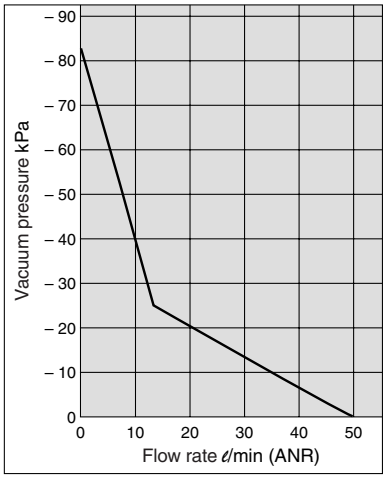


ZMA10□H

Exhaust Characteristics



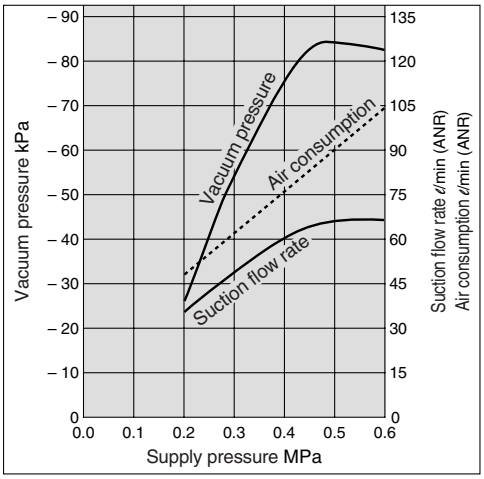
Flow Characteristics



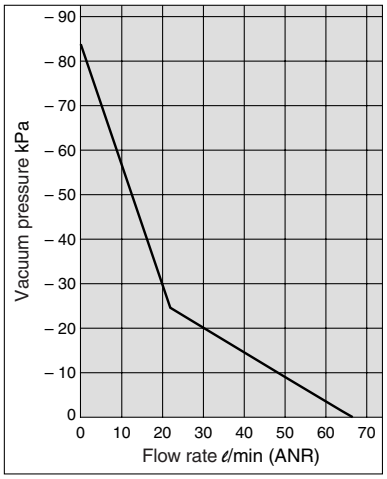
Exhaust Characteristics/Flow Characteristics, Standard Supply Pressure: H ··· 0.5 MPa

ZMA13□H

Exhaust Characteristics



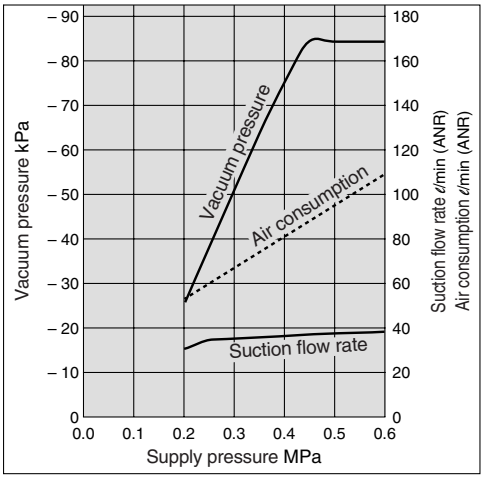
Flow Characteristics



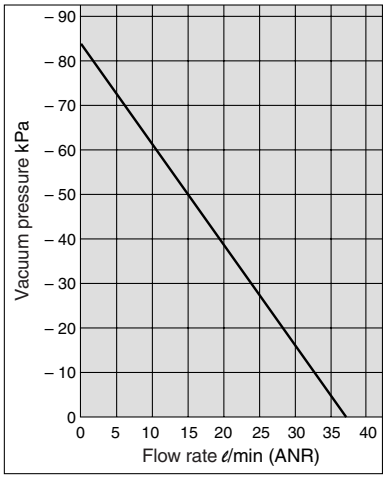
Exhaust Characteristics/Flow Characteristics, Standard Supply Pressure: S ··· 0.45 MPa

ZMA13□S

Exhaust Characteristics

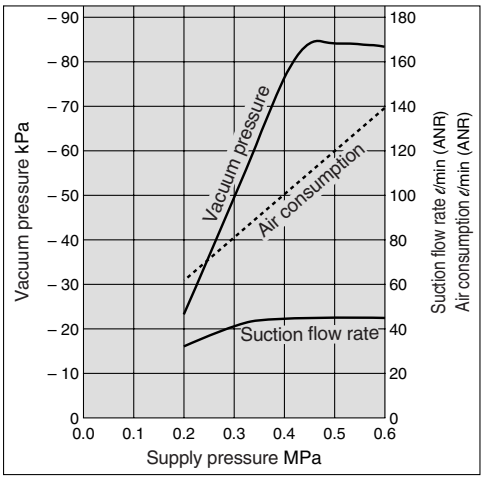


Flow Characteristics

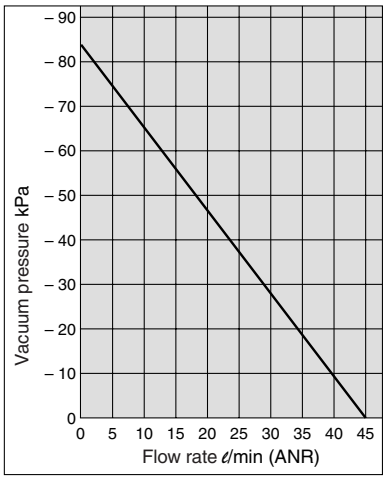


ZMA15□S

Exhaust Characteristics



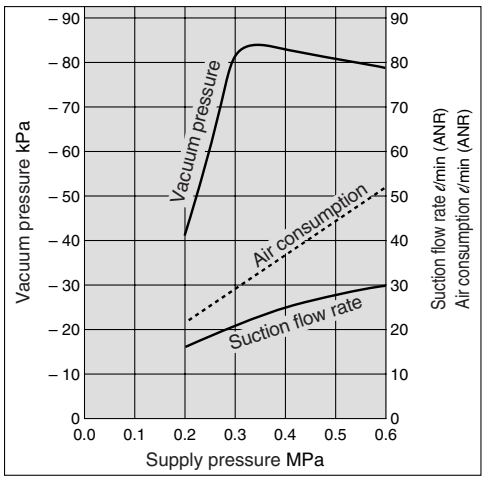
Flow Characteristics



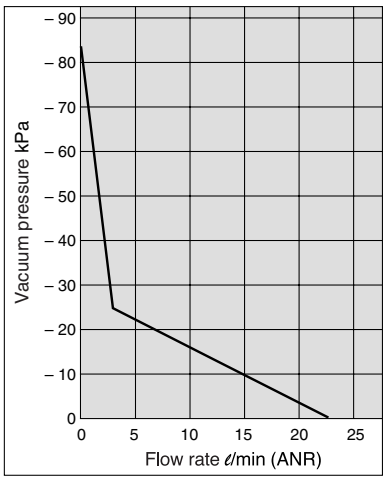
Exhaust Characteristics/Flow Characteristics, Standard Supply Pressure: M ··· 0.35 MPa

ZMA07□M

Exhaust Characteristics

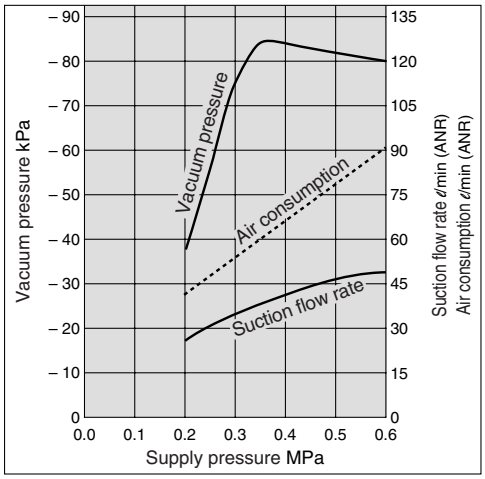


Flow Characteristics

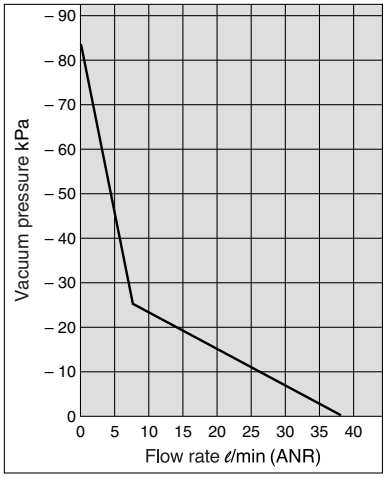


ZMA10□M

Exhaust Characteristics

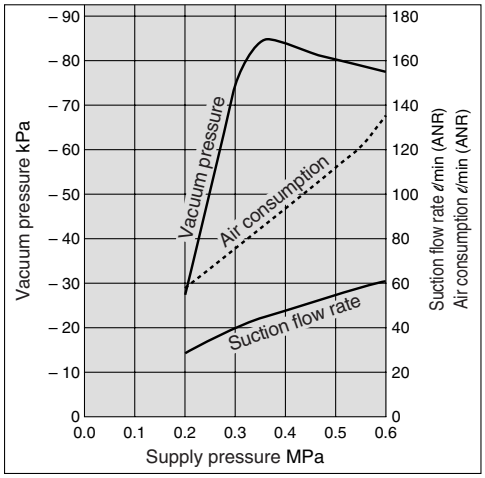


Flow Characteristics

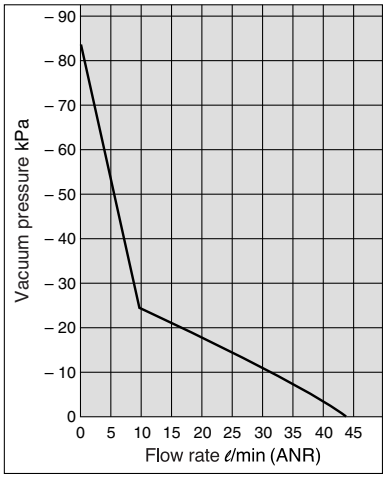


ZMA13□M

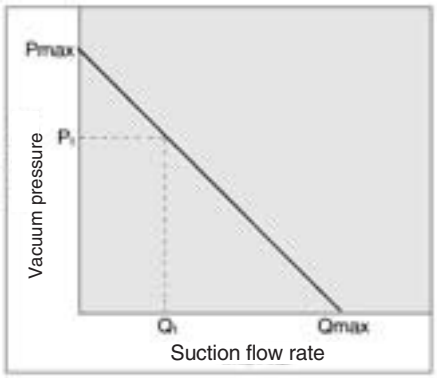
Exhaust Characteristics



Flow Characteristics



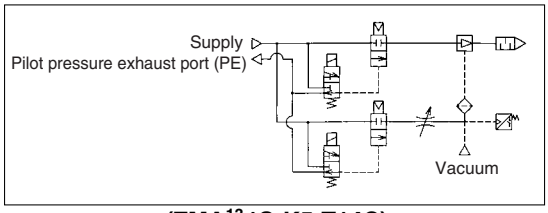
How to Read Flow Characteristics Graph



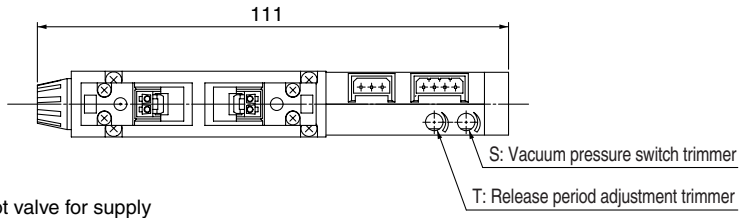
Flow characteristics are expressed in ejector vacuum pressure and suction flow. If suction flow rate changes, a change in vacuum pressure will also be expressed. Normally this relationship is expressed in ejector standard supply pressure.
In graph, Pmax is max. vacuum pressure and Qmax is max. suction flow. The values are specified according to catalog use. Changes in vacuum pressure are expressed in the order below.

1. When ejector suction port is covered and made airtight, suction flow is 0 and vacuum pressure is at maximum value (Pmax).
2. When suction port is opened gradually, air can flow through (air leakage), suction flow increases, but vacuum pressure decreases (condition P_1 and Q_1).
3. When suction port is opened further, suction flow moves to maximum value (Qmax), but vacuum pressure is near 0 (atmospheric pressure).
   When vacuum port (vacuum piping) has no leakage, vacuum pressure becomes maximum, and vacuum pressure decreases as leakage increases. When leakage value is the same as max. suction flow, vacuum pressure is near 0.
   When ventilative or leaky work must be adsorbed, please note that vacuum pressure will not be high.

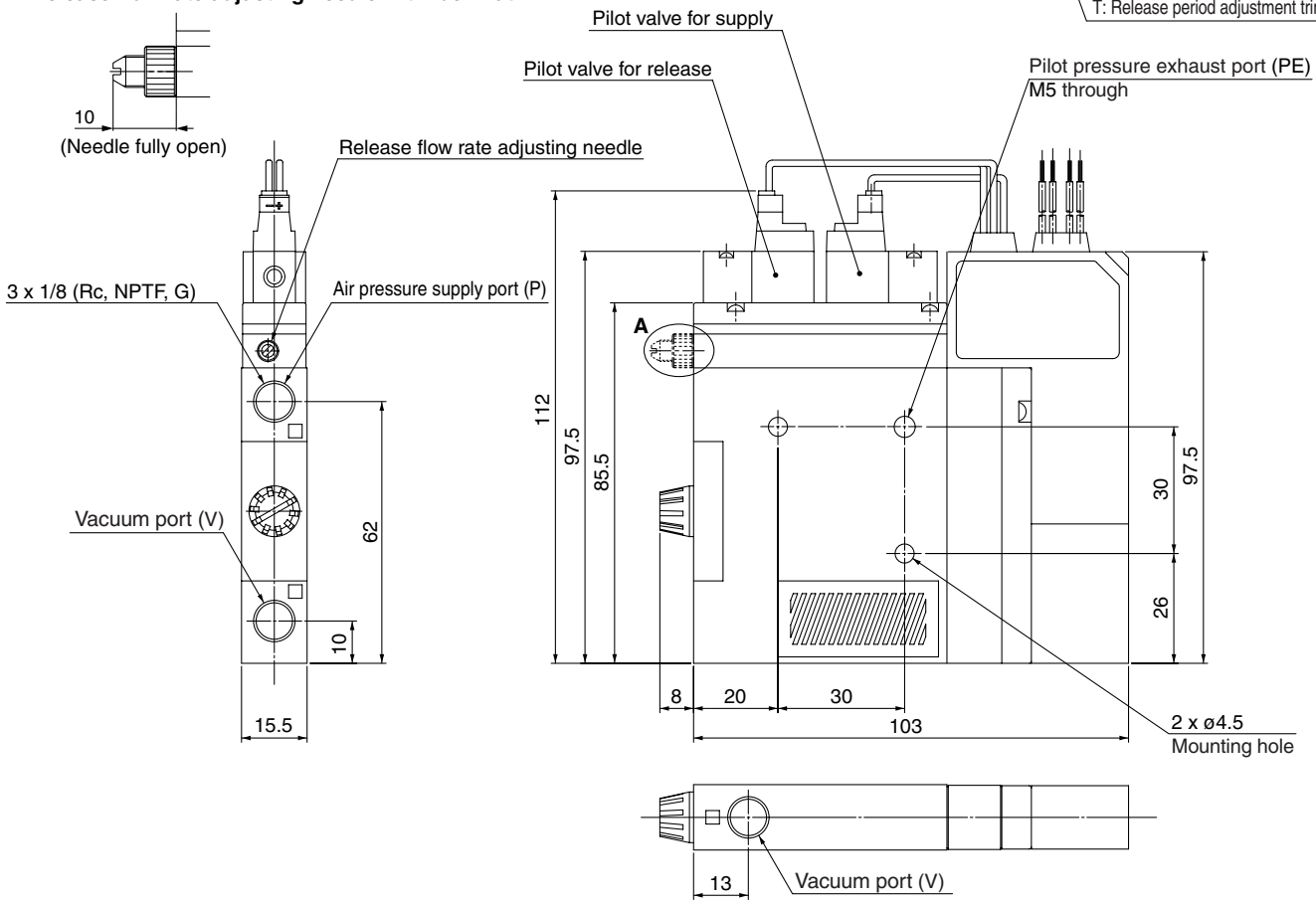
Dimensions



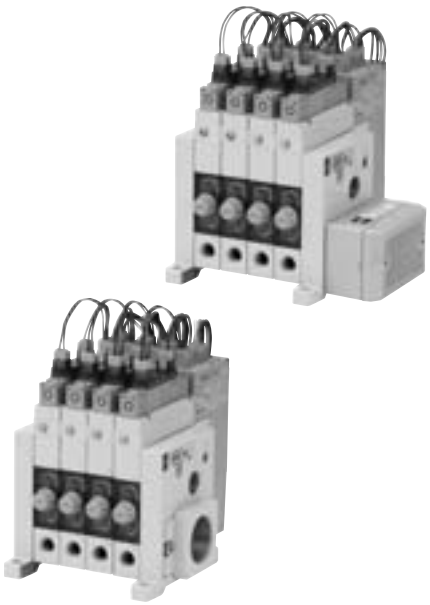
(ZMA$^{13}_{15}$1S-K5-T14C)



A: Release flow rate adjusting needle with lock nut



Manifold Specifications: Series ZZMA



Manifold Specifications

Manifold style	Stacking
Common air pressure supply port (P) *	1/4 (Rc, NPTF, G)
Individual air pressure supply port (P) *	1/8 (Rc, NPTF, G)
Common exhaust port	1/2, 3/4 (Rc, NPTF, G)
Position of common exhaust port (EXH)	Right side/Left side/Both sides**
Max. number of stations	Max.10 stations
Silencer	ZZM-SA (With bolts)

* The common air pressure supply port (P) and individual air pressure supply port (P) can be mounted together.
** Right and left sides are viewed from the front side of vacuum port (V).

Maximum Ejector Stations (Max. operable nos. simultaneously)

Manifold model \ Ejector model	ZMA053 ZMA054	ZMA073 ZMA074	ZMA103 ZMA104	ZMA133 ZMA134	ZMA153 ZMA154
ZZMA Stations **— 06** $^{R}_{L}$	10	8	5	4	3
ZZMA Stations **— 06B**	10	10	8	6	5
ZZMA Stations **— 04** $^{R}_{L}$	10	8	5	4	3
ZZMA Stations **— 04B**	10	10	8	6	5

* Effective area of external silencer is 160 mm^2.
Cv value: 8.8

How to Order Ejector Manifold

ZZMA 06 – □ 06 R – R

Number of stations

By viewing the front side of vacuum port (V), stations are counted starting from station 1 on the left side.

01	1 station
⋮	⋮
10	10 stations (max.)

Thread type

Nil	Rc
T	NPTF
F	G *

* G thread
The thread ridge shape is compatible with the G thread standard (JIS B 0203), but other shapes are not conforming to ISO16030 and ISO1179.

Common exhaust port (EXH) Size

04	1/2
06	3/4
S	Silencer dedicated for ZZMA (ZZM-SA)
00	Without exhaust port (Compatible with –X111)

Common exhaust port(EXH) and silencer location

R	Right Side
L	Left Side
B	Both Sides

Note) Right and left side are viewed from the front side of vacuum port (V).

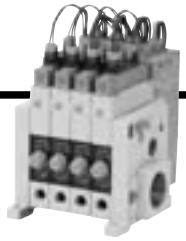
Common air pressure supply port (P) location **

Nil	Both Sides
R	Right Side
L	Left Side

** Right and left side are viewed from the front side of vacuum port (V).

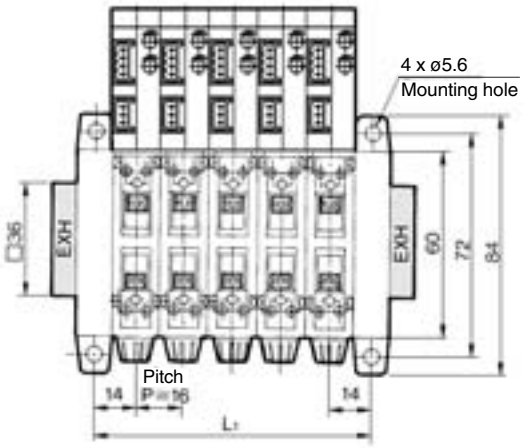
The asterisk (*) indicates the ejector model no. below the manifold base no.
Prefix it to the vacuum unit part numbers to be mounted.
When it is not added, products are shipped separately.

Example) Manifold model no.: ZZMA04-SR (1 pc.)
Ejector model no. : * ZMA073H-K5-T14C (4 pcs.)

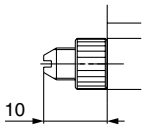


Manifold

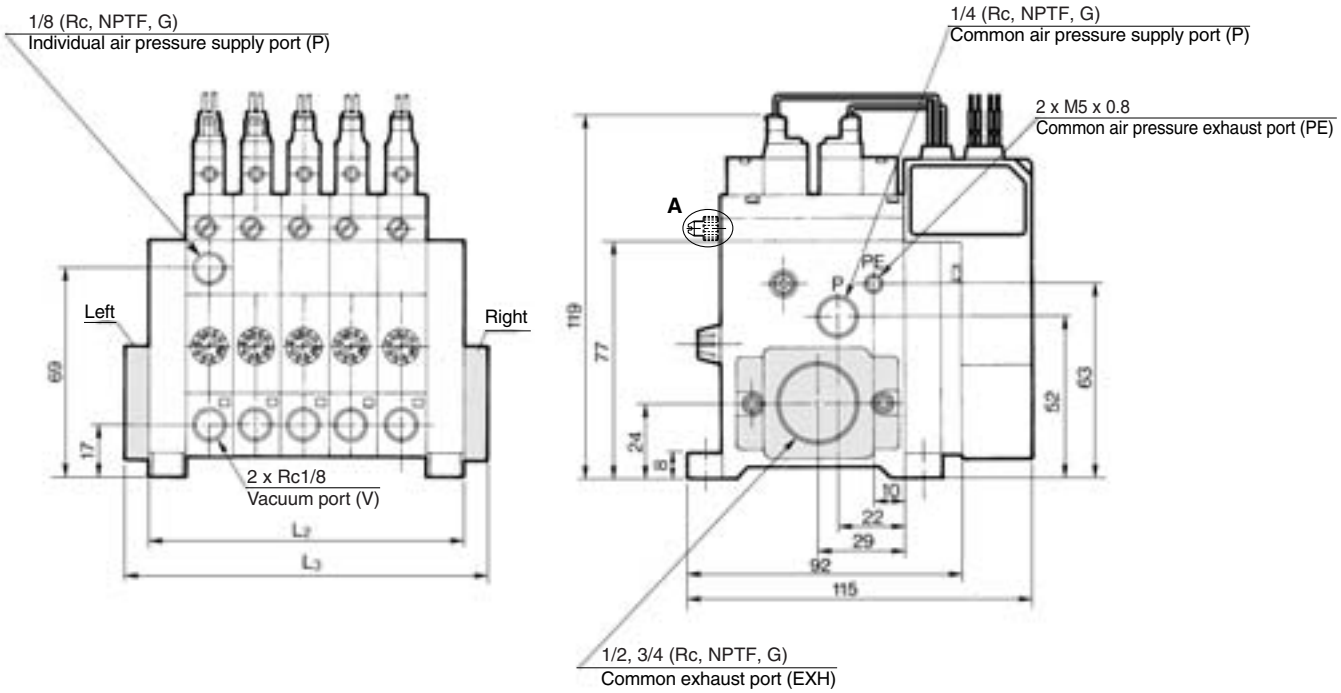
ZZMA | Number of ejectors | — | Common EXH port | Port position



A: Release flow rate adjusting needle with lock nut

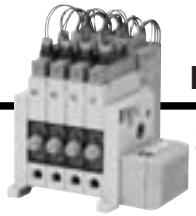


(Needle fully open)



(mm)

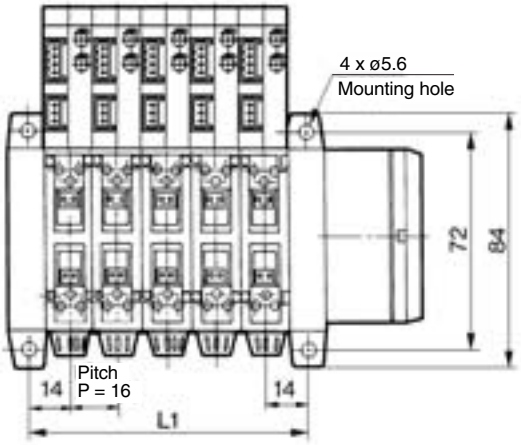
L \ Stations	1	2	3	4	5	6	7	8	9	10
L1	28 ±1.5	44 ±1.5	60 ±1.5	76 ±1.5	92 ±1.5	108 ±2.0	124 ±2.0	140 ±2.0	156 ±2.0	172 ±2.0
L2	40 ±1.5	56 ±1.5	72 ±1.5	88 ±1.5	104 ±1.5	120 ±2.0	136 ±2.0	152 ±2.0	168 ±2.0	184 ±2.0
L3	56 ±1.5	72 ±1.5	88 ±1.5	104 ±1.5	120 ±1.5	136 ±2.0	152 ±2.0	168 ±2.0	184 ±2.0	200 ±2.0



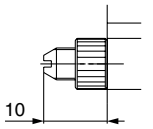
Manifold/With Silencer

<Components>
Manifold with Silencer Dedicated for Manifold

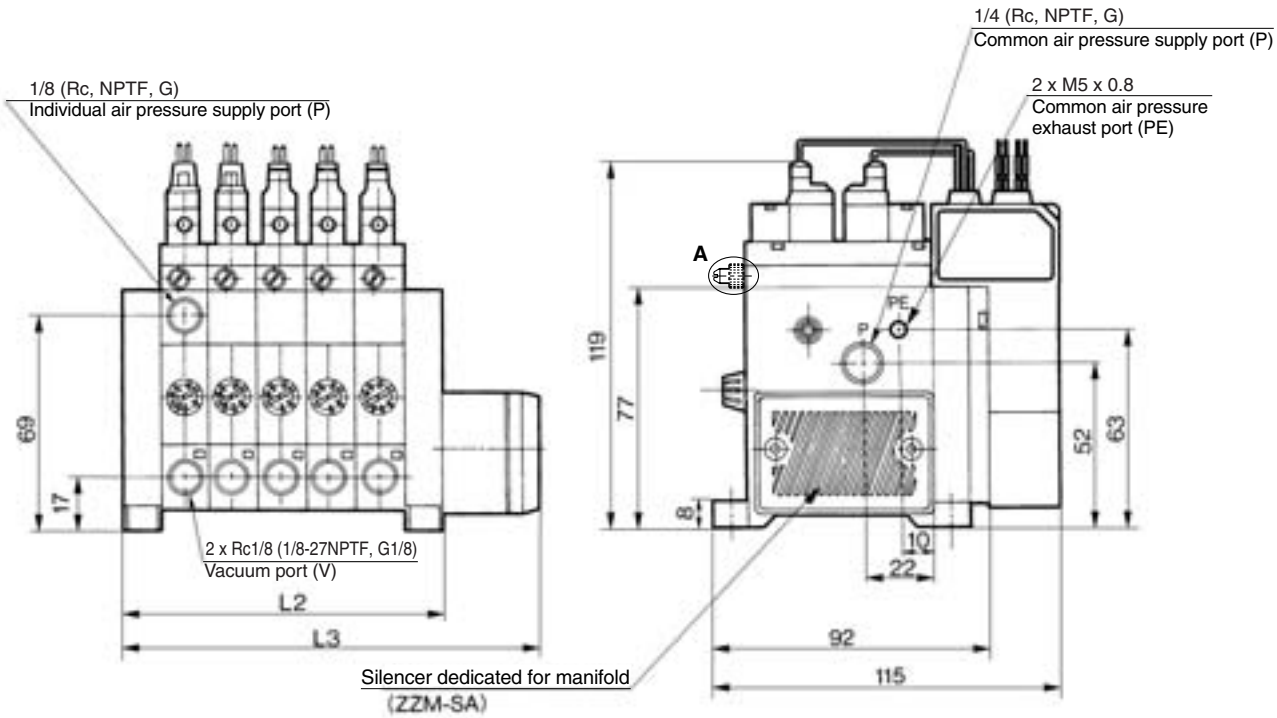
ZZMA [Number of ejectors] — **S** [Position of silencer]



A: Release flow rate adjusting needle with lock nut



(Needle fully open)



(mm)

L \ Stations	1	2	3	4	5	6	7	8	9	10
L1	28 ±1.5	44 ±1.5	60 ±1.5	76 ±1.5	92 ±1.5	108 ±2.0	124 ±2.0	140 ±2.0	156 ±2.0	172 ±2.0
L2	40 ±1.5	56 ±1.5	72 ±1.5	88 ±1.5	104 ±1.5	120 ±2.0	136 ±2.0	152 ±2.0	168 ±2.0	184 ±2.0
L3	72 ±1.5	88 ±1.5	104 ±1.5	120 ±1.5	136 ±1.5	152 ±2.0	168 ±2.0	184 ±2.0	200 ±2.0	216 ±2.0

Series ZMA
Specific Product Precautions

Be sure to read before handling.
Refer to front matters 38 and 39 for Safety Instructions and pages 844 to 846 for Vacuum Equipment Precautions.

Mounting

⚠Warning

1. Do not drop or bump.
Do not drop, bump or apply excessive impact (1,000 m/s^2) when handling. Even if the switch body is not damaged, the switch may suffer internal damage that will lead to malfunction.

2. Hold the product from the body side when handling.
The tensile strength of the power cord is 49 N, and pulling it with a greater force can cause failure.

3. When handling the product, never move or loosen the switch assembly or the switch assembly mounting screws.

Wiring

⚠Warning

1. Do not allow repeated bending or stretching forces to be applied to lead wires.
Wiring arrangements in which repeated bending stress or stretching force is applied to the lead wires can cause broken wires.

Pressure Source

⚠Warning

1. Vacuum pressure switches
There will be no change in performance if a pressure of approximately 0.5 MPa is applied momentarily (when releasing vacuum), but care should be taken that pressures of 0.2 MPa or more are not applied on a regular basis.

Operating Environment

⚠Warning

1. The product cannot be used in a strong magnetic field.