

# Power Valve Regulator Valve Series VEX1

## Large Capacity Relief Regulator

3 port large capacity poppet  
exhausting regulator  
equipped with a relief port the  
same size as the connection  
port.

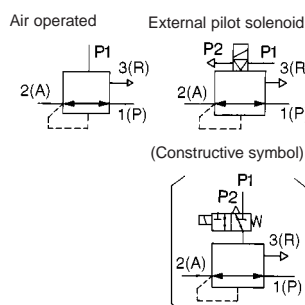


Air operated



External pilot solenoid

Symbol



## Specifications

Model		VEX110□- <sup>01</sup> <sub>02</sub>	VEX120□- <sup>01</sup> <sub>02</sub>	VEX130□- <sup>02</sup> <sub>03 04</sub>	VEX150□- <sup>04</sup> <sub>06 10</sub>	VEX170□- <sup>10</sup> <sub>12</sub>	VEX190□- <sup>14</sup> <sub>20</sub>								
Operating style		Air operated, External pilot													
Fluid		Air, Inert gas													
Proof pressure		1.5MPa													
Max. operating pressure		1.0MPa													
Set press. range	Air operated	0.05 to 0.9MPa													
	Solenoid	0.05 to 0.7MPa						0.05 to 0.9MPa							
Ambient and fluid temperature		0 to 50°C(Air operated: 0 to 60°C)													
Hysteresis		0.03MPa													
Repeatability		0.01MPa													
Sensitivity		0.01MPa													
Mounting		Free													
Lubrication		Not required (Use turbine oil No.1 ISO VG32, if lubricated)													
Port size Rc(PT)	Port	01	02	01	02	02	03	04	04	06	10	10	12	14	20
	P	1/8	1/4	1/8	1/4	1/4	3/8	1/2	1/2	3/4	1	1	1 1/4	1 1/2	2
	A											1 1/4			
	R														
Effective area	mm <sup>2</sup>	16	25	16	25	36	60	70	130	160	180	300	330	590	670
	Cv	0.9	1.4	0.9	1.4	2.0	3.3	3.9	7.2	8.9	10	17	18	33	37
Weight (kg)	Air operated	0.1		0.2		0.4		1.3		1.9		3.9			
	Solenoid	0.2		0.3		0.5		1.4		2.0		4.0			

## Solenoid Specifications

Model	VEX1101, 1201, 1301	VEX1501, 1701, 1901
Pilot valve	VK334-□□□	VO307-□□□
Electrical entry	Grommet, DIN connector	Grommet, Grommet terminal, Conduit terminal, DIN connector
Coil rated voltage V	AC(50/60Hz)	100V, 110V, 200V, 220V, 240V
	DC	6V, 12V, 24V, 48V
Allowable voltage	±10% of rated voltage	
Coil insulation	Class B (130°C)	
Temperature rise	55°C or less (Rated voltage)	
Apparent power	AC	9.5VA/50Hz, 8VA/60Hz
	Inrush	12.7VA(50Hz), 10.7VA(60Hz)
	Holding	7.6VA(50Hz), 5.4VA(60Hz)
Power consumption	DC	4W(Without light) 4.3W(With light)
Manual override	Non-locking push style	

## Options

Parts name	Part No.					
	VEX110□- <sup>01</sup> <sub>02</sub>	VEX120□- <sup>01</sup> <sub>02</sub>	VEX130□- <sup>02</sup> <sub>03 04</sub>	VEX150□- <sup>04</sup> <sub>06 10</sub>	VEX170□- <sup>10</sup> <sub>12</sub>	VEX190□- <sup>14</sup> <sub>20</sub>
Bracket	B	VEX1-18-1A	—	VEX3-32A	VEX5-32A	VEX7-32A
(with bolt and washer)	F	VEX1-18-2A	—	—	—	—
Pressure gauge <sup>(1)</sup>	G	G27-10-01	G36-10-01	G46-10-01		



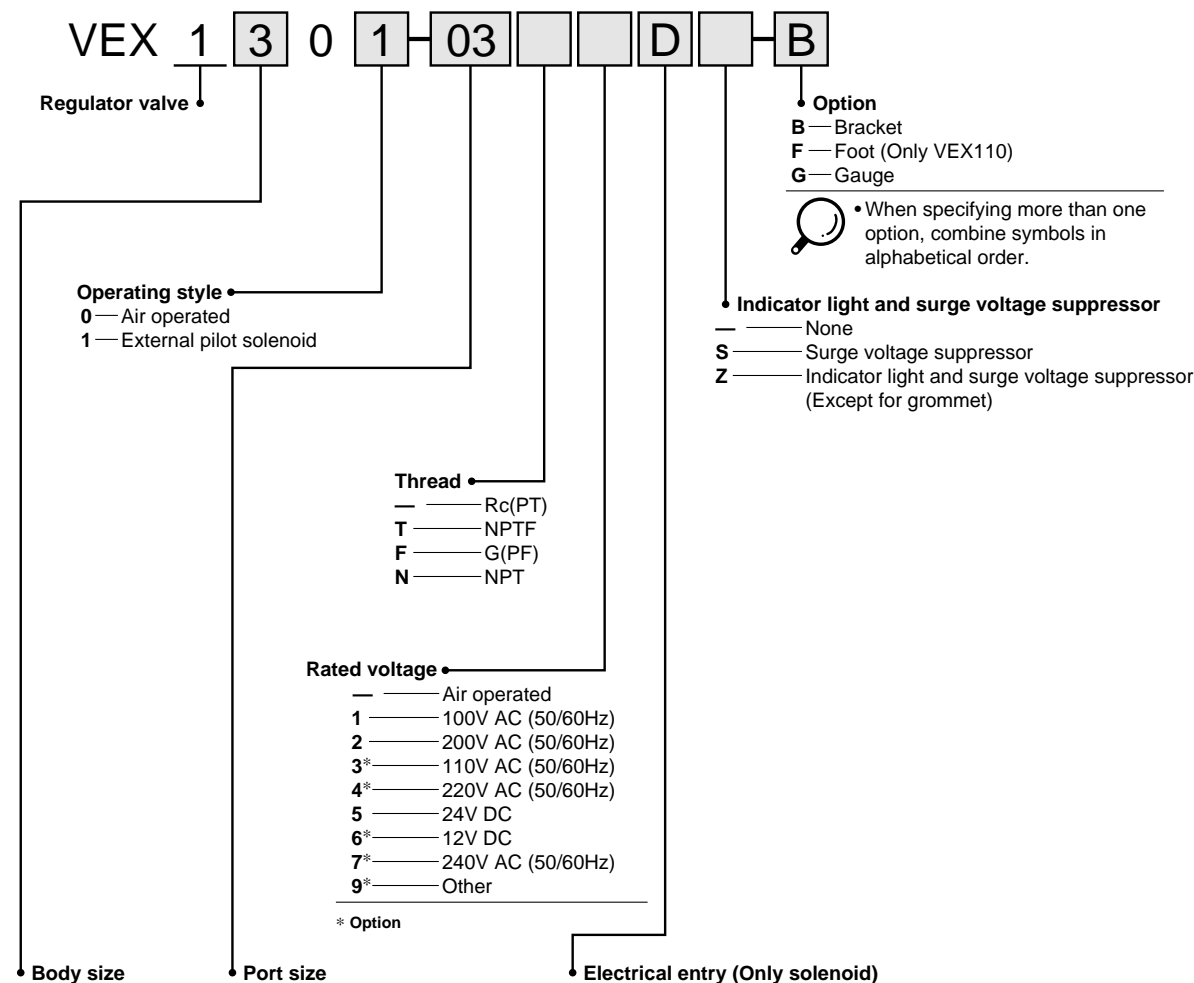
Note 1) When requiring the gauge except mentioned above, specify the model number. Option is packed with it.

(Refer to Best Pneumatics 4.)

Example: VEX1300-03

G36-4-01

## How to Order



Body size		Port size Rc(PT)			Electrical entry
		Port	P, A port	R port	
Body ported	1	01	1/8	1/8	G — Grommet (300mm lead wire) H — Grommet (600mm lead wire) D — DIN connector DO — DIN connector (Without connector)
		02	1/4	1/4	
	3	02	1/4	1/4	
		03	3/8	3/8	
	5	04	1/2	1/2	G — Grommet (300mm lead wire) H — Grommet (600mm lead wire) E — Grommet terminal T — Conduit terminal D — DIN connector
		04	1/2	1/2	
		06	3/4	3/4	
		10	1	1	
	7	10	1	1 1/4	
		12	1 1/4	1 1/4	
	9	14	1 1/2	2	
		20	2	2	
Base mounted	2	Without subplate			G — Grommet (300mm lead wire) H — Grommet (600mm lead wire) D — DIN connector DO — DIN connector (Without connector)
		01	1/8	1/8	
		02	1/4	1/4	

## Model

Model	Operating style		Port size Rc(PT)	
	Air operated	External pilot solenoid	P, A port	R port
Regulator valve	VEX1100	VEX1101	1/8, 1/4	1/8, 1/4
	VEX1200	VEX1201	1/8, 1/4	1/8, 1/4
	VEX1300	VEX1301	1/4, 3/8, 1/2	1/4, 3/8, 1/2
	VEX1500	VEX1501	1/2, 3/4, 1	1/2, 3/4, 1
	VEX1700	VEX1701	1, 1 1/4	1 1/4
	VEX1900	VEX1901	1, 1 1/2	2

## ⚠ Caution

Refer to p.0-33 to 0-36 for Safety Instructions and common precautions.

VEX

AN

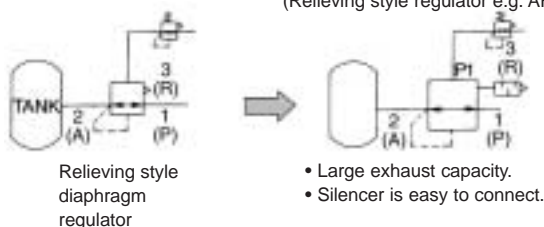
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## Applications

### ① Relief regulator

#### (Rapid tank internal pressure setting)

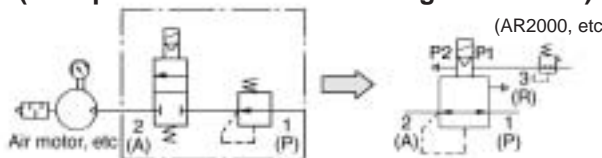
(Relieving style regulator e.g. AR2000)



### ② Air blow

#### (As 2 port directional control regulator valve)

(AR2000, etc.)



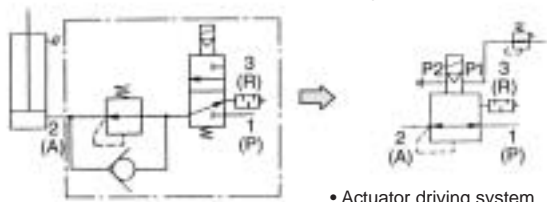
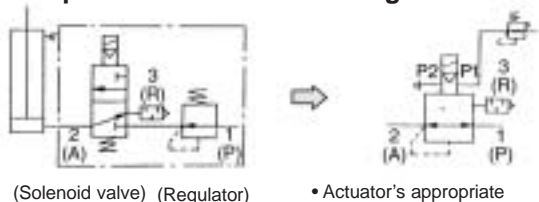
External pilot  
2 port solenoid  
valve  
(For on/off  
operation)

Diaphragm  
regulator  
(For pressure  
setting)

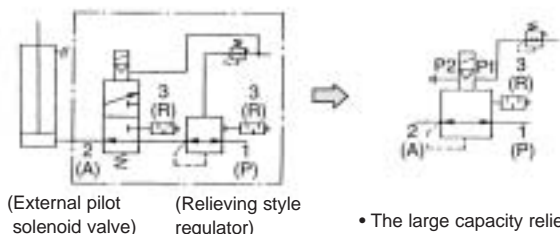
- Solenoid on/off operation controls the air flow.
- Setting can be changed by remote control. (Remote control)

### ③ Constant pressure supply and driving

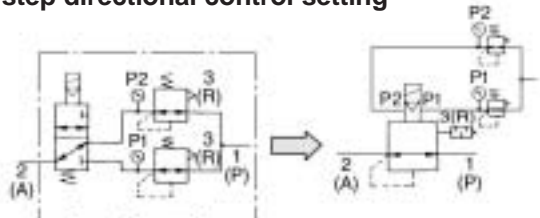
#### (As 3 port directional control regulator valve)



### ④ Balance and driving

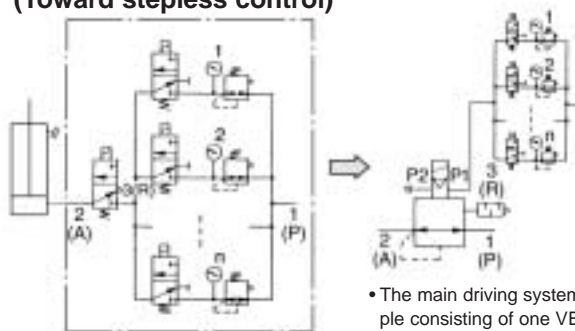


### ⑤ 2 step directional control setting

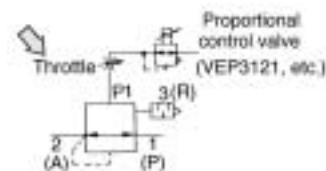


- 3 VALVES IN ONE  
-A simple main system is ensured.
- Remotely controlled by a compact pilot system.

### ⑥ Multiple step pressure control (Toward stepless control)



- The main driving system is simple consisting of one VEX only.
- Remotely controlled by compact pilot system



- Steplessly and remotely controlled by electric signals.
- Flexibility for pressure control for welders.

#### ⚠ Caution

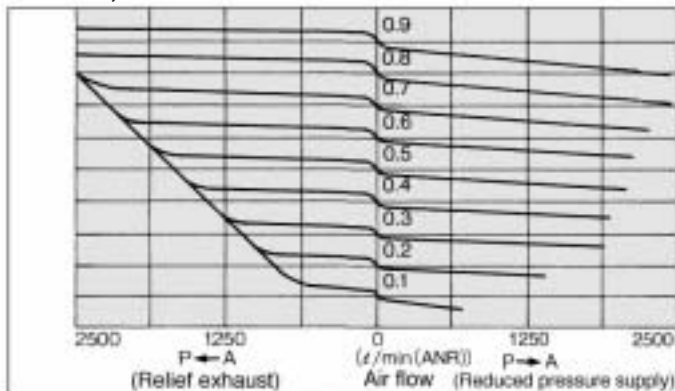
- When the VEX outlet side capacity is small, install a speed controller AS2000, etc., in the pilot pipe to lower the pilot pressure for vibration prevention. (Meter-in)

#### ⚠ Caution

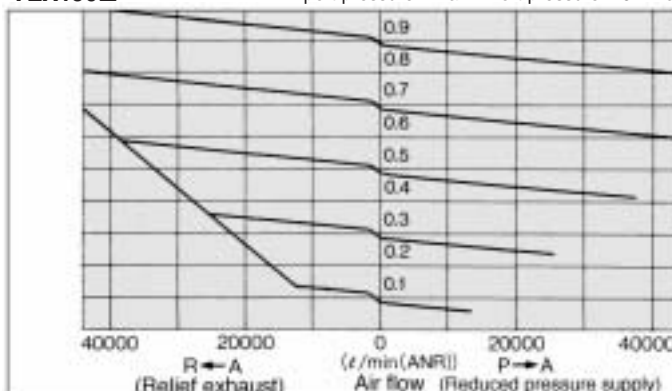
- Relieving style regulator such as AR2000, etc. should be used as pilot regulator in the application.
- Sensitive regulator such as ARP3000, etc. should be used as pilot regulator at low pressure side at especially ⑤ 2 step directional control setting.

## Flow Characteristics

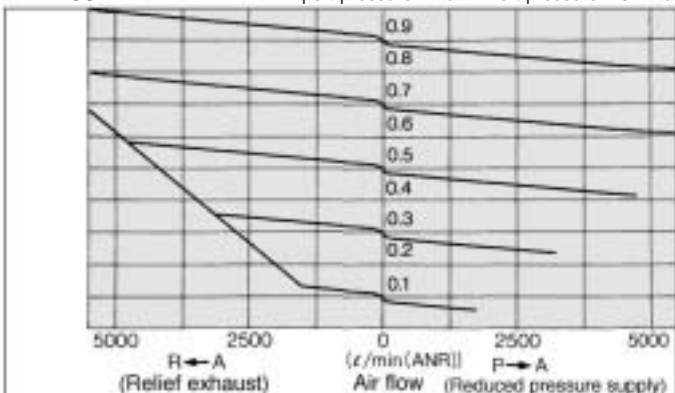
**VEX110□, 120□** A port pressure MPa P Port pressure 1.0 MPa



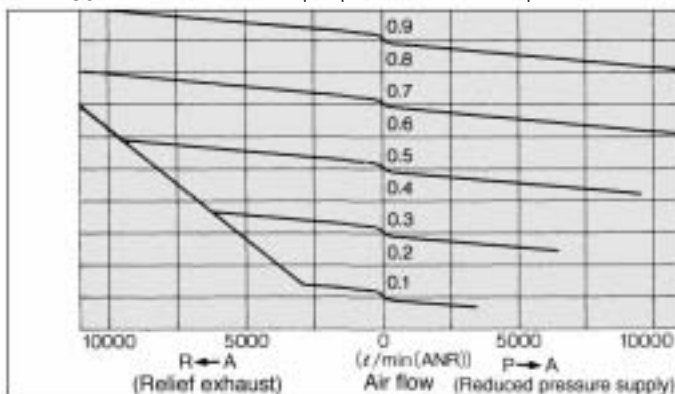
**VEX190□** A port pressure MPa P Port pressure 1.0 MPa



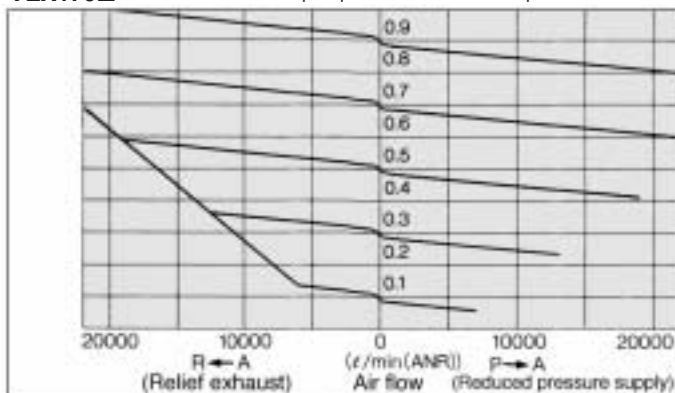
**VEX130□** A port pressure MPa P Port pressure 1.0 MPa



**VEX150□** A port pressure MPa P Port pressure 1.0 MPa

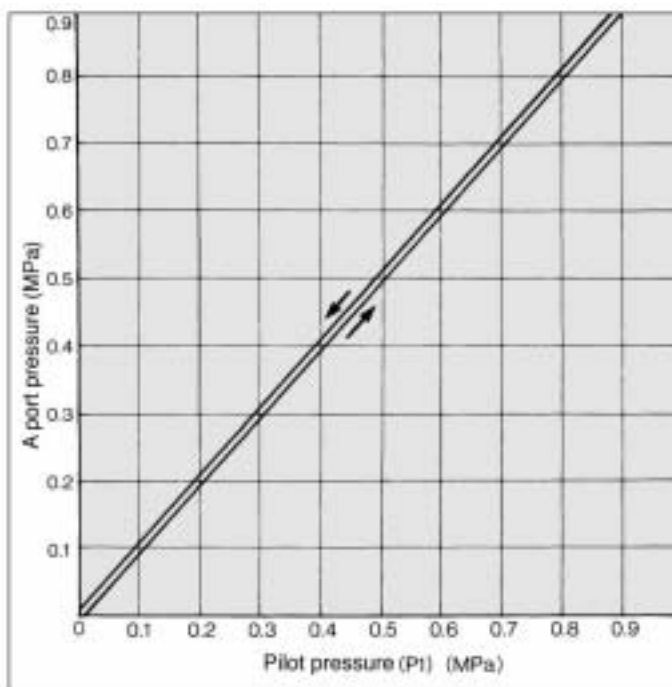


**VEX170□** A port pressure MPa P Port pressure 1.0 MPa



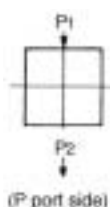
## Setting Pressure Characteristics

A port pressure is set in accordance with pilot pressure

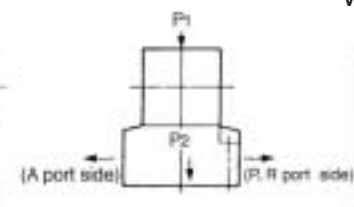


## External Pilot Piping

**VEX110□**



**VEX120□**



**VEX130□**

**VEX170□**

**VEX150□**

**VEX190□**



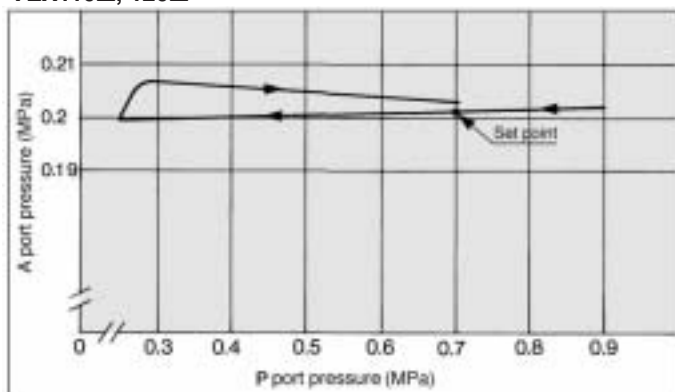
Port	VEX1□00	VEX1□01
P1	External Pilot	External Pilot
P2	—	Pilot exhaust

## Pressure Characteristics

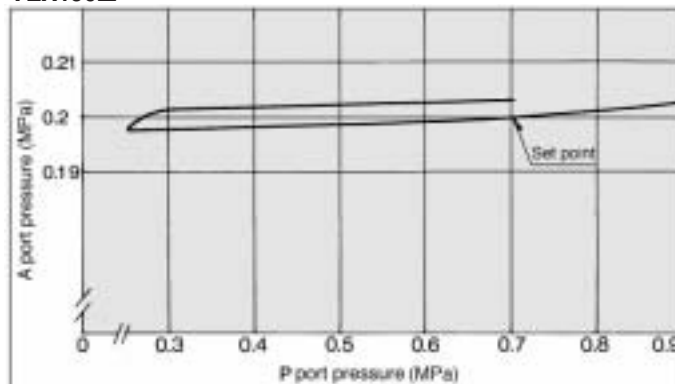
Shown the change of secondary pressure (A port) to the change of supply pressure (P port).

As per JIS B8372 (Pneumatic regulator)

VEX110□, 120□

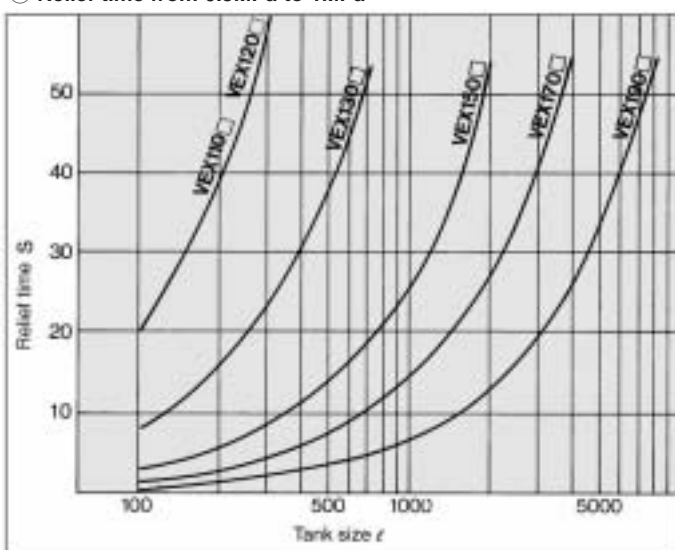


VEX190□

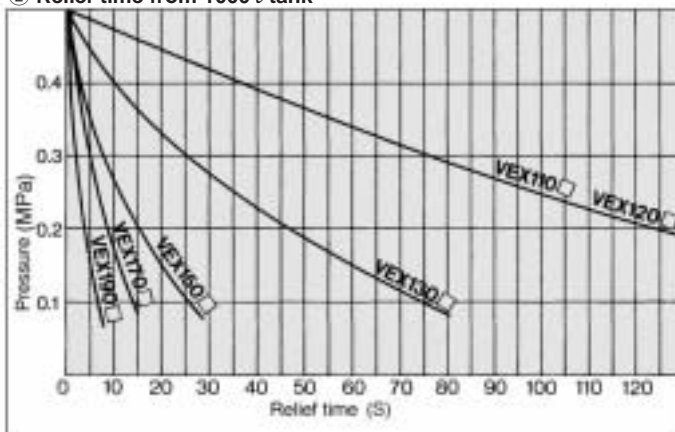


## Relief Time

① Relief time from 0.5MPa to 1MPa



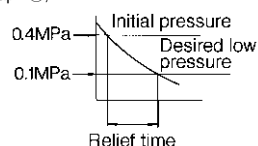
② Relief time from 1000 l tank



③ Relief time from an arbitrary pressure

[Example] VEX 1500 lowers 2000l tank from 0.4MPa to 0.1MPa:

a) In graph ②,



From the above, the relief time is 26-3=23S

b) Then, the relief time for the 2000l tank is found by conversion as shown below.

$$t = \frac{\text{Tank capacity}}{1000} \times \left[ \text{Relief time that is read} \right]$$

$$= \frac{2000}{1000} \times 23$$

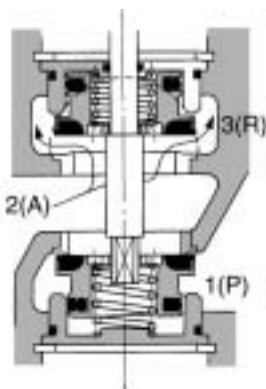
$$= 46$$

The result is 46S.

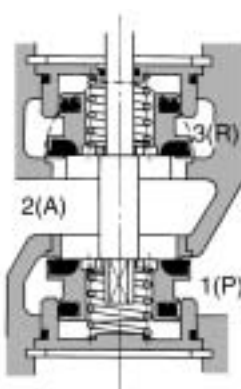


## Construction/Operation Principles/Component Parts

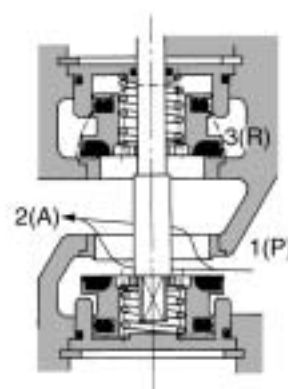
[1] When A port pressure is high.



[2] Setting pressure condition

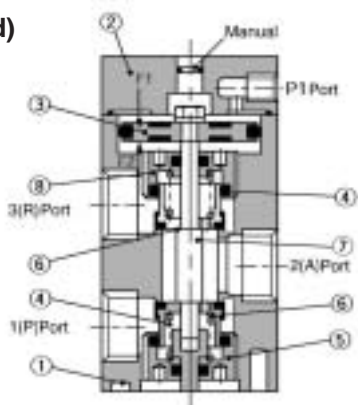


[3] When A port pressure is low.  
Pressure reducing supply.

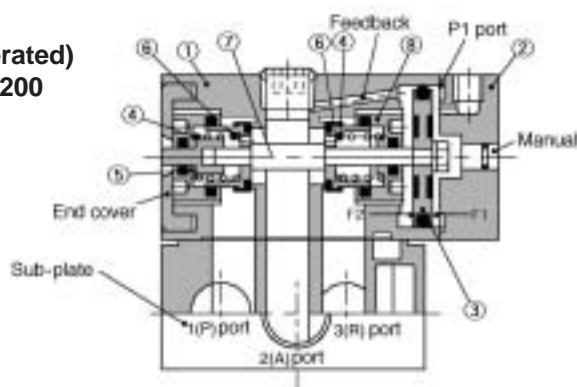


- The balance between the acting force  $F_1$  of the pilot pressure (P1 port) over the upper surface of the pressure regulating piston (3) and the acting force  $F_2$  of the pressure at A port leading to a space under the piston through the feed back flow root closes a couple of poppet valves (6) and sets A port pressure that corresponds to P1 port pressure. The poppet valves are backed up by spring (4) in the pressure balance structure by means of A port pressure. (DRW(2))
- When A port pressure exceeds P1 port pressure,  $F_2$  becomes larger than  $F_1$ , and the pressure regulating piston moves upward, opening the upper poppet valves. Thus air is released from A port to R port. (DRW(1)) When A port pressure lowers enough to restore the balance, the regulator valve returns again to the DRA (2) condition.
- When A port pressure is lower than P1 port pressure,  $F_1$  becomes larger than  $F_2$ , and the pressure regulating piston moves downwards, opening the lower poppet valves. Thus air is supplied from P port to A port. (DRW(3)) When A port pressure rises enough to restore the balance, the regulator valve returns again to the DRW(2) condition.

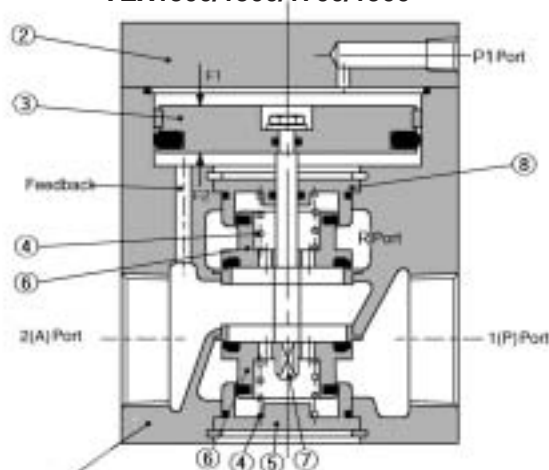
(Air operated)  
VEX1100



(Air operated)  
VEX1200



(Air operated)  
VEX1300/1500/1700/1900



Component Parts

No.	Description	Material
①	Body	Aluminium alloy die cast
②	Cover	Aluminium alloy die cast
③	Piston	Aluminium alloy
④	Spring	Stainless steel
⑤	Valve guide	Aluminium alloy
⑥	Poppet valve	Aluminium alloy, NBR
⑦	Shaft	Stainless steel
⑧	Valve guide	Aluminium alloy

VEX

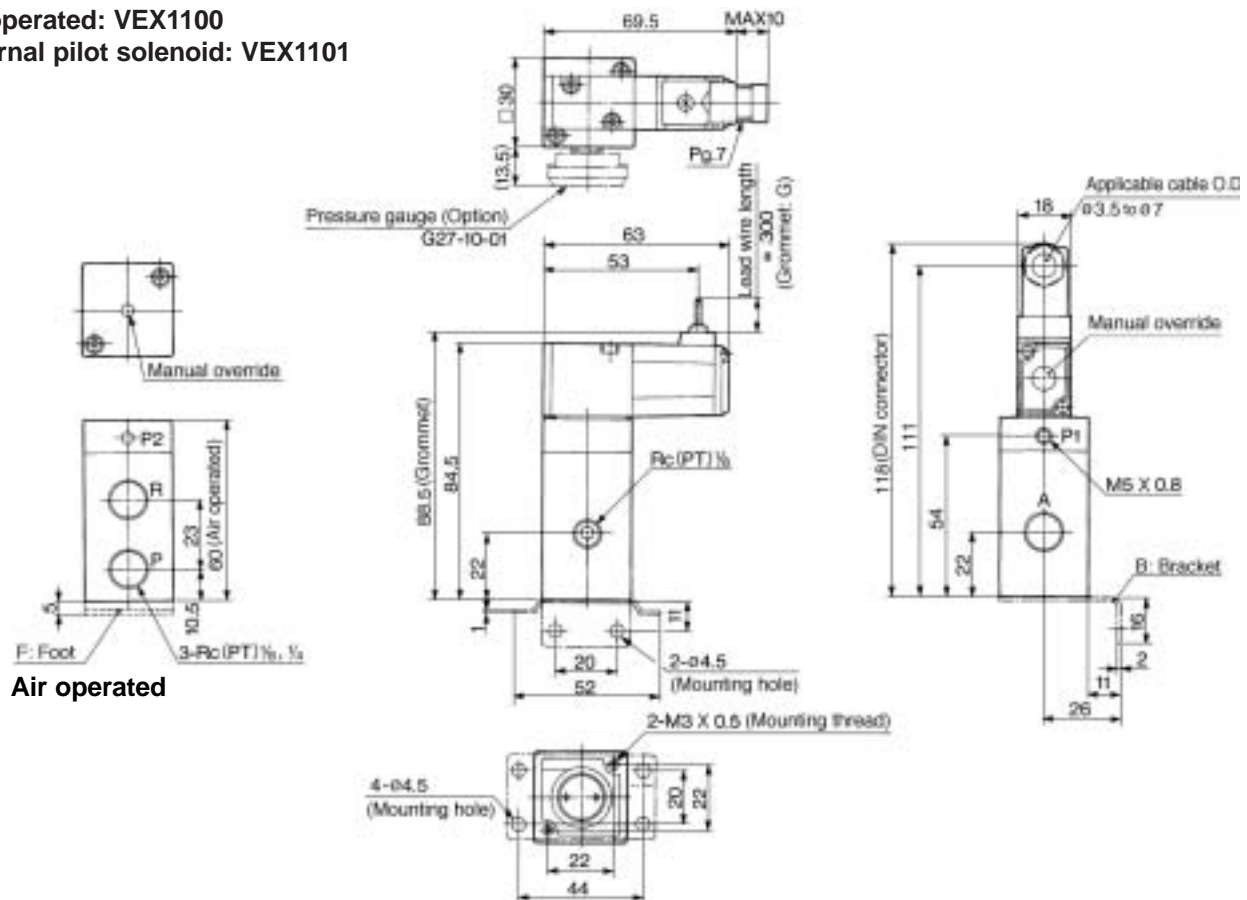
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## Dimensions

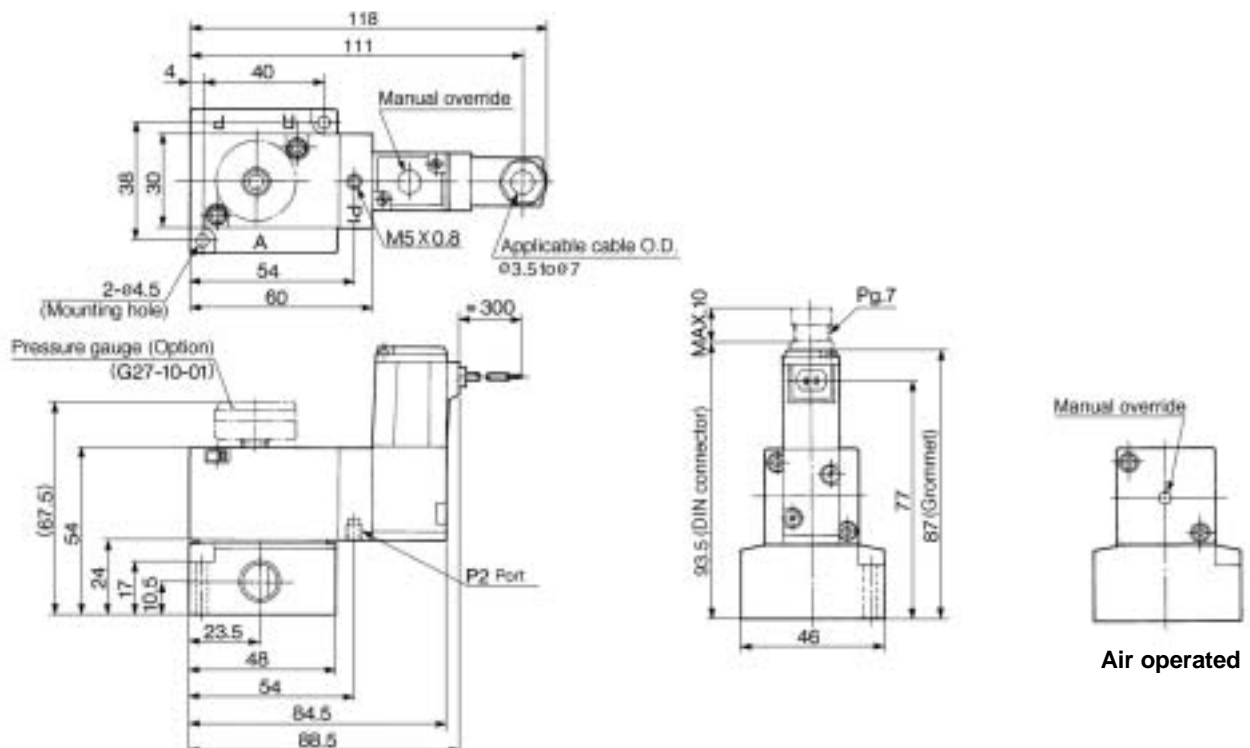
Air operated: VEX1100

External pilot solenoid: VEX1101



Air operated: VEX1200

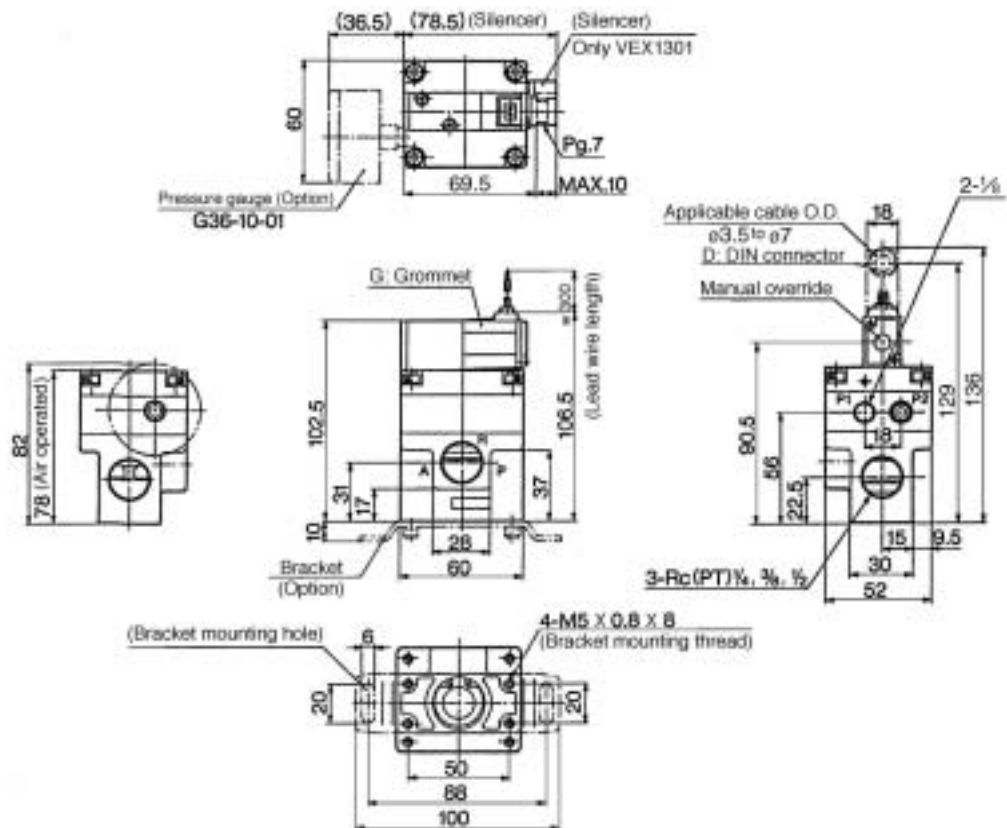
External pilot solenoid: VEX1201



## Dimensions

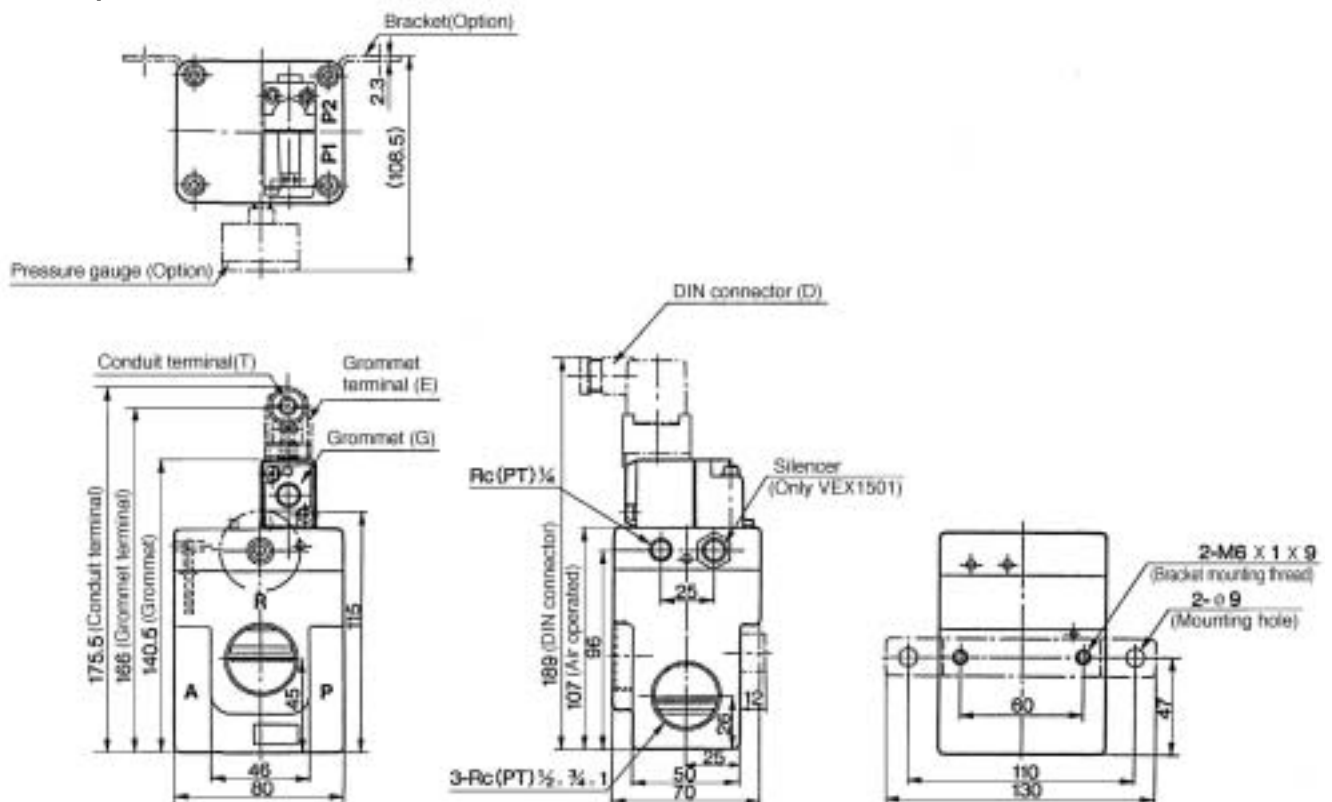
Air operated: VEX1300

External pilot solenoid: VEX1301



Air operated: VEX1500

External pilot solenoid: VEX1501



VEX

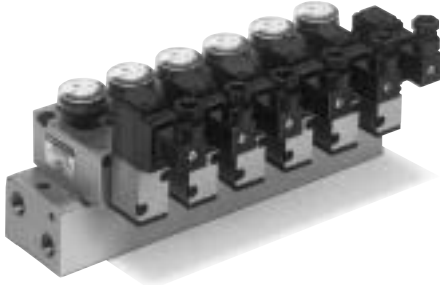
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# Series VEX1 Manifold



## Specifications

Valve stations	2 to 8 <sup>(1)</sup>
Passage specifications	Common SUP, EXH
Port size P, A, R port	Rc(PT), NPTF, G(PF), NPT 1/4
Applicable valve	VEX1200, VEX1201 <sup>(2)</sup>
Applicable blank plate	VEX1-17 (With gasket, bolt)

Note 1) When there are 5 stations or more, pressurize from P ports on both sides and exhaust from R ports on both sides.

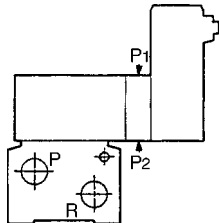
Note 2) Manifold base P1 (pilot port) is not used for VEX1200 (air operated) and VEX1201 (external pilot solenoid operated) because both are of an individual external pilot.

## How to Order

VVEX2-1-6-02

### External Pilot Piping

Valve port	Style	Air operated	External pilot solenoid valve
Valve		VEX1200	VEX1201
P1		External pilot	External pilot
P2		—	Pilot exhaust



Series VEX1  
Manifold

Stations

2	2 stations
⋮	⋮
8	8 stations

Port thread

—	Rc(PT)
T	NPTF
F	G(PF)
N	NPT

P, A, R port size

02	Rc(PT)1/4
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### How to Order Manifold

Please order the appropriate regulator valve and/or blank plate with manifold base.

(Ex.) VVEX2-1-5-02N.....1 5 stations manifold base, port thread NPT

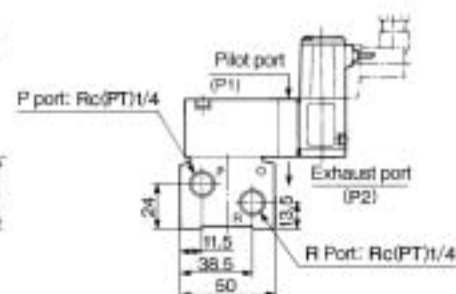
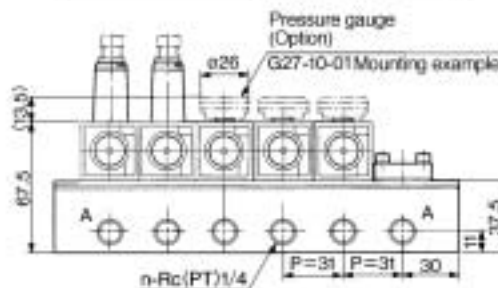
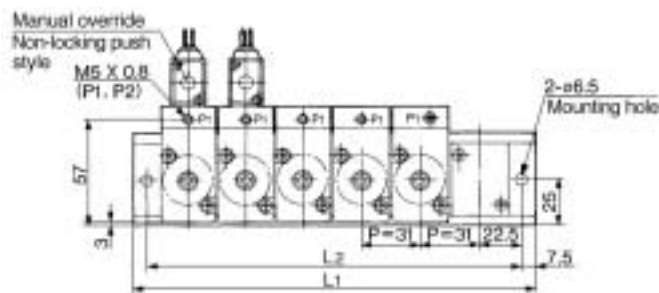
\* VEX1201-5DOZ-G...4 Regulator valve, External pilot solenoid valve, 24V DC, DIN connector (without connector), with indicator light and surge voltage suppressor, Option...With pressure gauge <sup>(1)</sup>

\* VEX1-17.....1 Blank plate

Note 1) In case of manifold, pressure gauge: Only G27-10-01(O.D.φ26)

## Dimensions

VVEX2-1-1- Station -02



n: Station

L	n	2	3	4	5	6	7	8	Calculation
L1		91	122	153	184	215	246	277	L1=31Xn+29
L2		76	107	138	169	200	231	262	L2=31Xn+14

VEX

AN

AMC

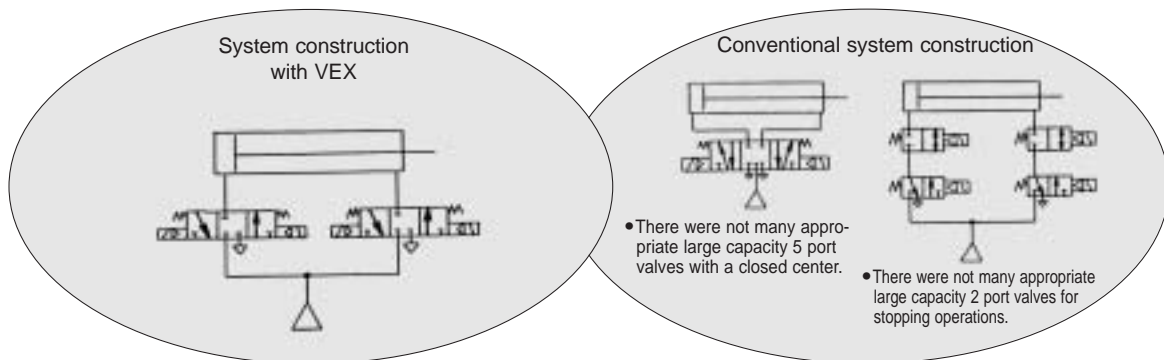
# Power Valve

## 3 Position Valve

# Series VEX3

A variety of circuits in simple construction

■ Intermediate and emergency stops with a large size cylinder



## Cylinder Speed

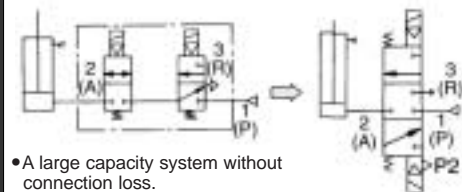
This table should be used as a guide only, because the cylinder speed is subject to the equipment in the piping. For details, refer to the cylinder working capacity and maximum working speed data on p.5.1-15.

Condition: Pressure 0.5MPa, Load 50%, Piping length 5m

		Effective area mm <sup>2</sup> (Cv) <div>Port size Rc(PT)</div>	Cylinder speed (mm/s)	Bore size (mm)											
				ø40	ø50	ø63	ø80	ø100	ø125	ø140	ø160	ø180	ø200	ø250	ø300
Body ported	VEX312□ -01, 02	25(1.4) <div>02 (1/4)</div>	250												
			500												
			750												
	VEX332□ -02, 03, 04	60(3.3) <div>03 (3/8)</div>	250												
			500												
			750												
	VEX350□ -04, 06, 10	160(8.9) <div>06 (3/4)</div>	250												
			500												
			750												
	VEX370□ -10, 12	300(17) <div>10(1)</div>	500												
			750												
			1000												
	VEX390□ -14, 20	590(33) <div>14(1 1/2)</div>	500												
			750												
			1000												
Base mounted	VEX322□ -01, 02	25(1.4) <div>02 (1/4)</div>	250												
			500												
			750												
	VEX342□ -02, 03, 04	70(3.9) <div>04(1/2)</div>	250												
			500												
			750												

## Intermediate and emergency cylinder stops

The 3 position closed center valve materializes a simple and large capacity system.



- A large capacity system without connection loss.

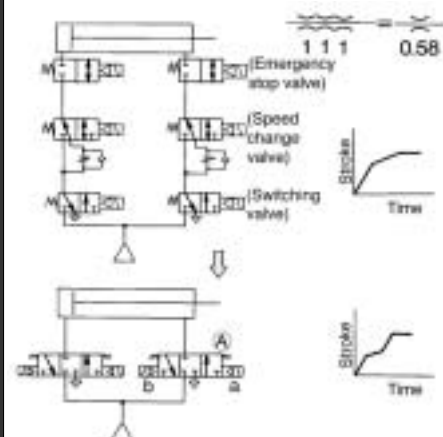
$$\frac{11}{11} = \frac{0.71}{0.71}$$

(Valves and piping can be made smaller.)

## Terminal deceleration and an intermediate speed change circuit can be materialized easily.

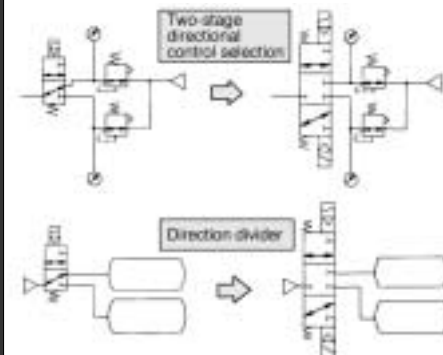
The simple system configuration permits sharp response. The large capacity system configuration without connection loss allows the use of smaller valves and piping.

- For example when the solenoid (b) of the valve (A) is turned off while the cylinder is forwarding, the exhaust port closes and cylinder movement decelerates.



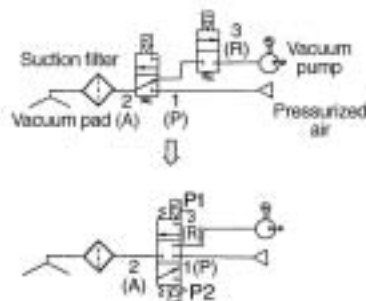
## Universal porting for use as a selector/divider valve

The pressure balancing poppet valve that permits any flow direction allows sequential switching operation, preventing blow by and air entrainment.



## Vacuum suction and release

The 3 port, 3 position double solenoid that permits vacuum suction, release, and suspension (closed) is ideal for a system where many valves are used.



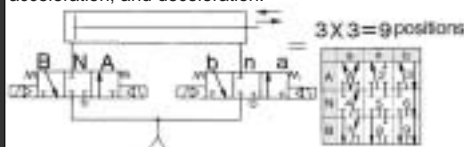
- Sequential switching operation prevents the inflow of pressurized air into the vacuum pump system.

### ⚠ Caution

- To maintain the vacuum of port A via the closed center, be aware that the vacuum could be decreased due to a leakage from the vacuum pad and the piping. Furthermore, it cannot be used as an emergency cutoff valve.

## For operation control of double acting cylinders

Two power valves driven by a double acting cylinder allows operation control in 9 positions (3 positions X 3 positions = 9 positions) including slow stopping, acceleration, and deceleration.



- |   |                              |
|---|------------------------------|
| 3 | } — Reciprocation            |
| 7 |                              |
| 1 | — Pressure center            |
| 5 | — Closed center              |
| 9 | — Exhaust center             |
| 2 | } — Pressure & closed center |
| 4 |                              |
| 6 | } — Exhaust & closed center  |
| 8 |                              |
- } Slow stopping or deceleration

### ⚠ Caution

- This valve is not a non-leak specification, and thus cannot be used for a long term intermediate stops or emergency stops.

VEX

AN

AMC

How to Order



Body size		Port size	
Body size	Port size		
	Port	P, A port	R port
12	01	1/8	
	02	1/4	
32	02	1/4	
	03	3/8	
	04	1/2	
50	04	1/2	
	06	3/4	
	10	1	
70	10	1	1 1/4
	12	1 1/4	
90	14	1 1/4	2
	20	2	

Electrical entry (Only solenoids)

Body size	Symbol	Electrical entry
12	G	Grommet, 300mm lead wire
	H	Grommet, 600mm lead wire
	L	L plug connector, with lead wire
	LN	L plug connector, without lead wire
	LO	L plug connector, without connector
	M	M plug connector, with lead wire
	MN	M plug connector, without lead wire
	MO	M connector, without connector
32	D	DIN connector
	DO	DIN terminal, without connector
	G	Grommet, 300mm lead wire
	H	Grommet, 600mm lead wire
	E	Grommet terminal
	T	Conduit terminal
	D	DIN connector

Body ported

VEX3 12 0 01 5 D B

Base mounted

VEX3 22 0 01 5 D B



- Operation
- 0 — Air operated
  - 1 — External pilot solenoid
  - 2 — Internal pilot solenoid

● Body size		● Port size	
Body size	Port size		
	Port	P, A port	R port
22	—	Without subplate	
	01	1/8	
	02	1/4	
42	—	Without subplate	
	02	1/4	
	03	3/8	
	04	1/2	

- Thread
- Rc(PT)
  - T — NPTF
  - F — G(PF)
  - N — NPT

- Voltage (Only solenoids)
- 1 — 100V AC (50/60Hz)
  - 2 — 200V AC (50/60Hz)
  - 3\* — 110V AC (50/60Hz)
  - 4\* — 220V AC (50/60Hz)
  - 5 — 24V DC
  - 6\* — 12V DC
  - 7\* — 240V AC (50/60Hz)
  - 9 — Other
- \* Option

- Option
- B — Bracket (Except VEX332□)
  - F — Foot (Only VEX312□, VEX332□)
  - N — Silencer for pilot exhaust (P<sub>2</sub>) port (Only solenoids)
- Indicator light and surge voltage suppressor
- None
  - S — With surge voltage suppressor
  - Z — With indicator light and surge voltage suppressor (Except for grommet)

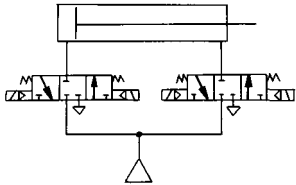
Symbol	Electrical entry
G	Grommet, 300mm lead wire
H	Grommet, 600mm lead wire
L	L plug connector, with lead wire
LN	L plug connector, without lead wire
LO	L plug connector, without connector
M	M plug connector, with lead wire
MN	M plug connector, without lead wire
MO	M plug connector, without connector
D	DIN connector
DO	DIN terminal, without connector

⚠ Caution

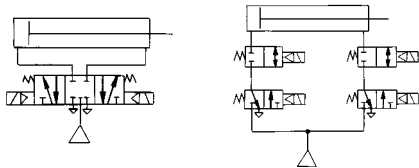
Refer to p.0-33 to 0-36 for Safety Instructions and common precautions



Variety of circuits in simple construction  
3 position valve suitable for intermediate  
and emergency stop of large size cylinder.  
System construction with VEX

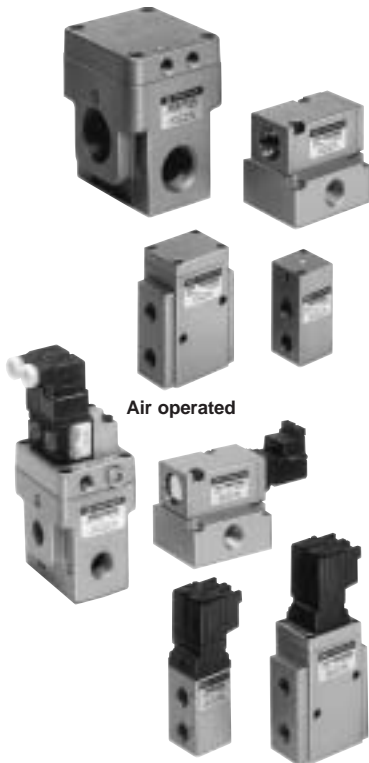


Conventional system construction



• There were not many appropriate large capacity 5 port valves of a closed center.

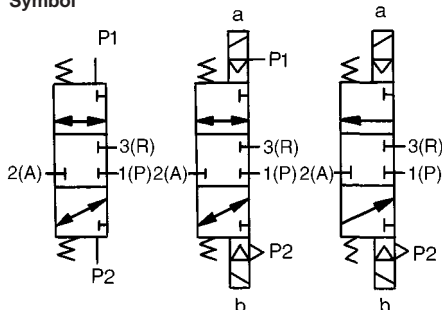
• There were not many appropriate 2 port valves for stopping operation.



Air operated

Internal pilot solenoid/External pilot solenoid

Symbol



Air operated

External pilot solenoid

Internal pilot solenoid

## Specifications

Model	Body ported	VEX312□- <sup>01</sup> <sub>02</sub>	VEX332□- <sup>02</sup> <sub>03 04</sub>	VEX350□- <sup>04</sup> <sub>06 10</sub>	VEX370□- <sup>10</sup> <sub>12</sub>	VEX390□- <sup>14</sup> <sub>20</sub>							
	Base mounted	VEX322□- <sup>01</sup> <sub>02</sub>	VEX342□- <sup>02</sup> <sub>03 04</sub>	—	—	—							
Operation		Air operated, External pilot solenoid, Internal pilot solenoid											
Fluid		Air											
Proof pressure		1.5MPa											
Set pressure range	Air operated	Low vacuum to 1.0MPa											
		External pilot pressure 0.2 to 1.0MPa											
	External pilot solenoid	Low vacuum to 1.0MPa											
		External pilot pressure 0.2 to 0.7MPa		External pilot pressure 0.2 to 0.9MPa									
	Internal pilot solenoid	0.2 to 0.7MPa		0.2 to 0.9MPa									
Ambient and fluid temperature		Max. 50°C (Air operated: 60°C)											
Response time		40ms or less (Pilot pressure 0.5MPa)		60ms or less (Pilot pressure 0.5MPa)									
Max. operating frequency		3 cycles/s											
Mounting		Free											
Lubrication		Not required (Use turbine oil No.1, ISO VG32, if lubricated)											
Port size Rc(PT)	Port	01	02	02	03	04	04	06	10	10	12	14	20
	P									1		1½	
	A	1/8	1/4	1/4	3/8	1/2	1/2	3/4	1		1¼		2
	R										1¼		
Effective area	mm²	16	25	36	60	70	130	160	180	300	330	590	670
	Cv	0.9	1.4	2.0	3.3	3.9	7.2	8.9	10	17	18	33	37

## Solenoid Specifications

Model	VEX3121, VEX3221, VEX3321, VEX3421 VEX3122, VEX3222, VEX3322, VEX3422	VEX3501, VEX3701, VEX3901 VEX3502, VEX3702, VEX3902
Pilot valve	Exclusive pilot valve	VO307-□□□
Electrical entry	Grommet, L plug connector, M plug connector	Grommet, Grommet terminal, Conduit terminal, DIN Connector
Coil rated voltage (V)	AC(50/60Hz) DC	100V, 110V, 200V, 220V, 240V 6V, 12V, 24V, 48V
Allowable voltage	-15% to + 10% rated voltage	
Coil insulation	Class E (120°C)	
Temperature rise	45°C or less (Rated voltage)	
Apparent power	AC	Inrush Holding
Power consumption	1.8W	
	4.8W	
Manual override	Non-locking push	

## Option

Parts name		Part No.						
		VEX312□- <sup>01</sup> <sub>02</sub>	VEX322□- <sup>01</sup> <sub>02</sub>	VEX332□- <sup>02</sup> <sub>03 04</sub>	VEX342□- <sup>02</sup> <sub>03 04</sub>	VEX350□- <sup>04</sup> <sub>06 10</sub>	VEX370□- <sup>10</sup> <sub>12</sub>	VEX390□- <sup>14</sup> <sub>20</sub>
Bracket (With bolt and washer)	B	VEX1-18-1A	—	—	—	VEX5-32A	VEX7-32A	VEX9-32A
Foot (With bolt and washer)	F	VEX1-18-2A	—	VEX3-32-2A	—	—	—	—
Pilot exhaust (P2) port silencer	N	AN120-M5		AN103-01		AN210-02		

## Weight (kg)

Model	VEX312□-01 02	VEX322□-01 02	VEX332□-02 03 04	VEX342□-02 03 04	VEX350□-04 06 10	VEX370□-10 12	VEX390□-14 20
Air operated	0.1	0.2	0.3	0.6	1.4	2.1	3.3
Solenoid	0.2	0.3	0.4	0.7	1.6	2.3	3.5

VEX

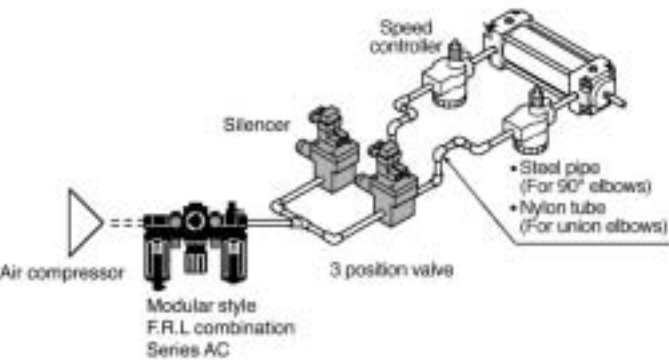
AN

AMC

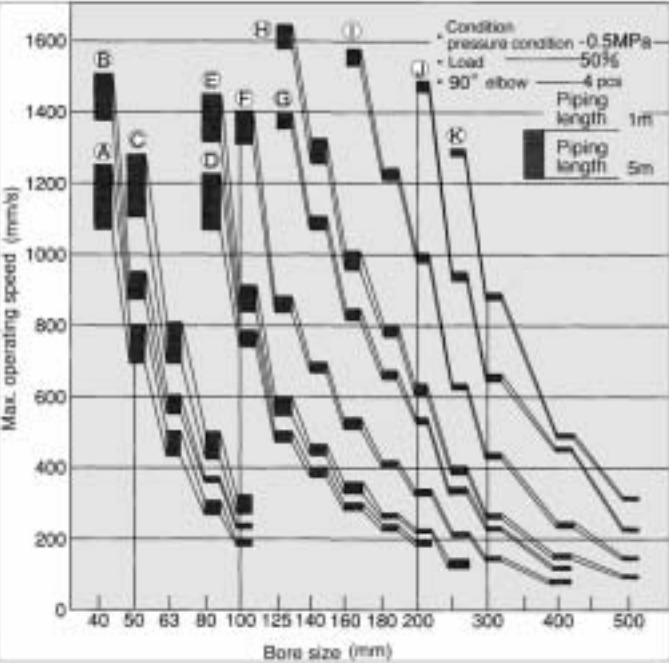
# VEX3

## Cylinder Speed

### System



### Max. Working speed



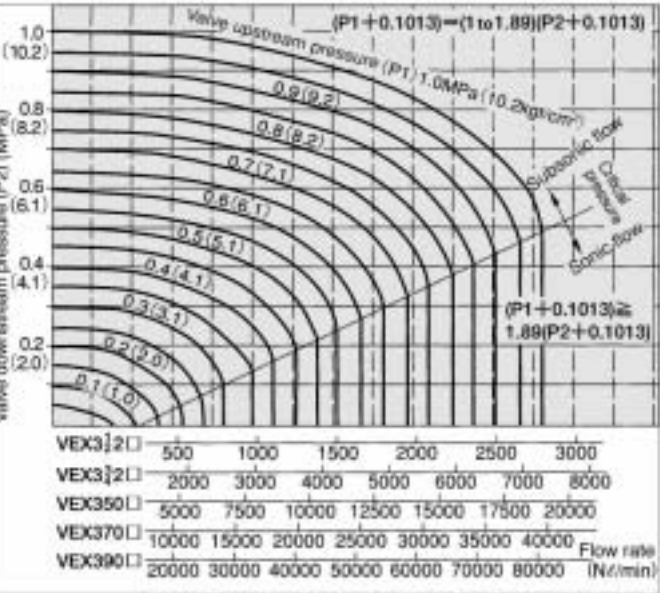
System	Solenoid valve	Speed controller	Silencer	Port size	Fitting (One side) 4 pcs
(A)	VEX3 $\frac{1}{2}$ 2□	AS4000	AN200	T1075* (ø10)	DL10-02
(B)	VEX3 $\frac{1}{2}$ 2□	AS4000	AN200	T1209* (ø12)	DL12-02
(C)	VEX3 $\frac{3}{4}$ 2□	AS420	AN300	T1209* (ø12)	DL12-03
(D)	VEX3 $\frac{3}{4}$ 2□	AS420	AN400	SGP1½ B	90° elbow
(E)	VEX350□	AS420	AN400	SGP1½ B	90° elbow
(F)	VEX350□	AS500	AN500	SGP¾ B	90° elbow
(G)	VEX350□	AS600	AN600	SGP1B	90° elbow
(H)	VEX370□	AS600	AN600	SGP1B	90° elbow
(I)	VEX370□	AS700	AN700	SGP1¼ B	90° elbow
(J)	VEX390□	AS800	AN800	SGP1½ B	90° elbow
(K)	VEX390□	AS900	AN900	SGP2B	90° elbow

\* Nylon tube No.

### Caution

- The cushion incorporated in the cylinder has a limit to the relationship between maximum working speed and load. Please check it with the cylinder catalog.
- When the load factor is 0% (no load), the maximum working speed will be 1.2 times, and when the load factor is 75%, it will be 0.7 times.

## Flow Characteristics



When air is used, the flow characteristics are subject to  $P_1$  (MPa),  $P_2$  (MPa)  $\Delta P$  (MPa), and the distinction between sonic and subsonic flow.

① Equation in the domain of subsonic flow.

Calculation by effective area

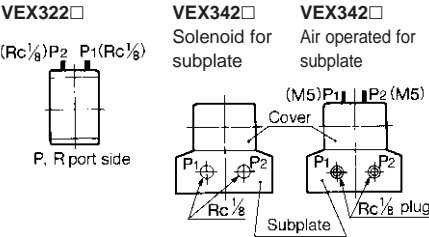
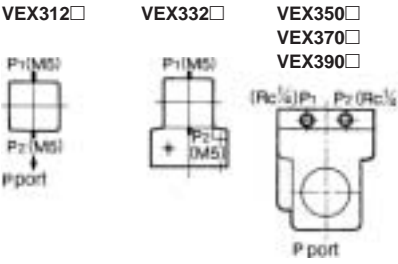
$$Q = 226S \sqrt{\frac{\Delta P(P_2 + 0.1013)}{G}} \cdot \sqrt{\frac{273}{273 + \theta}} \dots \text{l/min(ANR)}$$

② Equation in the domain of sonic flow.

$$Q = 113S(P_1 + 0.1013) \cdot \frac{1}{\sqrt{G}} \cdot \sqrt{\frac{273}{273 + \theta}} \dots \text{l/min(ANR)}$$

Q: Flow rate (l/min)  
 $\Delta P$ : Pressure differential (MPa)  
 $P_1$ : Upstream pressure (MPa)  
 $P_2$ : Downstream pressure (MPa)  
G: Specific gravity (Air = 1)  
 $\theta$ : Temperature (°C)  
S: Effective area (mm<sup>2</sup>)

## External Pilot Piping

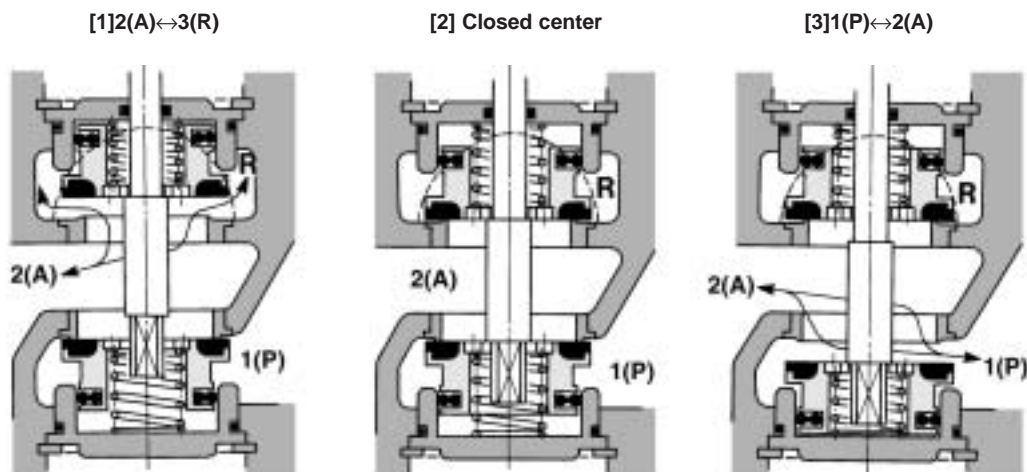


Port	VEX3□□0	VEX3□□1	VEX3□□2
P1	External pilot	External pilot	Plug
P2	External pilot	Pilot exhaust	Pilot exhaust

### Caution

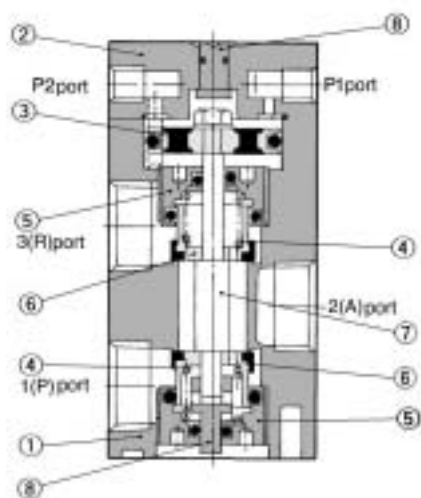
When the VEX3420 air operated power valve is delivered from our factory, the M5 threaded pilot ports P1 and P2 in the cover are open and the Rc1/8" pilot port in the subplate is plugged. Before connecting pipes to P1 and P2 ports in the subplate, remove the 1/8" plug from the subplate and put M5 plugs into P1 and P2 ports in the cover. M5 plug - M-5P

## Construction/Operation Principles

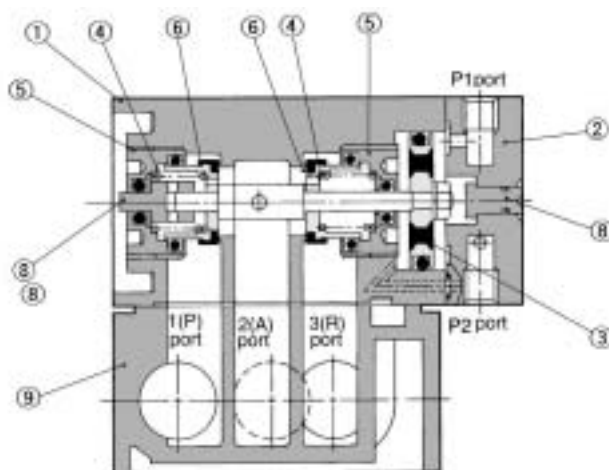


- This is a 3 port switch valve in which the shaft ⑦- extending from the driving piston ③ opens/closes a pair of poppet valves ⑥. The poppet valve has a pressure balancing mechanism in which A port pressure is constantly applied from the back and the center spring ④ is acting as a backup.
- When neither the pilot solenoid valve "a" nor "b" are energized (or when air is exhausted both from the P1 and P2 ports of the air-operated style), no force will act on the working piston, and the spring closes the poppet valve, thus the valve assuming the closed center position. ([2])
- When the pilot solenoid valve "a" is energized (or when pressurized air enters through the P1 port of the air operated style), pilot air that enters the space above the working piston pushes down the piston and opens the lower poppet valve, thus connecting the P port and A port. ([3]) The upper poppet valve continues to close the R port by means of pressure balance and the spring.
- When the pilot solenoid valve "b" is energized (or when pressurized air enters through the P2 port of the air-operated style), the pilot air that enters the space under the working piston pushes the piston upward and opens the upper poppet valve, thus connecting the A port and R port. ([1]) The lower poppet valve continues to close the P port by means of pressure balance and the spring.

VEX3120(Air operated)



VEX3220(Air operated)



VEX

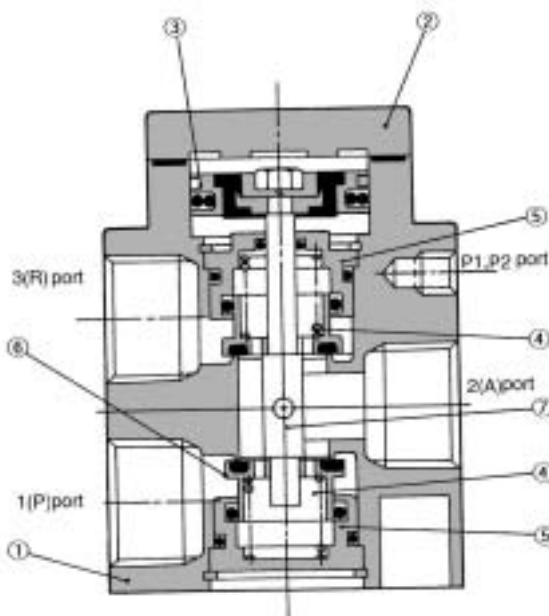
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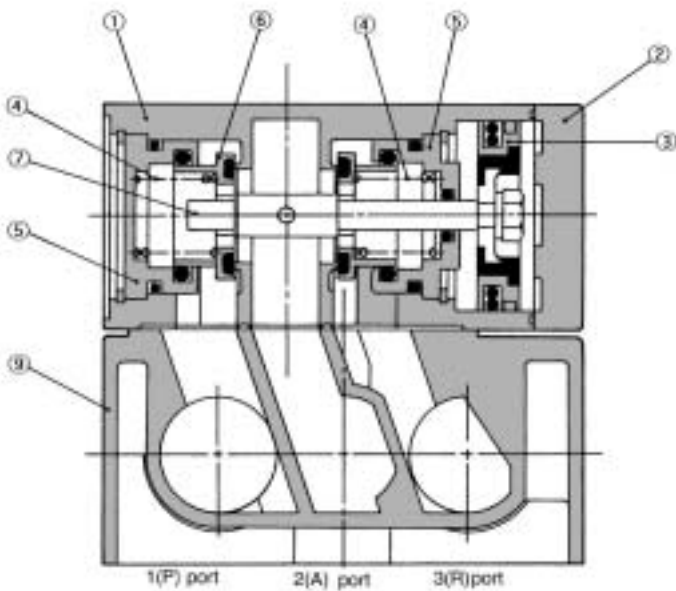
# VEX3

## Construction (Component Parts)

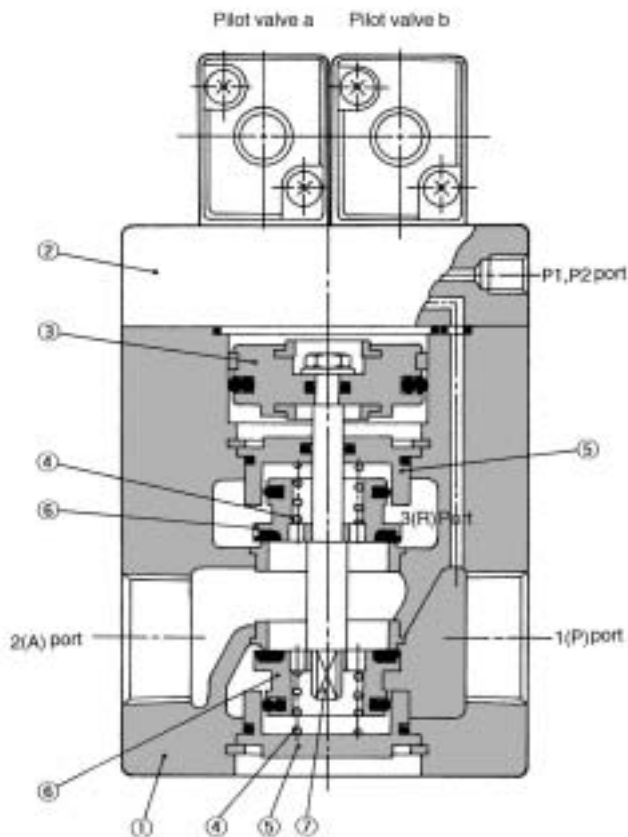
VEX3320 (Air operated)



VEX3420 (Air operated)



VEX350□, 370□, 390□ (Solenoid)



### Component Parts

No.	Description	Material
①	Body	Aluminium alloy
②	Cover	Aluminium alloy
③	Working piston	Aluminium alloy
④	Center spring	Stainless steel
⑤	Valve guide	Aluminium alloy
⑥	Poppet valve	Aluminium alloy, NBR
⑦	Shaft	Stainless steel
⑧	Manual override	P.O.M
⑨	Sub-plate	Aluminium alloy

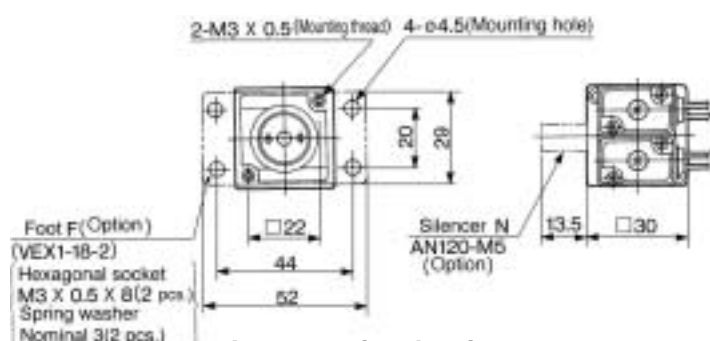


## Body Ported/VEX312□

Air operated: VEX3120

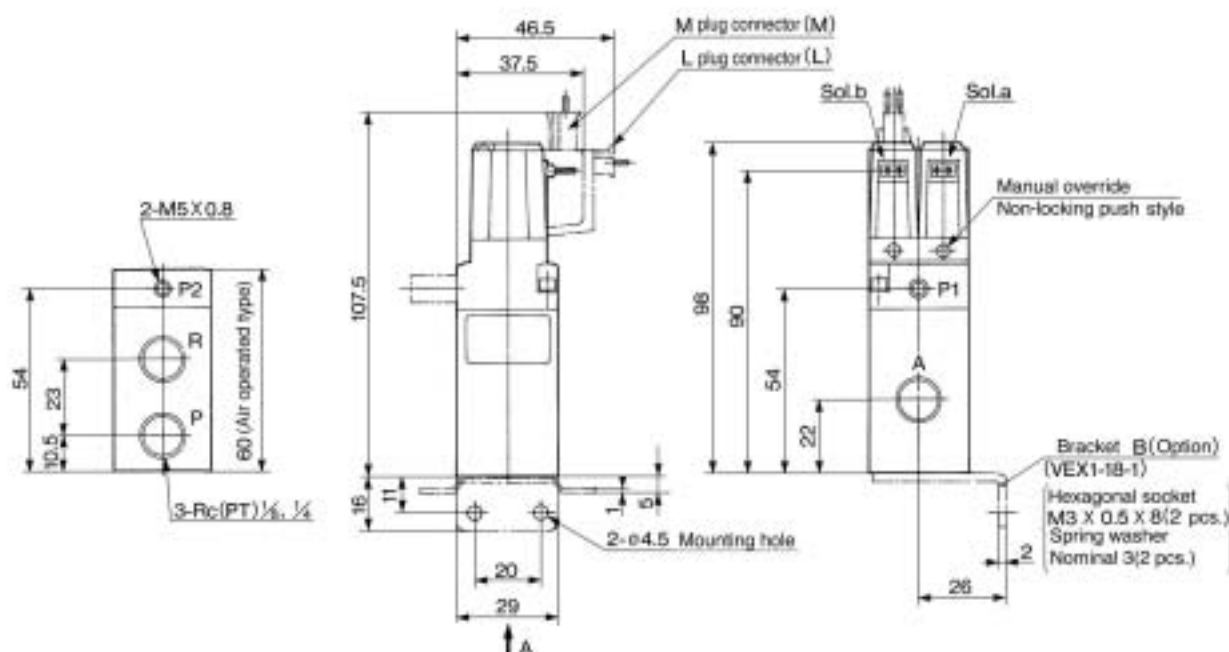
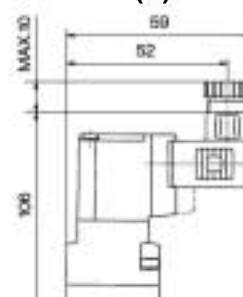
External pilot solenoid: VEX3121

Internal pilot solenoid: VEX3122



A perspective drawing

### DIN connector (D)

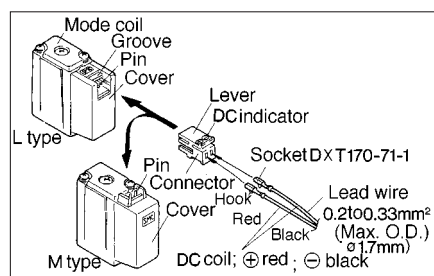


## ⚠ Caution

How to Use of Plug Connector Applicable Model: VEX312<sup>1</sup><sub>2</sub>, 322<sup>1</sup><sub>2</sub>, 332<sup>1</sup><sub>2</sub>, 342<sup>1</sup><sub>2</sub>

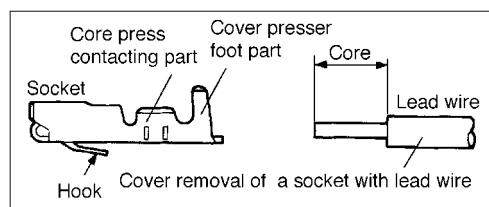
### Connection/Disconnection of a plug

- ① Push the connector straight on the pins of the solenoid, making sure the lip of the lever is securely positioned in the groove on the solenoid cover.
- ② Press the lever against the connector and pull the connector away straightly from the solenoid.



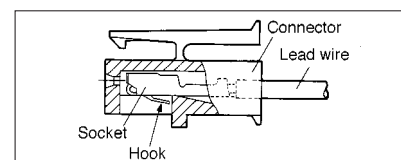
### Crimping lead wire and socket

Peel 3.2 to 3.7 mm of the tip of the lead wire, enter the core wires neatly into a socket and press contact it by a press tool. Be careful so that the cover of lead wire does not enter into the core press contacting part. (Press contacting tool: No. DXT 170-75-1)



### Connection/Disconnection of socket with lead wire

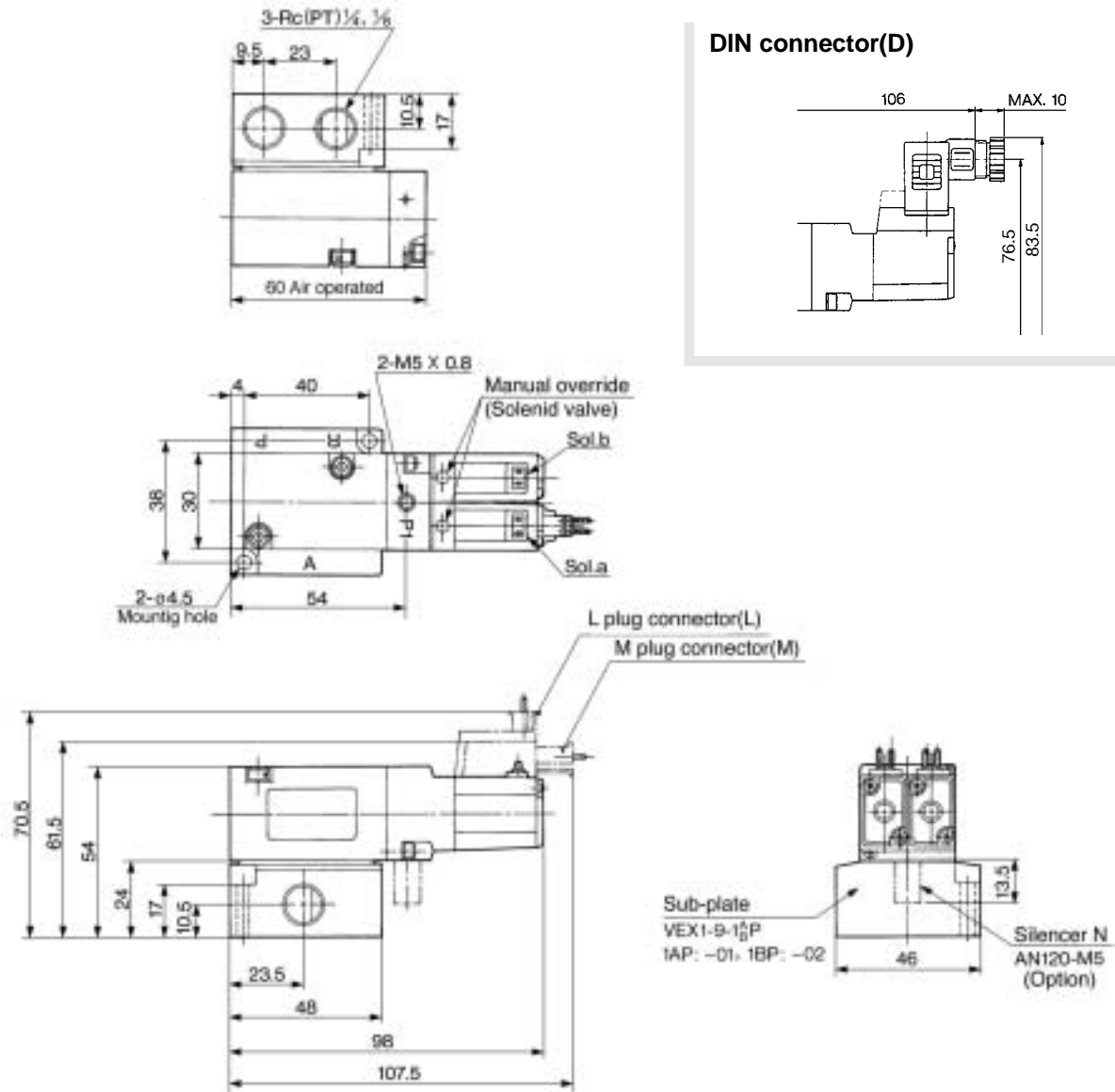
- ① **Connection**  
Insert a socket into the square hole (indicated at +, -) of connector, push fully the lead wire and lock by hanging the hook of socket to the seat of connector. (Pushing in can open the hook and lock it automatically.) Then confirm the locking by lightly pulling on the lead wire.
- ② **Disconnection**  
For pulling out the socket from the connector, pull out the lead wire while pushing the hook of socket with a stick with a fine point (1mm). If the socket is to be re-used as it is, return the hook to the outside.





## Base mounted/VEX322□

Air operated: VEX3220 External pilot solenoid: VEX3221 Internal pilot solenoid: VEX3222



### ⚠ Caution

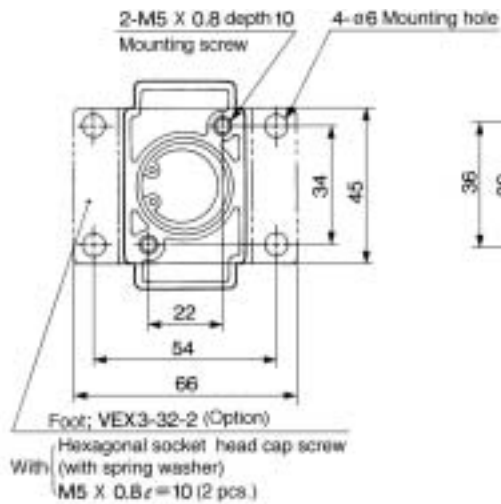
#### How to Use DIN Connector



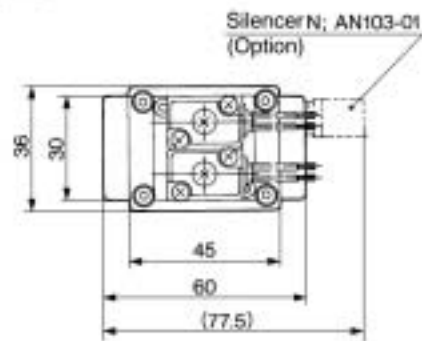
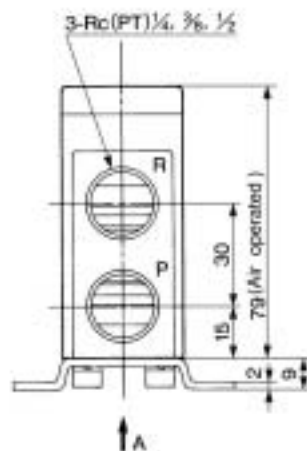
Refer to p.1.5-6

Body ported: VEX332□

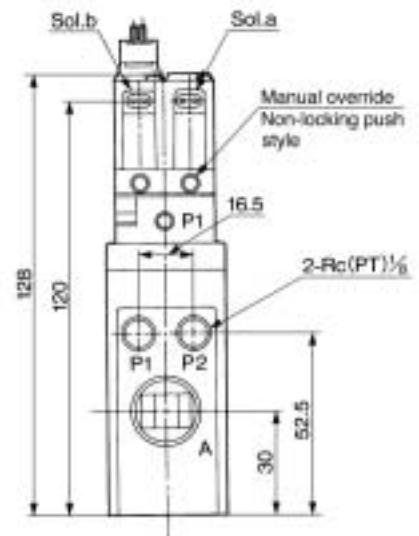
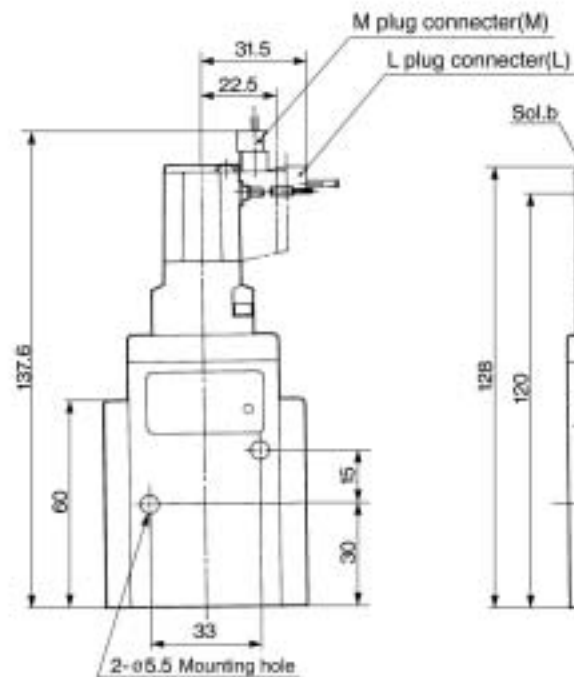
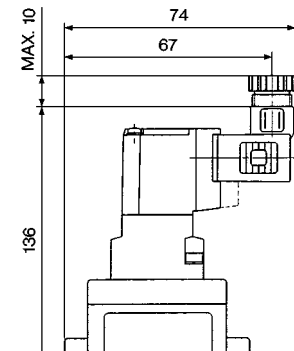
Air operated: VEX3320 External pilot solenoid: VEX3321 Internal pilot solenoid: VEX3322



A perspective drawing



DIN connector(D)



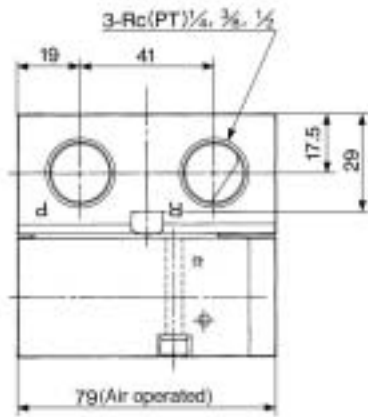
VEX

AN

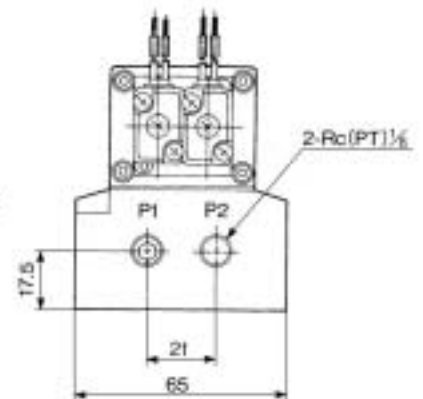
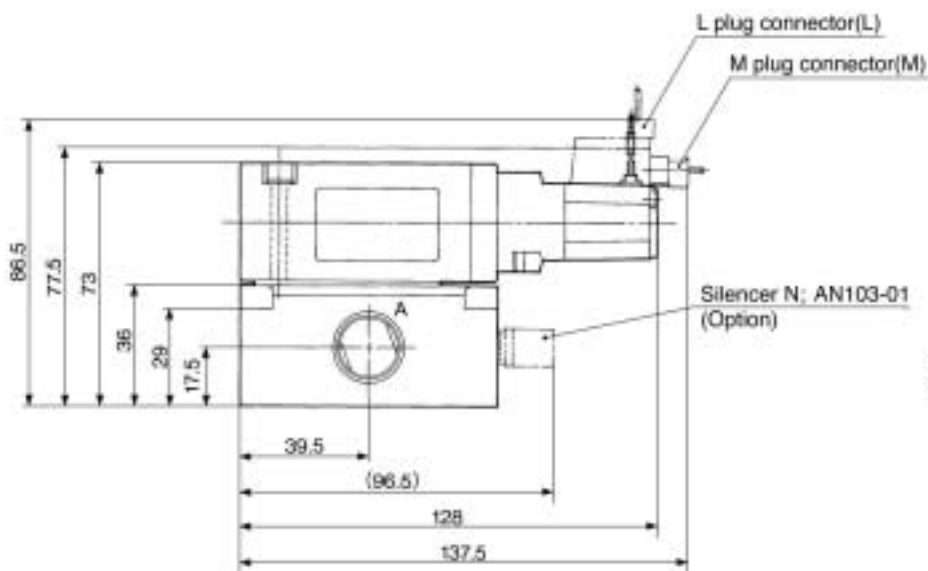
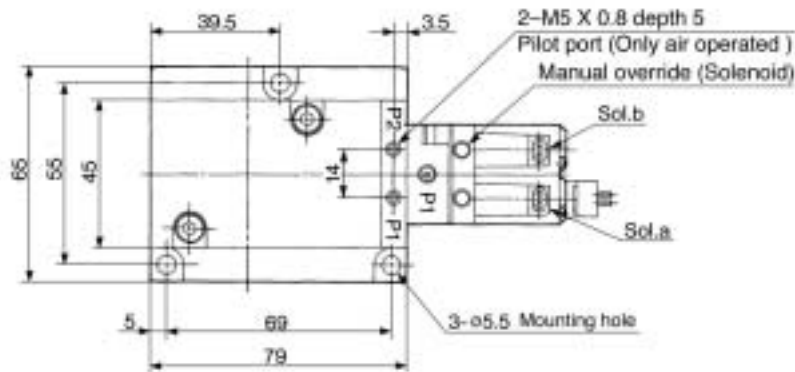
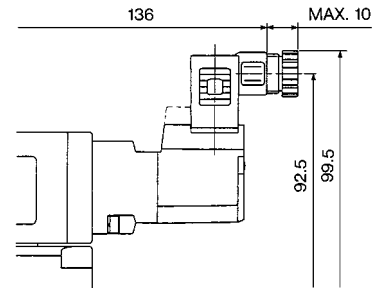
AMC

Base mounted: VEX342□

Air operated: VEX3420 External pilot solenoid: VEX3421 Internal pilot solenoid: VEX3422

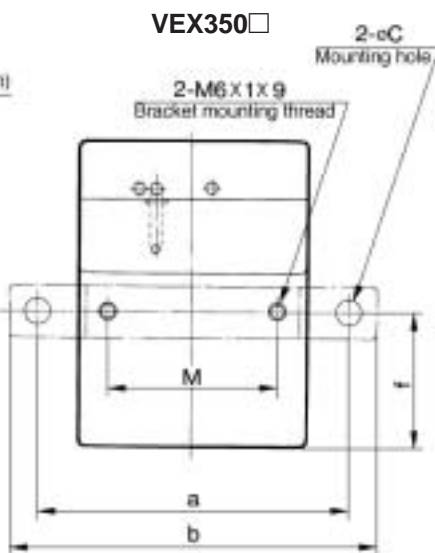
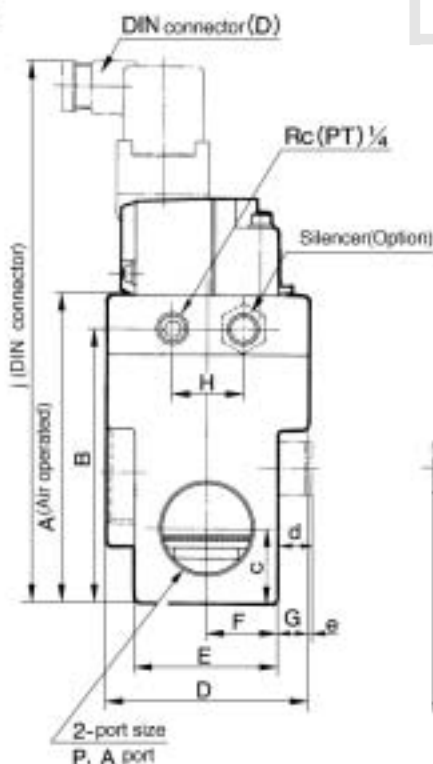
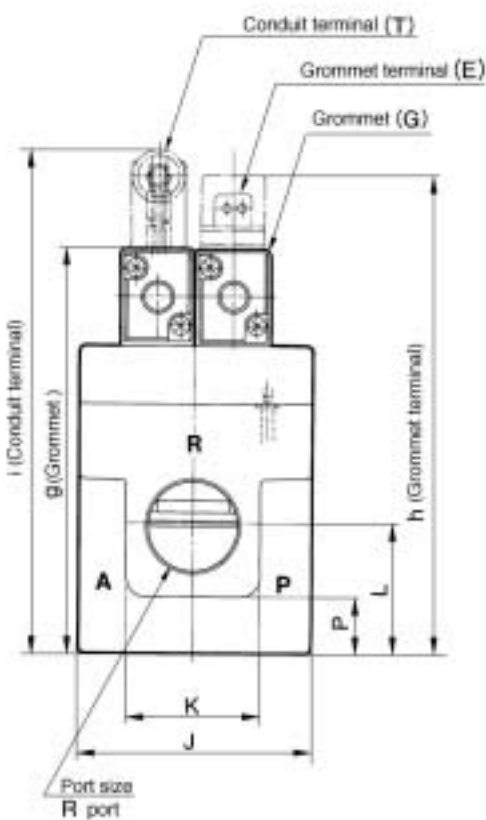
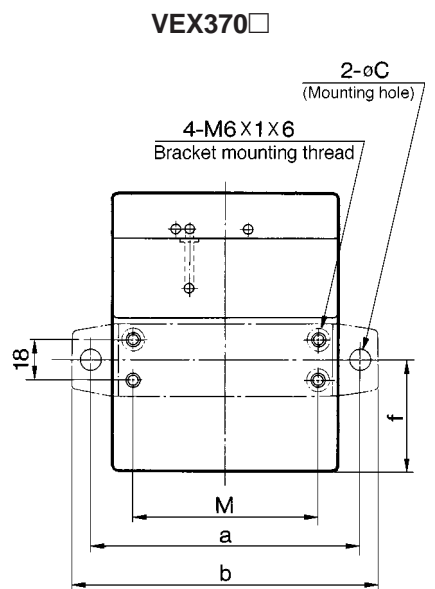
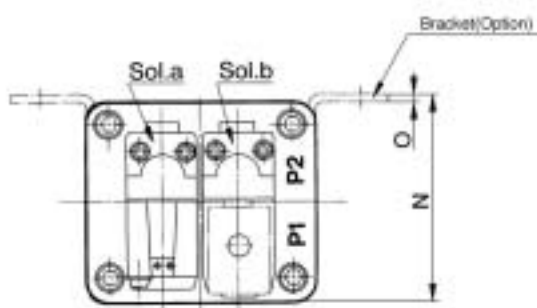


## DIN connector (D)



## Body ported/VEX350□/370□

Air operated: VEX3500/3700    External pilot solenoid: VEX3501/3701    Internal pilot solenoid: VEX3502/3702



### Dimensions

Model	Port size		A	B	C	D	E	F	G	H	J	K	L	M	N	O
	P, A port	R port														
VEX350□	Rc(PT)1/2, 3/4, 1		107	96	26	70	50	25	10	25	80	46	45	60	72	2.3
VEX370□	Rc(PT)1, 1 1/4	Rc(PT)1 1/4	123	112	30	90	60	30	15	25	100	60	51	82	95	2.3

Model	Bracket						Grommet	Grommet terminal	Conduit terminal	DIN connector
	a	b	øc	d	e	f				
VEX350□	110	130	9	12	2	47	140.5	166	175.5	189
VEX370□	120	136	9	20	5	49	156.5	182	191.5	205

VEX

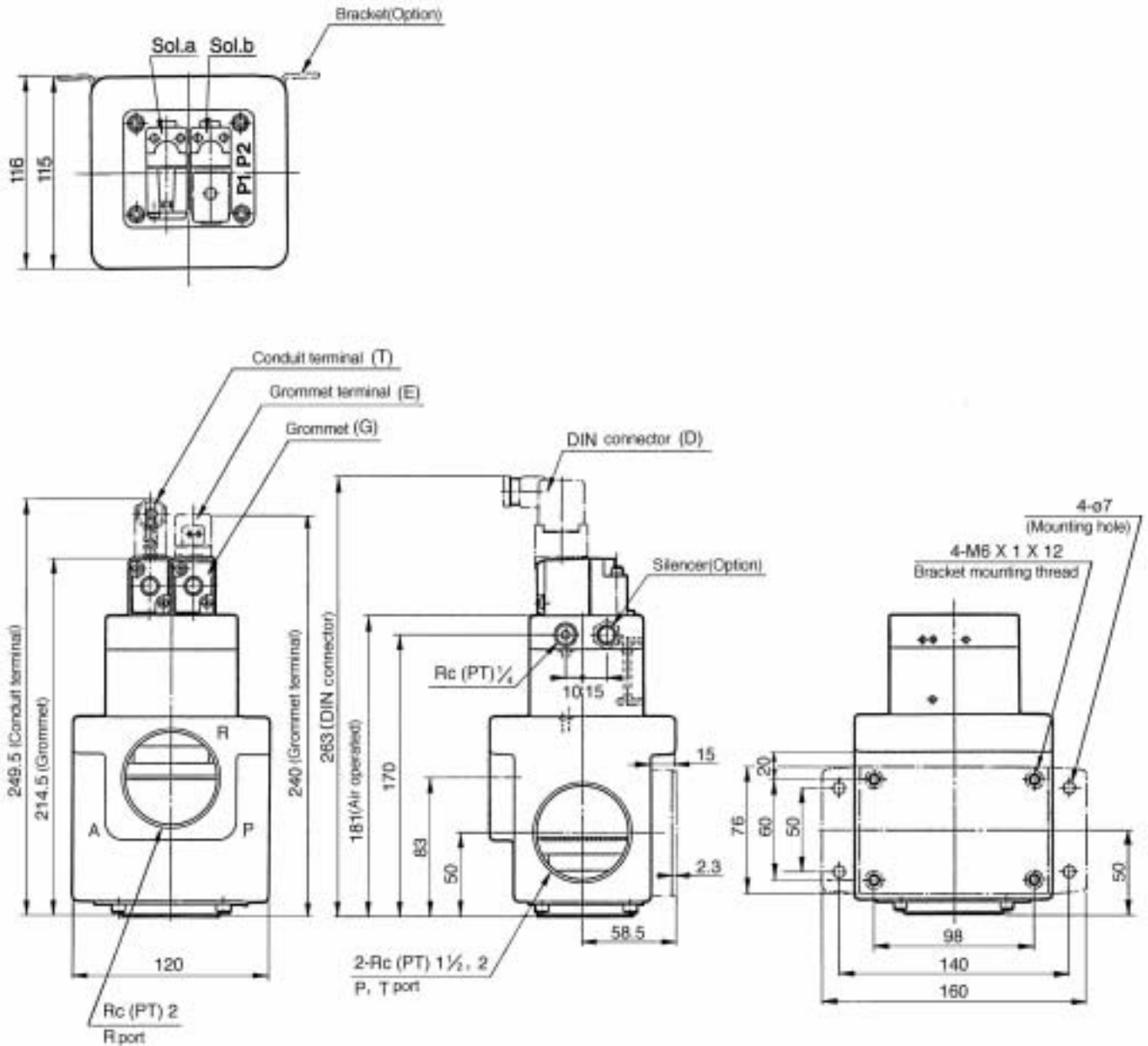
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# VEX3

## Body ported/VEX390□

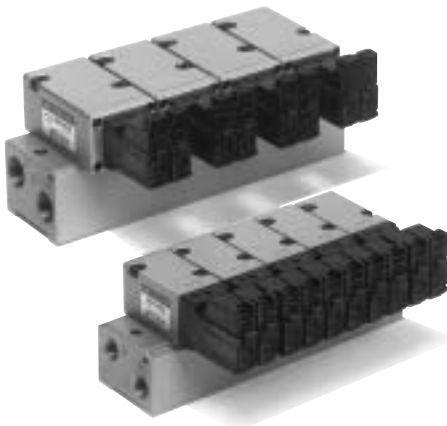
Air operated: VEX3900 External pilot solenoid: VEX3901 Internal pilot solenoid: VEX3902





# Series VEX3 Manifold

## Manifold: Series VVEX



### Specifications

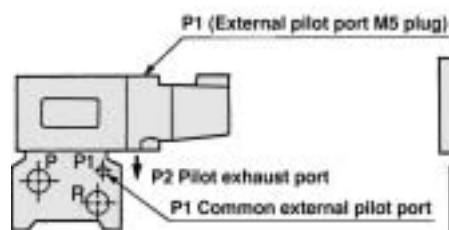
Model		VVEX2	VVEX4		
Applicable valve		VEX3220, VEX3222	VEX3420, VEX3422		
Valve stations (1)		2 to 8	2 to 6		
Port specifications		Common SUP, EXH			
Pilot		Internal pilot, Common external pilot			
Common external pilot port size		M5 X 0.8 Length of thread 5			
Port size	P	1/4	3/8	3/8	1/2
	R		1/4	3/8	3/8
	A				
Blank plate		VEX1-17 (With gasket, mounting bolt)	VEX4-5 (With gasket, mounting blot)		



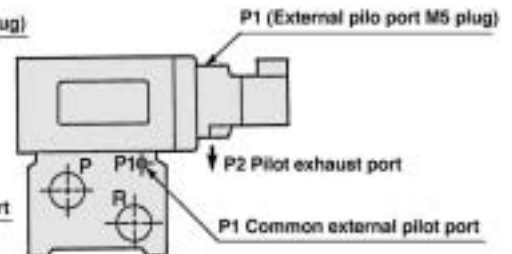
Note 1) When series VVEX2 is used with more than 5 stations, Series VVEX4 is used with more than 4 stations, apply pressure to the P port on both sides and exhaust from the R port on both sides.

### External Pilot Piping

VVEX2-2



VVEX4-2



### ⚠ Caution

When ordering the valve for manifold, be sure to indicate "for manifold" in case of VEX3422 (internal pilot solenoid)

## How to Order Manifold Base

VVEX 2-1-6-02



Thread  
 — Rc(PT)  
 T — NPTF  
 F — G(PF)  
 N — NPT

Body size		Pilot style		Applicable Valve	Valve stations	Port size			
Body size						Port	P	R	A
2	1	Internal pilot	Air operated: VEX3220 <sup>(1)</sup>	VEX3222	2 2 stations	02	1/4		
					6 6 stations				
	2	Common external pilot			8 8 stations				
4	1	Internal pilot	Air operated: VEX3420 <sup>(1)</sup>	VEX3422	2 2 stations	A	3/8	1/4	
					6 6 stations	B	3/8		
	2	Common external pilot			6 6 stations	C	1/2	3/8	

### Note) Air operated

VEX 3220 and VEX3420 (air operated) are used. Distinction between the pilots (internal or external pilot) of the manifold base does not matter. Either may be used.

### Example of ordering a manifold base:

The valve and blank plate for manifold arrangement should be specified in order from the left side of the manifold base (With the A port on your side).

(Example) **VVEX2-2-7-02N**

\* VEX3222-1LN — 6 pcs. } Solenoid  
 \* VEX1-17 — 1 pc. }

**VVEX4-2-6-A**

\* VEX3420 — 5 pcs. } Air operated  
 \* VEX4-5 — 1 pc. }

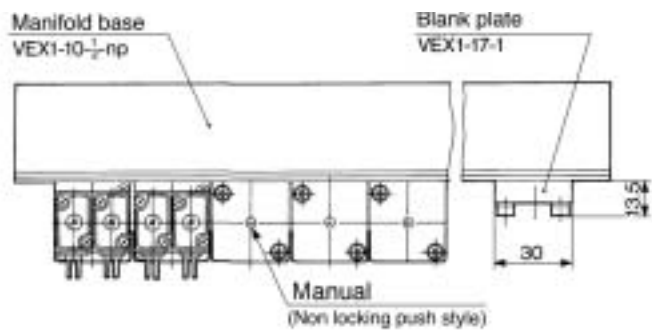
VEX

AN

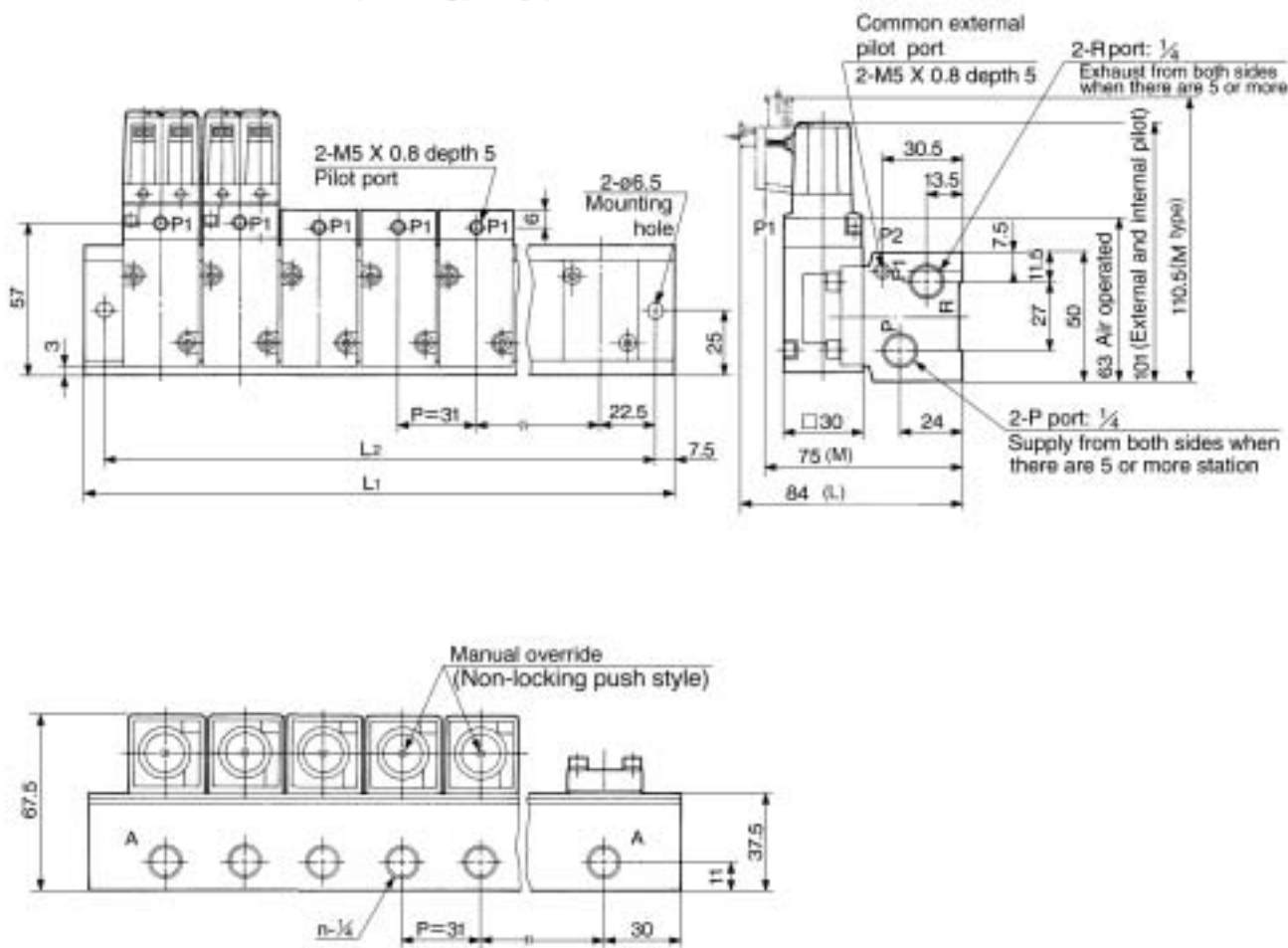
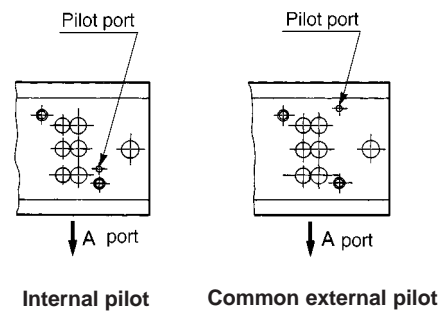
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Manifold/VVEX2

VVEX2- $\frac{1}{2}$  Applicable valve: VEX3220/3222



Valve mounting side



L: Dimensions

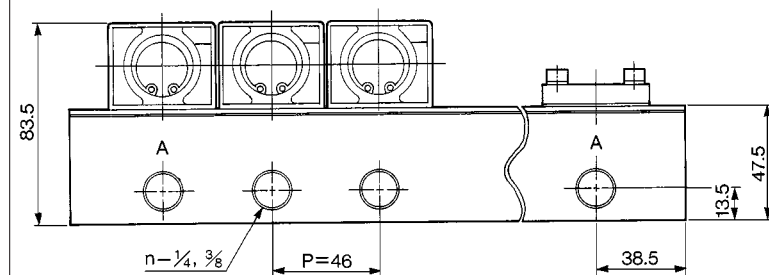
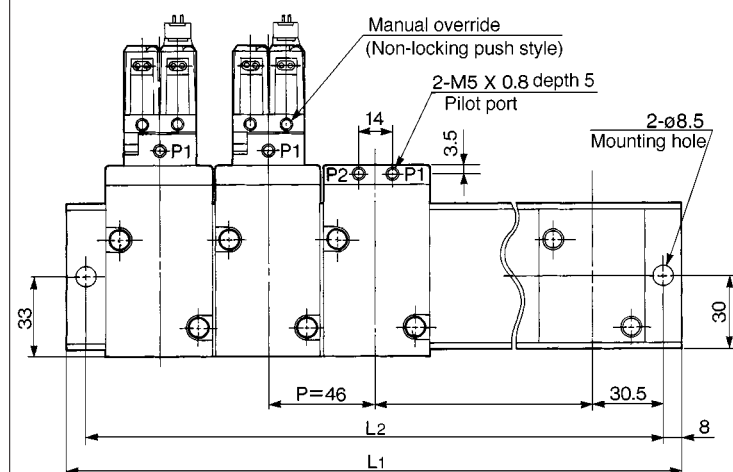
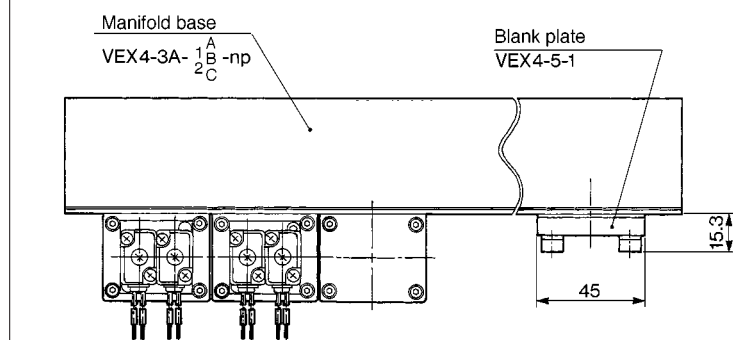
Equation L<sub>1</sub>=31n+29, L<sub>2</sub>=31n+14 n: Station

L	n	2	3	4	5	6	7	8
L <sub>1</sub>		91	122	153	184	215	246	277
L <sub>2</sub>		76	107	138	169	200	231	262

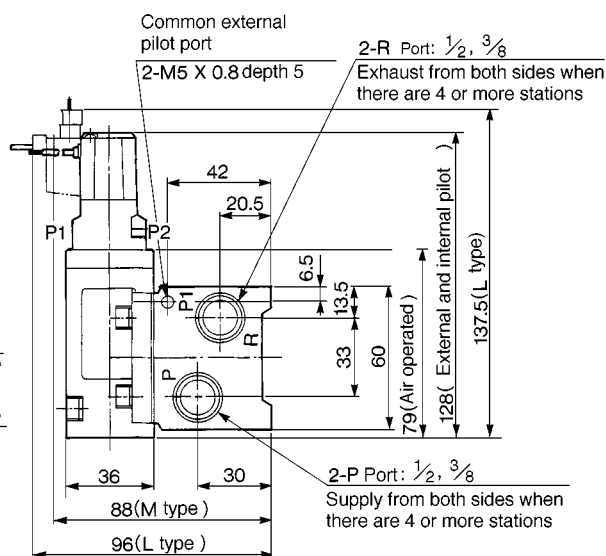
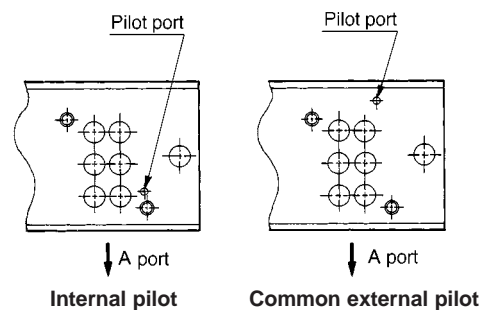
## Manifold/VVEX4-1 □

VVEX4-1 Applicable valve: VEX3420/E3422

VVEX4-2 Applicable valve: VEX3420/E3422



### Valve mounting side



### L: Dimensions

L1=46n+31, L2=46n+15 n: Station

L	n	2	3	4	5	6
L1		123	169	215	261	307
L2		107	153	199	245	291

VEX

AN

AMC

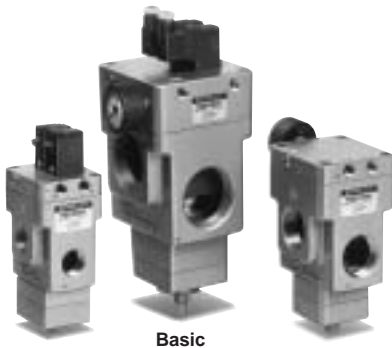
# Power Valve Economy Valve Series **VEX5**

The conventional valve combination circuit has been condensed into a single valve.

Three functions (pressure regulator, switching valve, and speed controller) are provided by a single valve.

A large capacity and economical system.

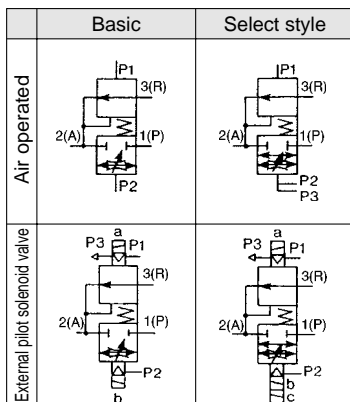
This valve provides twice the system capacity of the conventional circuit. Therefore, it is possible to downsize 1 or 2 sizes (for example, a conventional 32A circuit can be changed to a 25A or a 20A). It is economical, as its performance cost (system price/effective area) is one half of the conventional style. (Comparison based on SMC data.)



Basic



Select style



## Standard Specifications

Model			VEX55□□ <sup>04</sup> <sub>06</sub> <sup>10</sup>			VEX57□□ <sup>10</sup> <sub>12</sub>		VEX59□□ <sup>14</sup> <sub>20</sub>	
Style			Air operated, External pilot solenoid						
Fluid			Air						
Proof pressure			1.5MPa						
Pressure range			0 to 1.0MPa						
Set pressure range			0.05 to 0.9MPa						
Ambient and fluid temp.			Max. 50°C(Air operated 60°C)						
Pilot pressure			P1: 0.05 to 0.9MPa P2: 0.2 to 0.9MPa (Air operated: P2, P3: 0.2 to 0.9MPa P2≤P3)						
Repeatability			0.01MPa						
Sensitivity			0.01MPa						
Response time			60ms or less						
Max. operating frequency			3 cycles/sec.						
No. of needle rotations			6 turns			8 turns			
Mounting			Free						
Lubrication			Not required(use turbine oil No.1 ISO VG32, if lubricated)						
Port size Rc(PT)		Port	04	06	10	10	12	14	20
		P				1		1¼	
		A	½	¾	1		1¼		2
		R				1¼		2	
Effective area		mm²	130	160	180	300	330	590	670
		Cv	7.2	8.9	10	17	18	33	37
Weight (kg)	Air operated	Basic	2.0			3.2		4.7	
		Select	2.3			3.5		5.0	
	Solenoid	Basic	2.2			3.5		4.9	
		Select	2.6			3.8		5.3	

## Solenoid Specifications

Model	VEX5511, 5711, 5911, 5501, 5701, 5901	
Pilot valve	SF4-□□20	
Electrical entry	Grommet(G), Grommet terminal(E), Conduit terminal(T), DIN connector(D)	
Rated Voltage(V)	AC(50/60Hz)	100V, 200V, Other(Option)
	DC	24V, Other(Options)
Allowable voltage	-15% to +10% of rated voltage	
Coil insulation	Class B(130 °C) or equivalent	
Temperature rise	35°C or less	
Apparent power	AC	Inrush: 5.6VA(50Hz), 5.0VA(60Hz)
		Holding: 3.4VA(50Hz), 2.3VA(60Hz)
Power consumption	DC	1.8W
Manual override	Non-locking push style	
Pilot port silencer	AN210-02	

## Accessories/Part No.

Model	Part No.		
Description	VEX55□□ <sup>04</sup> <sub>06</sub> <sup>10</sup>	VEX57□□ <sup>10</sup> <sub>12</sub>	VEX59□□ <sup>14</sup> <sub>20</sub>
Bracket (With bolt and washer)	VEX5-32A	VEX7-32A	VEX9-32A
Pressure gauge	G46-10-01		

How to Order

VEX5

5

1

1

06

2

E

Z

B

Economy valve

Style

0 — Basic

1 — Select

Operation style

0 — Air operated

1 — External pilot solenoid

Body size

Port size

Body size	Port size Rc(PT)		
	P, A port		R port
5	04	1/2	1/2
	06	3/4	3/4
	10	1	1
7	10	1	1 1/4
	12	1 1/4	
9	14	1 1/4	2
	20	2	

Option

B — Bracket

G — Pressure gauge

Indicator light and surge voltage suppressor

— — None

S — With surge voltage suppressor (Only grommet)

Z — With indicator light and surge voltage suppressor (Except for grommet)

Electrical entry (Only solenoid)

G — Grommet, Lead wire length 300mm

H — Grommet, Lead wire length 600mm

E — Grommet terminal

T — Conduit terminal

D — DIN connector

Coil rated voltage

1	100V AC50/60Hz
2	200V AC50/60Hz
3*	110V AC50/60Hz
4*	220V AC50/60Hz
5	24V DC
6*	12V DC
7*	240V AC50/60Hz
9*	Other

\* Options

How to Order Pilot valve

SF4

20

Electrical entry

Coil rated voltage

(Ex.) SF4-1G-20

100V AC, Grommet

(Ex.) VEX5511-062EZ-BG

Body size 5, Select, External pilot solenoid

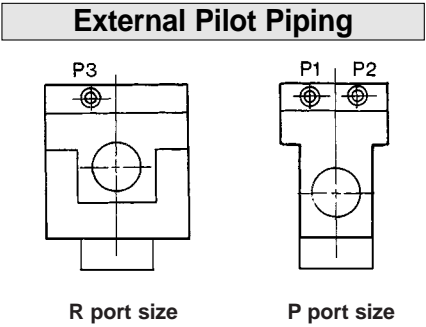
Port size Rc(PT) 3/4

200V AC, Grommet terminal,Indicator light and surge voltage suppressor

Option...Bracket, with pressure gauge.

Model

Model	Basic		Select		Port size Rc(PT)	
	Air operated	External pilot solenoid	Air operated	External pilot solenoid	P, A port	R port
Economy valve	VEX5500	VEX5501	VEX5510	VEX5511	1/2, 3/4, 1	1/2, 3/4, 1
	VEX5700	VEX5701	VEX5710	VEX5711	1, 1 1/4	1 1/4
	VEX5900	VEX5901	VEX5910	VEX5911	1 1/2, 2	2



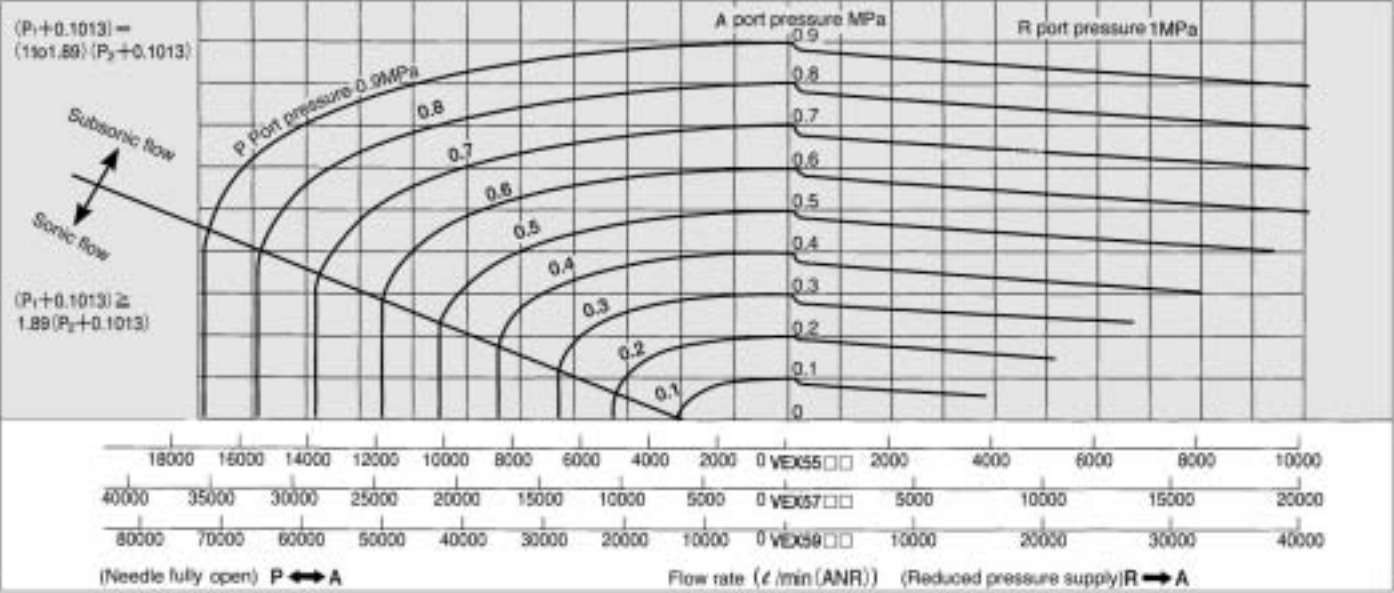
⚠ Caution

Refer to p.0-33 to 0-36 for Safety Instructions and common precautions

Model	P1	P2	P3
VEX5□00	External pilot	External pilot	Plug
VEX5□01	External pilot	External pilot	Pilot Exhaust
VEX5□10	External pilot	External pilot	External pilot
VEX5□11	External pilot	External pilot	Pilot Exhaust

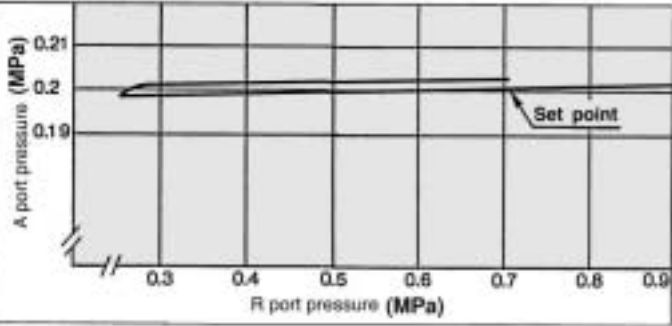


Flow Characteristics

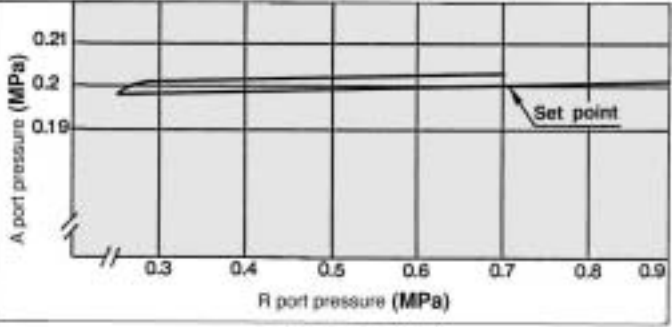


Pressure Characteristics

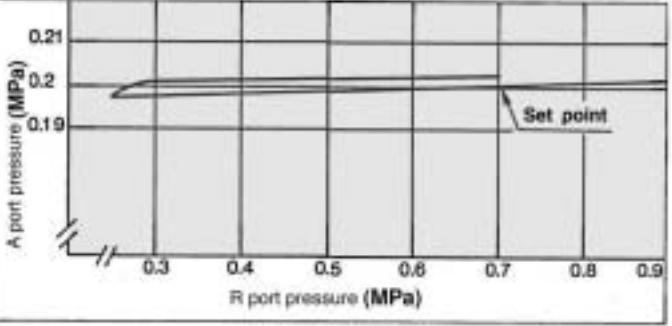
Shows secondary pressure (A port) change against primary pressure (R port) change. They conform to JISB8372(Air pressure regulator)  
VEX55□□



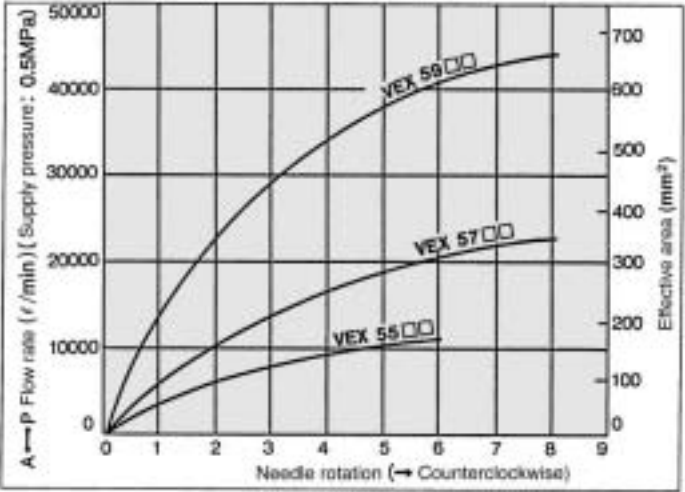
VEX57□□



VEX59□□

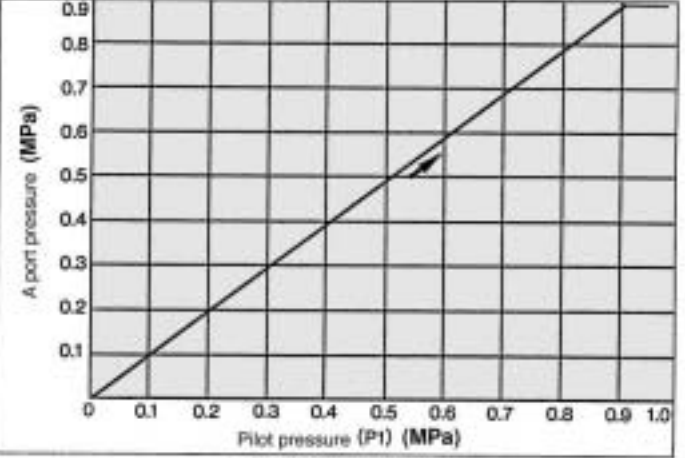


Needle Characteristics A↔P



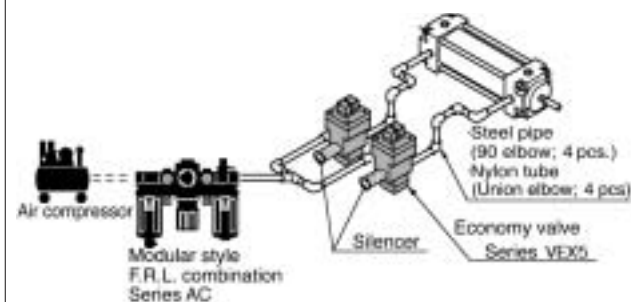
Setting Pressure Characteristics

A port pressure is set according to pilot pressure (R→A: Non-relief regulator)

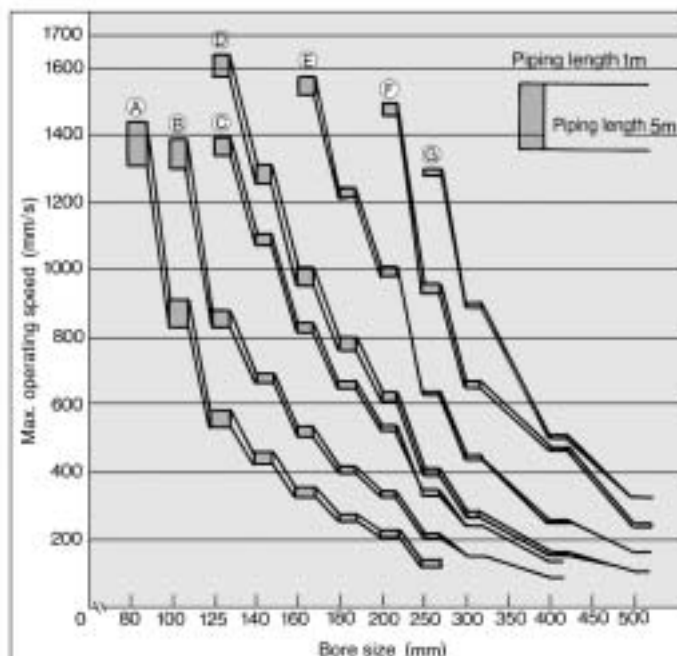


## Cylinder Speed

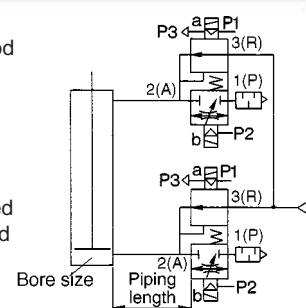
### System diagram



System	Solenoid valve	Silencer	Port size	Fitting (One side) 4 pcs
(A)	VEX55□□	AN400	SGP 1½ B	90° Elbow
(B)	VEX55□□	AN500	¾ B	90° Elbow
(C)	VEX55□□	AN600	1B	90° Elbow
(D)	VEX57□□	AN600	1B	90° Elbow
(E)	VEX57□□	AN700	1 ¼ B	90° Elbow
(F)	VEX59□□	AN800	1 ½ B	90° Elbow
(G)	VEX59□□	AN900	2B	90° Elbow



- Supply air pressure  
Set pressure is 0.5MPa both on rod and head side.
- Needle fully open
- Load 50%
- 90° elbow 4 pcs.
- There is a limit to the relation between maximum operational speed and load in the cushion incorporated in the cylinder. Check it with the cylinder catalogue.
- Maximum working speed is 1.2 times when load factor is 0% and is 0.7 times when load factor is 75%.



## Energy Saving Lifter

### • Simple

Two economy valves and a tank move the double-acting cylinder to raise and lower heavy objects.

### • Energy saving

The balancing air reciprocates between the lower cylinder chamber and the tank, thus not being consumed. Low pressure air alone is exhausted from the upper chamber in every cycle, so the air consumption is reduced to 20 to 30% of the air consumption by the double acting cylinder with an ordinary change over valve.

### • Excellent operation control

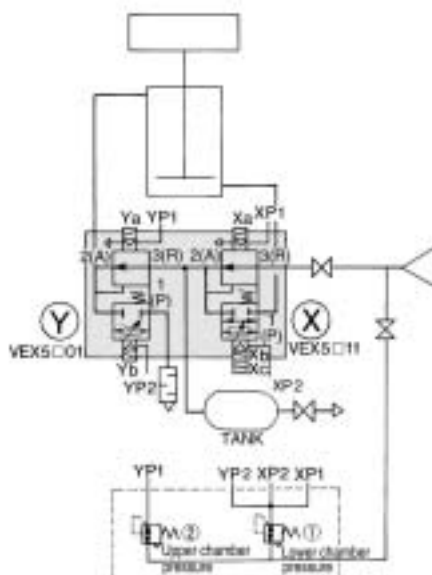
The economy valve sets pressure and permits high speed and low speed operation as well as suspension of operation. While the piston moves up and down, the valve controls speed change in the middle of strokes, terminal deceleration, inching, and emergency stops.

### • Simple operation

The pilot system is composed of a small regulator and solenoid valve (which is unnecessary for solenoid style), remote controls the economy valve.

Therefore, change in the pilot system sequence allows selection of a cylinder operation mode. Change in the large capacity main piping system is not necessary.

### <System configuration and operation of circuit in which external pilot solenoid is used >



The two economy valves (hereinafter called VEX) ① and ② and a tank composes a main system that drives the double acting cylinder, and the small regulator (hereinafter called REG) and pilot valve (hereinafter called SOL) remote control the economy valve.

### Action

Cylinder	SOL	Xa Xb Xc Yb Ya					Mode
		ON	●	OFF	●	—	
Upward	High speed	ON	●	OFF	●	—	a
	Low speed	—	●	●	●	—	b
Downward	High speed	—	●	—	—	●	c
	Low speed	—	●	●	—	●	d
Stop	—	—	—	—	—	—	e

- The air in the upper cylinder chamber is exhausted from the P port of VEX①, and the air in the tank flows in through the P port of VEX②.
- Air flows into the lower cylinder chamber through a throttled opening, set by a needle, from the A to P port of VEX②.
- The air in the tank flows into the upper cylinder chamber at a preset low pressure from the A port of VEX①, while the air in the lower cylinder chamber returns to the tank through VEX②.
- Air returns to the tank through a throttled opening from the P to the A port of VEX②.
- The air in the lower cylinder chamber is blocked at the P port of VEX①, while the air in the upper cylinder chamber is blocked at the A port of VEX①.

### ⚠ Caution

\* A lifter circuit can be composed of air operated valves. Contact SMC for details.

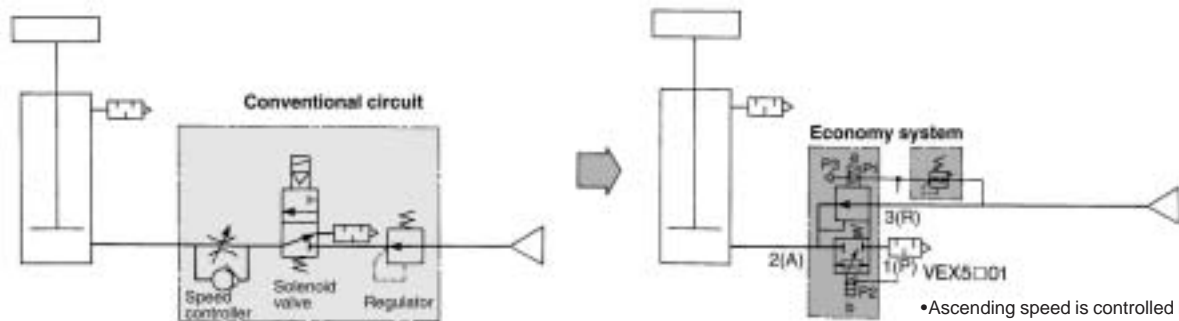
VEX

AN

AMC

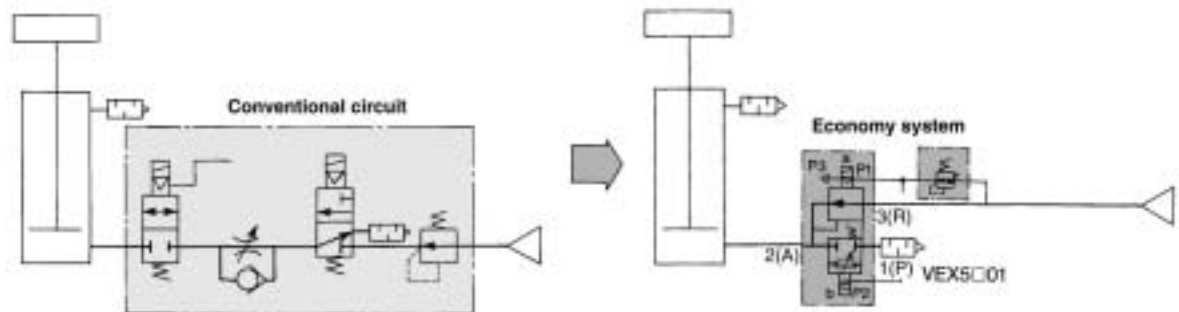
## Applicable System/Example of Single Acting Circuit (The valves can be used also for double acting circuits. Consult SMC for details.)

### ① Speed control

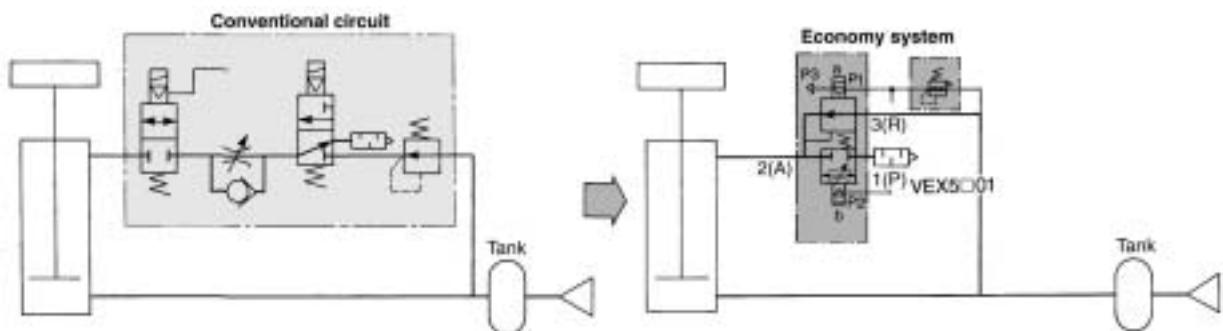


- Ascending speed is controlled by a pilot regulator.
- Descending speed is controlled by needle setting.

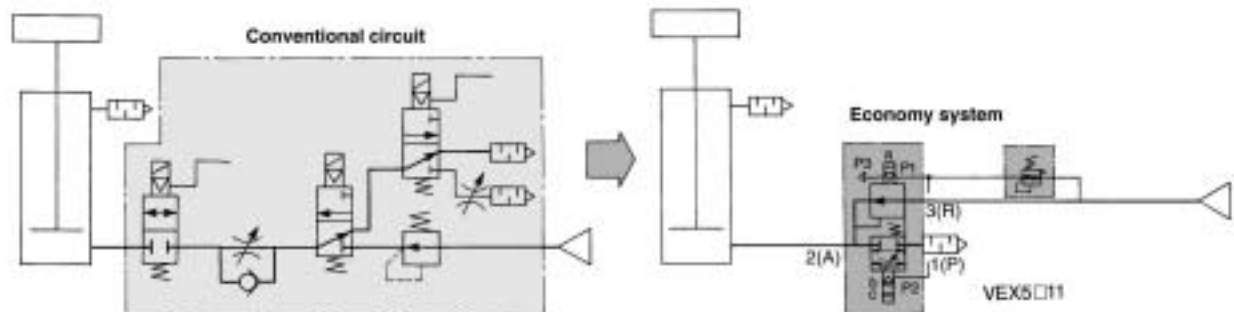
### ② Intermediate (emergency) stop



### ③ Double pressure driving...Energy saving lifter (Air saving counter balance)

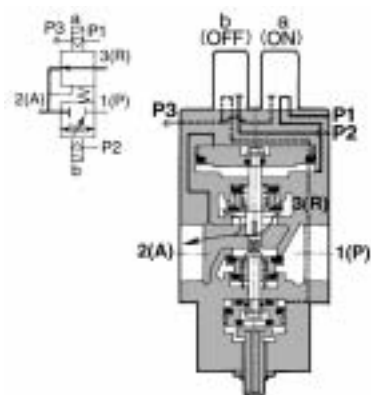


### ④ Two speed driving



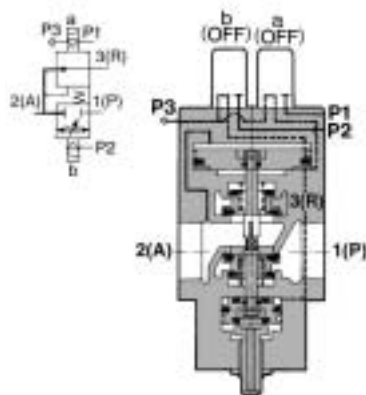
## Basic Construction/Principles

### (1)3(R)→2(A) Reduced pressure supply



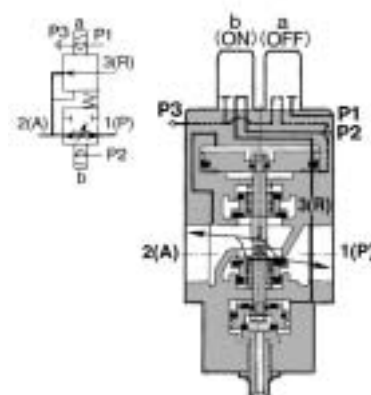
When the pilot solenoid valve "a" is energized (or when pilot pressure is applied to the P1 port of the air operated style) while the P1 port is under the pilot pressure, reduced pressure is supplied from the R port to the A port. The acting force of the pilot pressure (P1 port) reaches the space under the pressure control piston (3) pushes the piston upward and opens the poppet valve (6). Thus air is supplied from the R port to the A port. The air entering through the A port flows through the feedback passage to the space above the piston, and when its pressure balances with the pilot pressure under the pressure control piston, the poppet valve closes, thus setting the A port pressure corresponding to the pilot pressure (P1 port). (P1 port pressure: A port pressure = 1:1)

### (2) Closed center



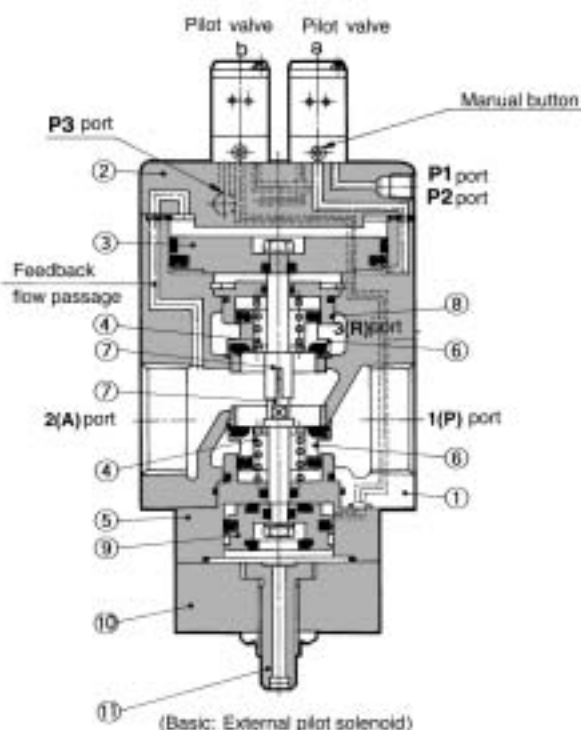
When neither the pilot solenoid valves "a" or "b" is energized (or when no pilot pressure is applied to the P1 and P2 ports of the air operated style), no acting force is applied to the pressure control piston (3) and operation piston (9), and the spring (4) closes both poppet valves (6), thus the valves assuming the closed centre position. While the A port is being pressurized, air will not be released even if electrical power to the pilot solenoid valve "a" is turned off (or pilot pressure if released from the P1 port of the air operated style). (R→A: Non relief regulator)

### (3)2(A)↔1(P) Throttled exhaust



When the pilot solenoid valve "b" is energized while pilot pressure is in the P2 port (or when the pilot pressure is applied to the P2 port of the air operated style), an acting force generated above the operation piston (9) pushes the operation piston down, and thus the P and A ports are connected. At that time, the lower poppet valve (6) opens by the degree preset by the needle (11). (Counterclockwise rotation of the needle opens the poppet valve.) The upper and lower poppet valves operate independently. When the pilot solenoid valves "a" and "b" are energized alternately (or when pilot pressure is applied to the P1 and P2 ports of the air operated style alternately), the supplied reduced pressure (R→A) can be throttled and exhausted (A→P).

## Construction



### Component Parts

No.	Description	Material
①	Body	Aluminium alloy casting
②	Cover	Aluminium alloy casting
③	Regulation piston	Aluminium alloy
④	Spring	Stainless steel
⑤	Chamber	Aluminium alloy
⑥	Poppet valve	NBR
⑦	Rod	Stainless steel
⑧	Valve guide	Aluminium alloy
⑨	Operating piston	Aluminium alloy
⑩	Bottom cover	Aluminium alloy
⑪	Needle	Brass

VEX

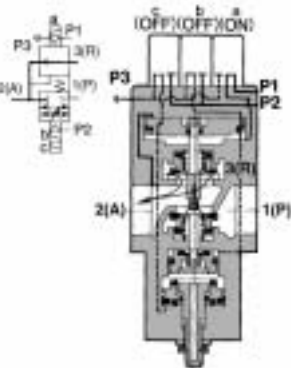
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Select style Construction/Principles

(1)3(R)→2(A) Reduced pressure supply



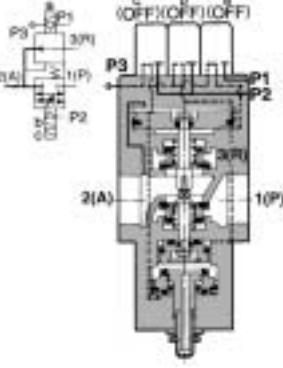
When the pilot solenoid valve “a” is energized while the P1 port is under the pilot pressure, reduced pressure is supplied from the R port to the A port.

The acting force of the pilot pressure (P1 port) reaches the space under the pressure control piston (3) pushes the piston upward and opens the poppet valve (6). Thus air is supplied from the R port to the A port.

The air entering through the A port flows through the feedback passage to the space above the piston and when it's pressure balances with the pilot pressure under the pressure control piston, the poppet valve closes, thus setting the A port pressure corresponding to the pilot pressure(P1 port).

(P1 port pressure: A port pressure =1:1)

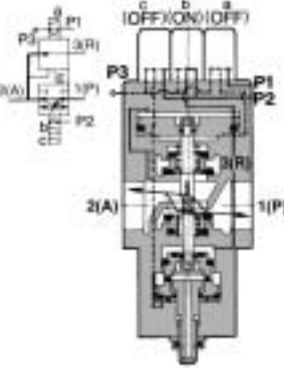
(2)Closed center



When neither the pilot solenoid valve “a” nor “b” is energized (or when no pilot pressure is applied to the P1 and P2 ports of the air operated style), no acting force is applied to the pressure control piston (3) and operation piston (9), and the spring (4) closes both poppet valves (6), thus the valve assuming the closed center position.

While the A port is being pressurized, air will not be released even if electrical power to the pilot solenoid valve “a” is turned off (or pilot pressure if released from the P1 port of the air operated style). (R→A: Non relief regulator)

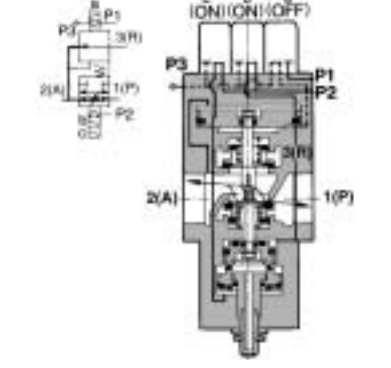
(3)2(A)→1(P)Fully open exhaust



When the pilot solenoid valve “b” is energized while pilot pressure is in the P2 port (or when the pilot pressure is applied to the P2 port of the air operated style), an acting force generated above the operation piston (9), and pushes down the operation piston, and thus the P and A ports are connected.

At that time, the lower poppet valve (6) fully opens.

(4)2(A)→1(P) Throttled exhaust



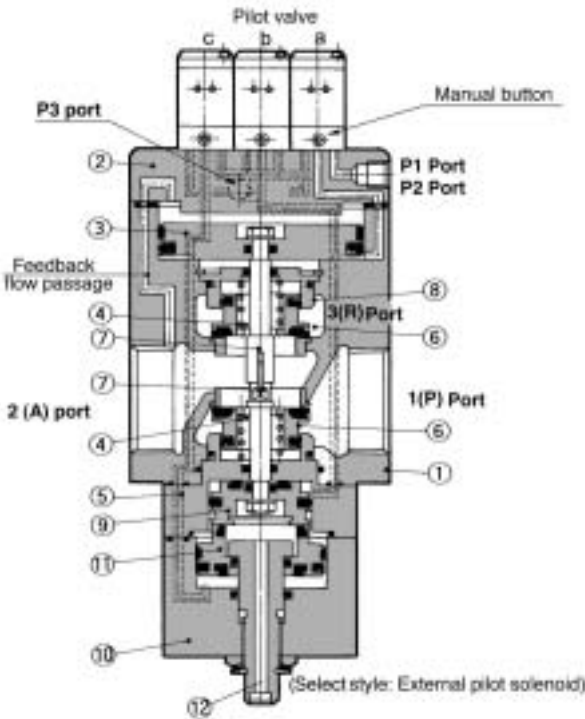
When the pilot solenoid valves “b”and “c” are energized simultaneously while pilot pressure is in the P2 port (or when the pilot pressure is applied simultaneously to the P2 and P3 ports of the air operated style), an acting force generated above the operation piston (9) pushes the piston down and another acting force generated under the stopper (11) pushes up the stopper, and thus the P and A parts are connected. At that time, the lower poppet valve (6) opens by the degree preset by the needle (12) (Counterclockwise rotation of the needle opens the poppet valve.)

The upper and lower poppet valves operate independently. When the pilot solenoid valves “a” and “b” are energized alternately (or when pilot pressure is applied alternately to the P1 and P2 ports of the air operated style), the supplied reduced pressure (R→A) can be throttled and exhausted (A→P).

\* The pilot solenoid valve “c” remains energized (or pilot pressure remains applied to the P3 port of the air operated style).

By turning on/off the pilot solenoid valve “c” (or by supplying/exhausting pilot pressure to/from the P3 port of the air operated style)while electric power is being supplied to the pilot solenoid valve “b”(or pilot pressure is being applied to the P2 port of the air operated style), either throttling or fully open exhaust can be selected (deceleration/acceleration) for the A↔P port.

Construction



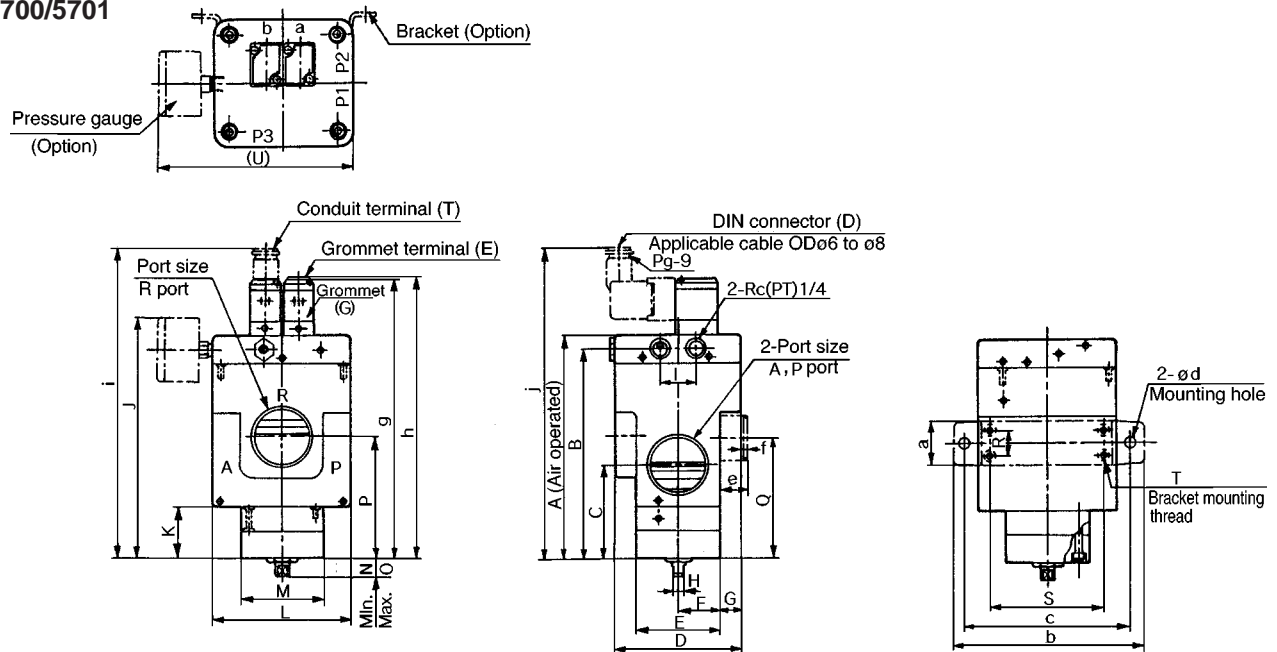
Component Parts

No.	Description	Material
①	Body	Aluminium alloy casting
②	Cover	Aluminium alloy casting
③	Regulation piston	Aluminium alloy casting
④	Spring	Stainless steel
⑤	Chamber	Aluminium alloy
⑥	Poppet valve	NBR
⑦	Rod	Stainless steel
⑧	Valve guide	Aluminium alloy
⑨	Operating piston	Aluminium alloy
⑩	Bottom cover	Aluminium alloy
⑪	Stopper	Aluminium alloy
⑫	Needle	Brass



## Basic Dimensions

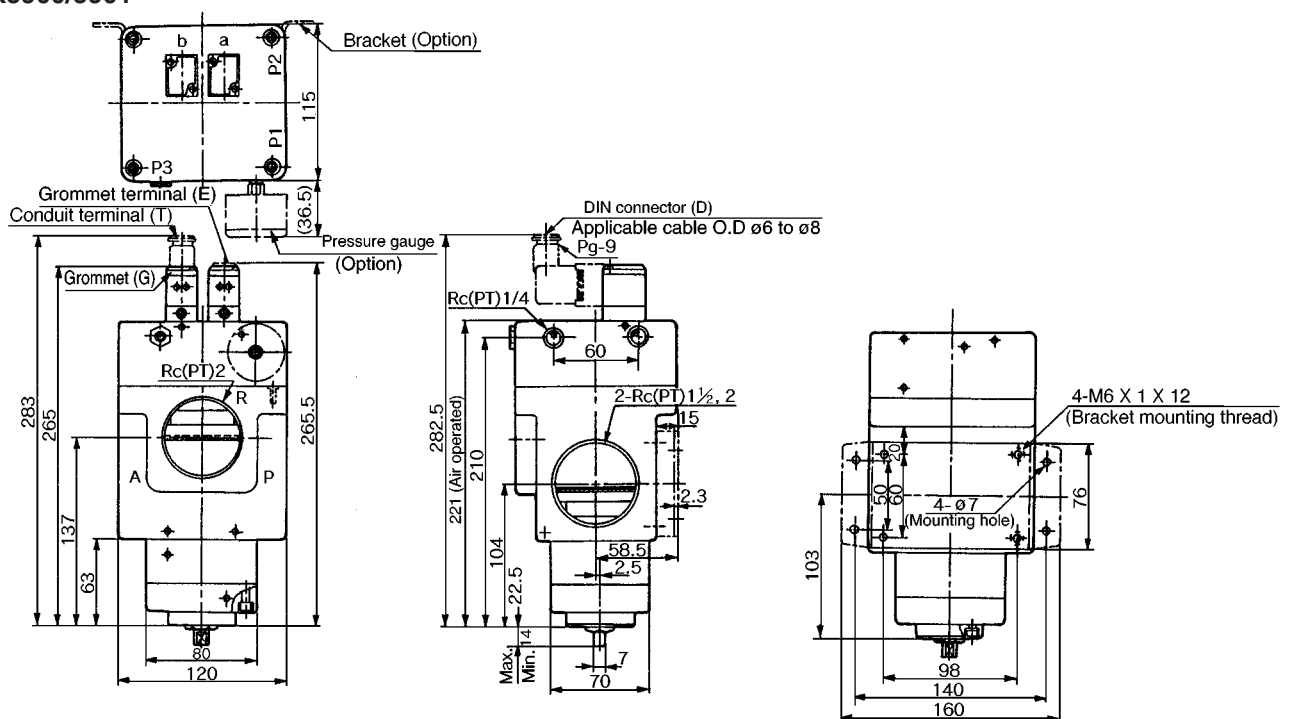
VEX5500/5501  
VEX5700/5701



Model	Port size		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
	A, P port	R port																					
VEX5500	Rc(PT)	Rc(PT)	143.5	133.5	62.5	70	50	25	10	7	25	156.5	36.5	80	60	16.5	20	81.5	83.5	Center	60	2-M6 X 1 X Depth 9	116.5
VEX5501	1/2, 3/4, 1	1/2, 3/4, 1																					
VEX5700	Rc(PT)	Rc(PT)	160.5	150.5	62.5	90	60	30	15	7	25	173.5	37.5	100	60	13	17	88.5	86.5	18	82	4-M6 X 1 X Depth 6	136.5
VEX5701	1, 1 1/4	1 1/4																					

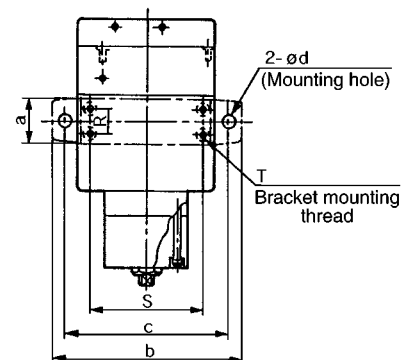
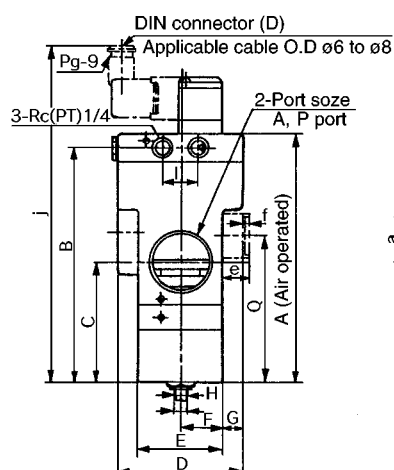
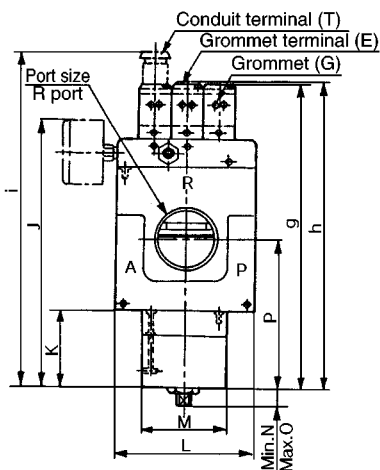
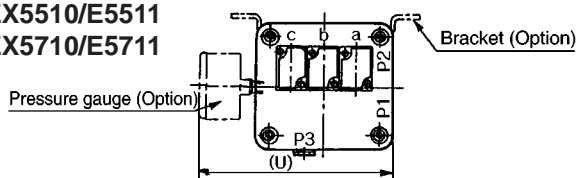
Model	Bracket mounting dimensions						Grommet	Grommet terminal	Conduit terminal	DIN connector
	a	b	c	ød	e	f	g	h	i	j
VEX5500	19	130	110	9	12	2.3	187	187.5	205.5	205
VEX5501										
VEX5700	32	136	120	9	20	2.3	204	204.5	222.5	222
VEX5701										

VEX5900/5901



## Select style Dimensions

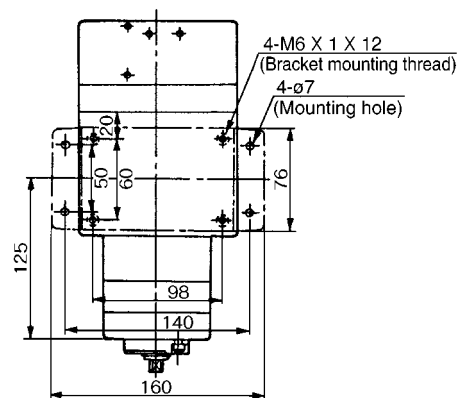
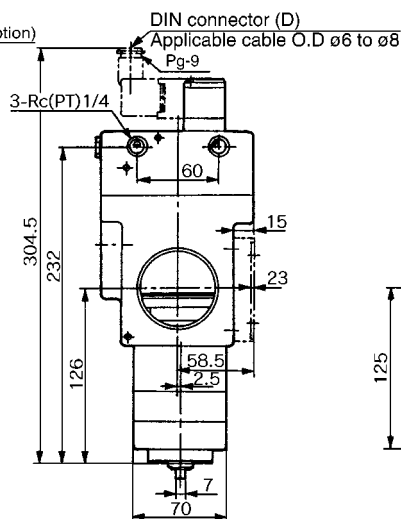
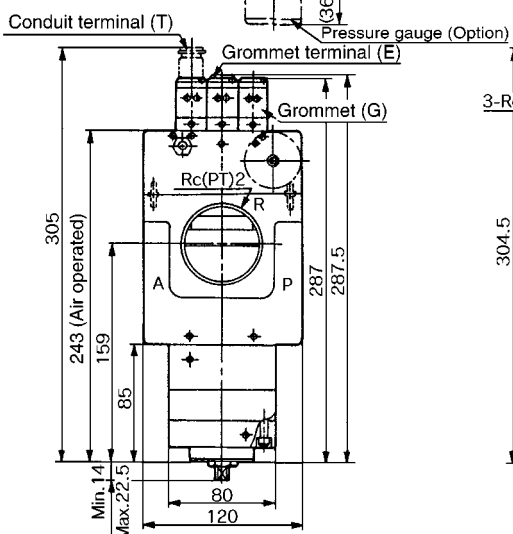
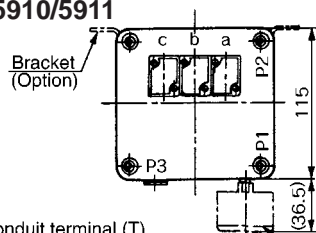
VEX5510/E5511  
VEX5710/E5711



Model	Port size		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
	A, P port	R port																					
VEX5510	Rc(PT)	Rc(PT)	160	150	79	70	50	25	10	7	25	173	53	80	60	13	18	98	100	Center	60	2-M6 X 1 X depth 9	116.5
VEX5511	1/2, 3/4, 1	1/2, 3/4, 1																					
VEX5710	Rc(PT)	Rc(PT)	177.5	167.5	84.5	90	60	30	15	7	25	190.5	54.5	100	60	13	17	105.5	103.5	18	82	4-M6 X 1 X depth 6	136.5
VEX5711	1, 1 1/4	1 1/4																					

Model	Bracket mounting dimensions						Grommet	Grommet terminal	Conduit terminal	DIN connector
	a	b	c	ød	e	f				
VEX5510	19	130	110	9	12	2.3	204	204.5	222	221.5
VEX5511										
VEX5710	32	136	120	9	20	2.3	221	221.5	239.5	239
VEX5711										

VEX5910/5911



Others

Silencer (Series AN)

- Over 30dB noise reduction
- Sufficient effective area



Model	Connection R(PT)	Effective area (mm <sup>2</sup> )
AN110	1/8	35
AN200	1/4	35
AN300	3/8	60
AN400	1/2	90
AN500	3/4	160
AN600	1	270
AN700	1 1/4	440
AN800	1 1/2	590
AN900	2	960



• Refer to p.5.2-1 for details.

Exhaust Cleaner (Series AMC)

- Provides a silencing capability and an oil mist recovery function.
- Can also be used in a centralized piping system.



Model	Connection R(PT)	Effective area (mm <sup>2</sup> )	Max.air flow (ℓ/min)
AMC310	3/8	16	300
AMC510	3/4	55	1,000
AMC610	1	165	3,000
AMC810	1 1/2	330	6,000
AMC910	2	550	10,000

- 99.9% of oil mist removal.
- Over 35dB noise reduction.



• Refer to p.5.3-1 for details.

VEX

AN

AMC