

Power Valve Precision Regulator

Series VEX1□3⁰₃

High precision, large capacity relief regulator

A 3 port large exhaust capacity pressure reducing valve which utilizes a nozzle flapper mechanism available as air operated or manual styles.

Precise pressure setting

Having a relief Cv value that is similar to the supply Cv value, this regulator responds quickly in order to set a precise outlet pressure even when the outlet volume and the pressure fluctuations are large.

High precision

This regulator is well-suited for balancer applications because it minimizes pressure fluctuations with its large-volume supply/exhaust capability, in addition it features high precision F.S. (full span) sensitivity within 0.2% and F.S. repeatability of ±0.5%.

Manifold capable

VVEXB 1/8—Up to 10 stations
VVEX2 1/4—Up to 8 stations

Rich line-up

Port sizes available from M5 to 2 inches, most flow rates and pipes can be accommodated.

Minimum size VEX1^A_B33

- Non-grease only for VEX1^A_B33
- Seal materials (HNBR, FKM) only for VEX1^A_B33



Manual handle type

Air operated type

ARJ

AR425
to 935

AMR

ARM

ARP

IR

IRV

VEX1□

SRH

SRP

SRF

ARX20

VCHR

ITV

IC

PVQ

VEF
VEP

VER

VEA

VY2

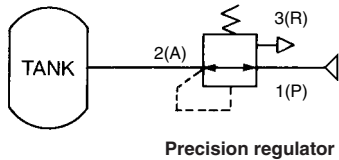
VBA
VBAT

AP100

Application Example

Relief Type Regulator

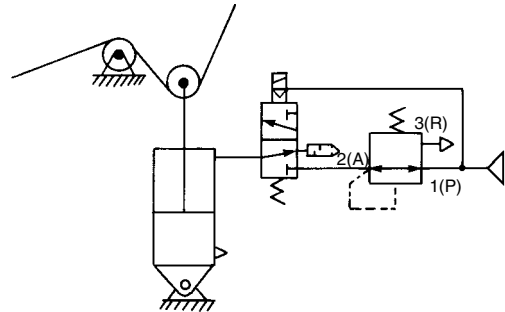
Precise internal tank pressure setting



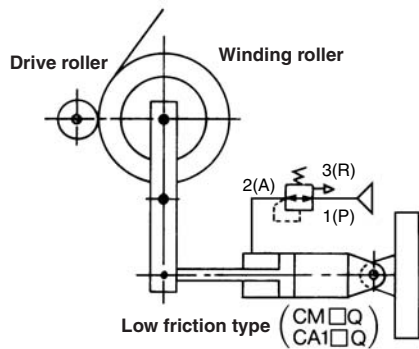
- Large effective areas of both supply and exhaust sides make it possible to precisely set large-flow internal tank pressure.

Accurate Pressure Setting

Sensitivity within 0.2% F.S. (Full span) Tension control



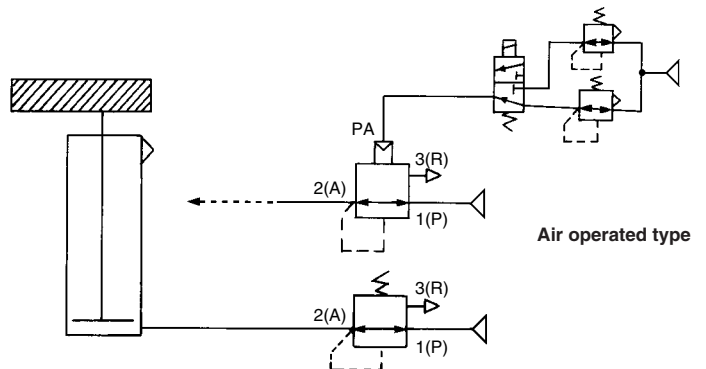
Contact Pressure Control



- Pressure is kept steady, responding rapidly to the position change of the piston in the cylinder.

Balance and Drive

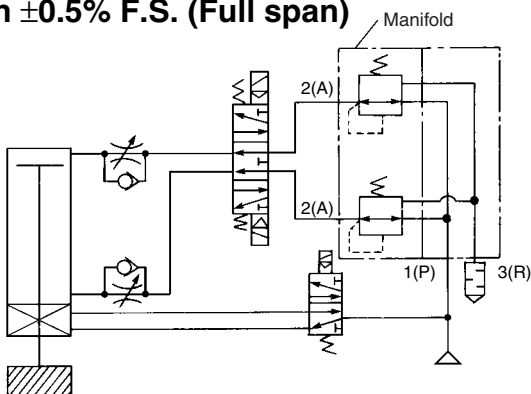
Accurate balance pressure setting



- Pressure changes during cylinder actuation are suppressed, balancing the cylinder in both static and dynamic conditions.

Load Balance (With superior repeatability)


Within ±0.5% F.S. (Full span)



- Accurate balance pressure setting and superior repeatability prevent actuating play in the cylinder, and make the stop precision steady.
- Manifold can be mounted to VEX1B33, VEX123⁰.

Power Valve/Precision Regulator **Series VEX1□3□**

Specifications

Model	VEX1A33- ^{M5} ₀₁	VEX1B33- ^{M5} ₀₁	VEX113 ^{0.01} _{3 02}	VEX123 ^{0.01} _{3 02}	VEX133 ^{0.02} _{3 03 04}	VEX153 ^{0.04} _{3 06 10}	VEX173 ^{0.10} _{3 12}	VEX193 ^{0.14} _{3 20}											
Operation	Manual (Push locking slotted type)		Manual handle (Push locking slotted type) and Air operated type																
Pilot	Internal pilot  (External pilot can be switched. * Refer to "How to Switch to External Pilot" on page 574.)																		
Fluid	Refer to Applicable Fluids.		Air																
Supply pressure	(Set pressure + 0.1 MPa) to Max. 1 MPa ⚠ Caution * Refer to "Precautions".																		
Setting pressure range	0.01 to 0.7 MPa			0.05 to 0.7 MPa															
Ambient temperature (1)	0 to 60°C																		
Fluid temperature (1)	0 to 60°C (VEX1 ^A ₃₃) 0 to 99°C (VEX1 ^A _{33B})			0 to 60°C															
Repeatability	Within ±0.5% F.S. (Full span)																		
Sensitivity	Within 0.2% F.S. (Full span)																		
Air consumption (2)	9.5 ℓ/min (ANR) (at supply pressure 1.0 MPa)																		
Mounting	Free																		
Port size	Port	M5	01	M5	01	01	02	01	02	02	03	04	04	06	10	10	12	14	20
	1(P)															1	1 1/4	1 1/2	
	2(A)	M5	1/8	M5	1/8	1/8	1/4	1/8	1/4	1/4	3/8	1/2	1/2	3/4	1	1 1/4	1 1/2	2	
3(R)																			
Mass (kg)	0.15		0.18 ⁽⁴⁾		0.2		0.3 ⁽⁴⁾		0.5			1.4		2		4			



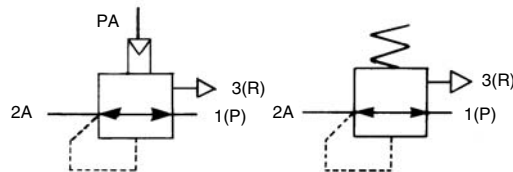
- Note 1) No condensation.
- Note 2) Large amount of air is exhausted all the time.
- Note 3) Applicable only to air operated type.
- Note 4) With sub-plate.
- Note 5) Non-lubricated specifications are not available for valve sizes 1 to 9.



Applicable Fluids

Model	VEX1 ^A ₃₃ (Seal material: HNBR seals)	VEX1 ^A _{33B} (Seal material: FKM seals)
Fluid	Air (Normal, Dry)	High temp. air (Max. 99°C)

JIS Symbol



Air operated type

ARJ

AR425
to 935

AMR

ARM

ARP

IR

IRV

VEX1□

SRH

SRP

SRF

ARX20

VCHR

ITV

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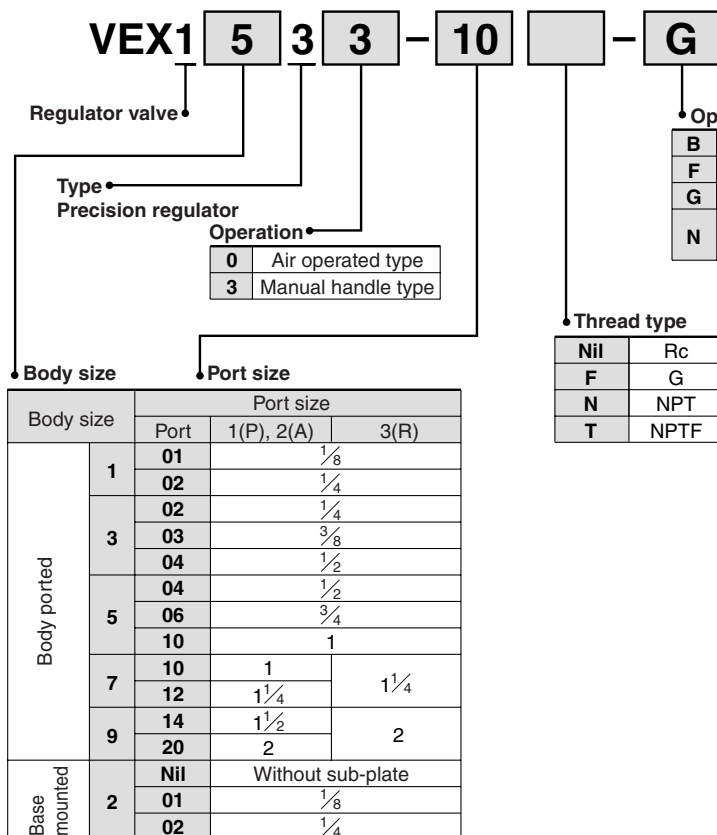
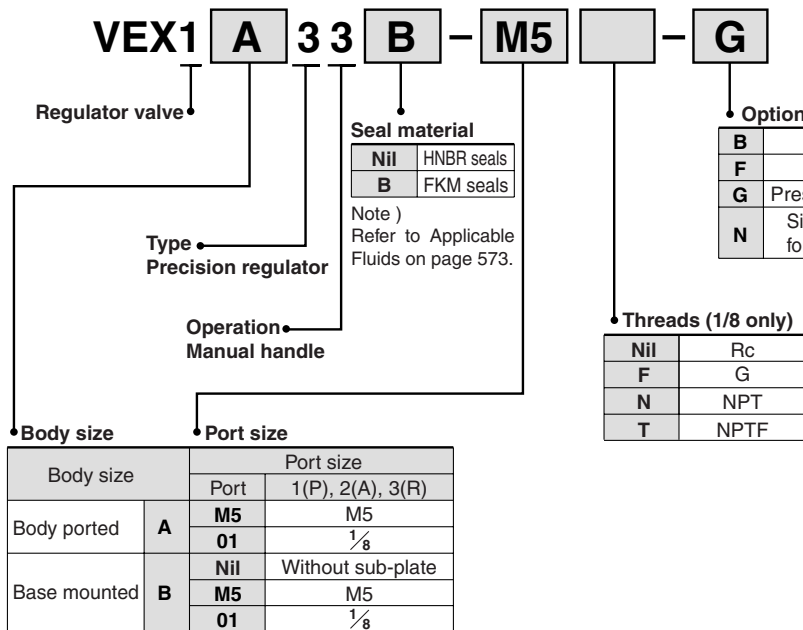
VY2

VBA
VBAT

AP100

Series VEX1□3⁰₃

How to Order



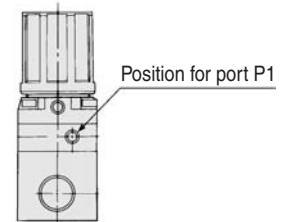
⚠ Caution

Using the External Pilot

1. If a pressure difference over 0.1 MPa between the supply and the set pressure cannot be maintained, change to an external pilot to obtain the necessary pressure difference.
2. If a mist separator cannot be installed on the supply side, change to an external pilot, and make sure to install a mist separator on the pilot side.

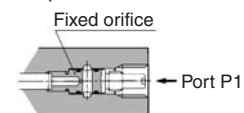
How to Switch to External Pilot

1. Using a flat head screwdriver, remove the fixed orifice from port P1.
2. Install the fixed orifice facing in the opposite direction (external pilot). Install it carefully to prevent damage to the O-ring.
3. Tighten the fixed orifice again and connect the pilot piping to port P1 using an M5 fitting.

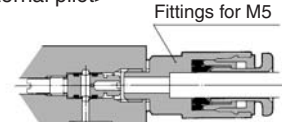


Dimensions of port P1

<Internal pilot>



<External pilot>



Fixed orifice assembly (with O-ring) part no.:

VEX1-A30-3

Note) O-rings cannot be shipped as a single unit.

Option ⁽¹⁾

Description		Part no.							
		VEX1A33	VEX1B33	VEX113 ³	VEX123 ³	VEX133 ³	VEX153 ³	VEX173 ³	VEX193 ³
Bracket (With bolt and washer)	B	VEX1-18-1A	—	VEX1-18-1A	—	VEX3-32A	VEX5-32A	VEX7-32A	VEX9-32A
Foot (With bolt and washer)	F	VEX1-18-2A	—	VEX1-18-2A	—	—	—	—	—
Pressure gauge ⁽²⁾	G	G27-10-R1-X207		G27-10-01		G36-10-01	G46-10-01		
Silencer for bleed port (PE)	N	AN120-M5							



Note 1) The optional parts are shipped in the same package.

Note 2) If a pressure gauge other than that which is indicated in the option table is to be used, also enter the part number of the pressure gauge.

Refer to the pressure gauge guide in Best Pneumatics No. 6 for details.

Example: VEX1333-03

G36-4-01

Sub-plate/Base Gasket Part No.

Valve body size	B	2																																
Sub-plate	<p>VEXB-2-□□P</p> <p>Port size</p> <table border="1"> <thead> <tr> <th>Symbol</th> <th>Port size</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>M5</td> </tr> <tr> <td>B</td> <td>1/8</td> </tr> </tbody> </table> <p>Thread type</p> <table border="1"> <thead> <tr> <th>Symbol</th> <th>Thread type</th> </tr> </thead> <tbody> <tr> <td>Nil</td> <td>Rc</td> </tr> <tr> <td>F</td> <td>G</td> </tr> <tr> <td>N</td> <td>NPT</td> </tr> <tr> <td>T</td> <td>NPTF</td> </tr> </tbody> </table>	Symbol	Port size	A	M5	B	1/8	Symbol	Thread type	Nil	Rc	F	G	N	NPT	T	NPTF	<p>VEX1-9-1□□P</p> <p>Port size</p> <table border="1"> <thead> <tr> <th>Symbol</th> <th>Port size</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>1/8</td> </tr> <tr> <td>B</td> <td>1/4</td> </tr> </tbody> </table> <p>Thread type</p> <table border="1"> <thead> <tr> <th>Symbol</th> <th>Thread type</th> </tr> </thead> <tbody> <tr> <td>Nil</td> <td>Rc</td> </tr> <tr> <td>F</td> <td>G</td> </tr> <tr> <td>N</td> <td>NPT</td> </tr> <tr> <td>T</td> <td>NPTF</td> </tr> </tbody> </table>	Symbol	Port size	A	1/8	B	1/4	Symbol	Thread type	Nil	Rc	F	G	N	NPT	T	NPTF
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Base gasket	<p>VEXB-4□</p> <p>Seal material</p> <table border="1"> <thead> <tr> <th>Symbol</th> <th>Seal material</th> </tr> </thead> <tbody> <tr> <td>Nil</td> <td>HNBR seals</td> </tr> <tr> <td>B</td> <td>FKM seals</td> </tr> </tbody> </table>	Symbol	Seal material	Nil	HNBR seals	B	FKM seals	VEX1-11-2																										
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VY2

VBA
VBAT


AP100

Series VEX1□3⁰

Manifold Specifications

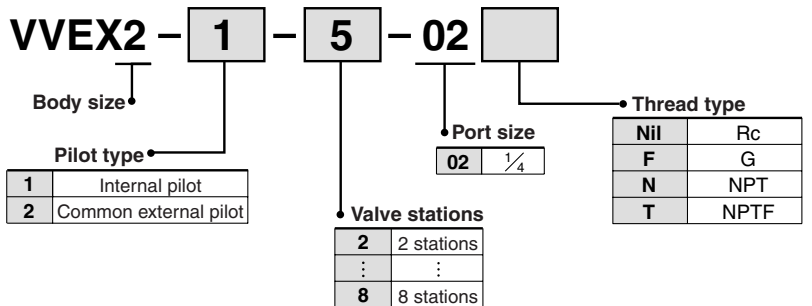
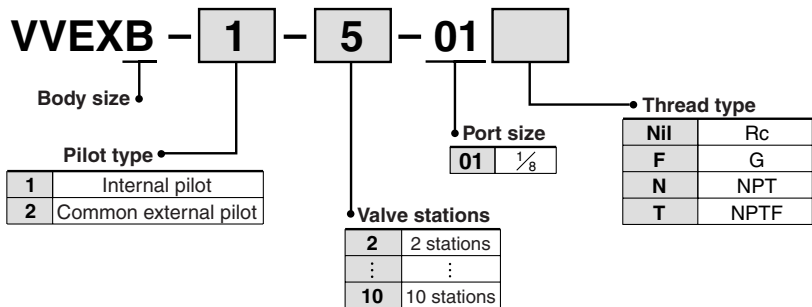
Specifications

Applicable valve	VEX1B33		VEX123 ⁰					
Valve stations	2 to 10 stations <small>Note)</small>		2 to 8 stations <small>Note)</small>					
Air passage	Common supply/exhaust							
Pilot	Internal pilot	Common external pilot	Internal pilot	Common external pilot				
Pilot port size	—	M5 x 0.8	—	M5 x 0.8				
Port size Port 1(P), 2(A), 3(R)	1/8		1/4					
Blanking plate	<p>VEXB-5 (With gasket and mounting bolt)</p> <p>Seal material</p> <table border="1"> <tr> <td>Nil</td> <td>HNBR seals</td> </tr> <tr> <td>B</td> <td>FKM seals</td> </tr> </table>		Nil	HNBR seals	B	FKM seals	<p>VEX1-17 (With gasket and mounting bolt)</p>	
Nil	HNBR seals							
B	FKM seals							

 Note) Pressurize to Port 1(P) and exhaust from Port 3(R) on the both sides for six stations or more of "VEX1B33" and/or five stations or more of "VEX1233".



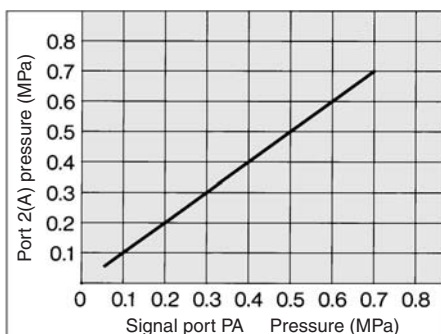
How to Order



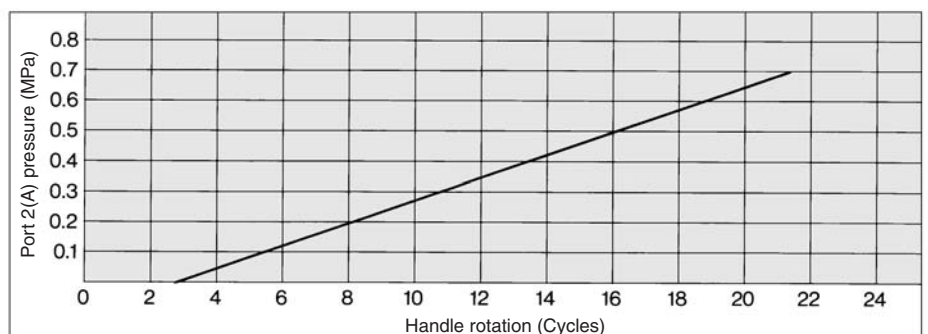
List symbols in the order of precision regulators and blanking plates for manifolds from the left-hand side (Port 2(A) faces this side) of the manifold base.

- Ex.) VVEX2-2-5-02
 ● VEX1233-G — 4 pieces
 ● VEX1-17 — 1 piece

Set Pressure Characteristics (Air Operated Type)



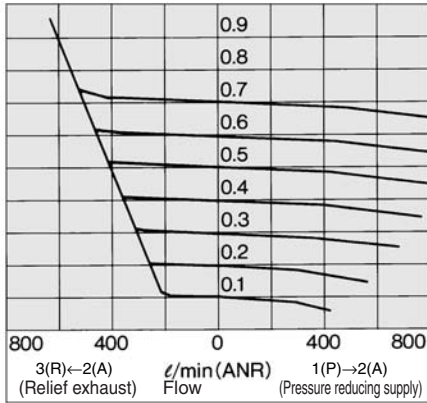
Set Pressure Characteristics (Manual Handle Type)



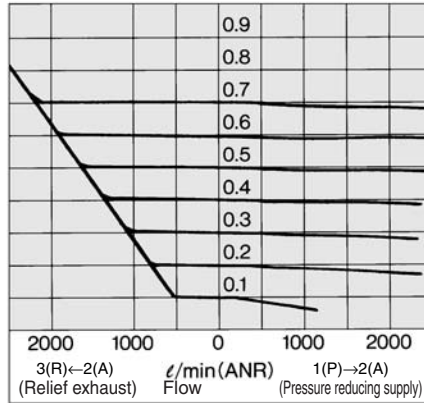
Flow Characteristics

Port 1(P) pressure: 1 MPa

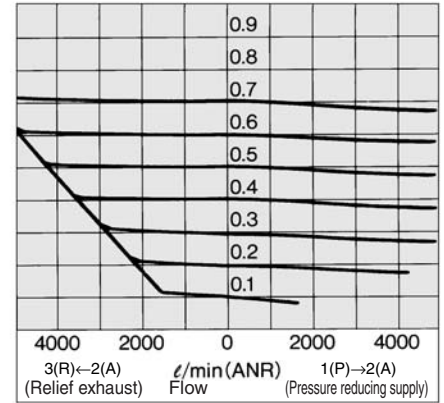
VEX1A33, VEX1B33-01
Port 2(A) pressure (MPa)



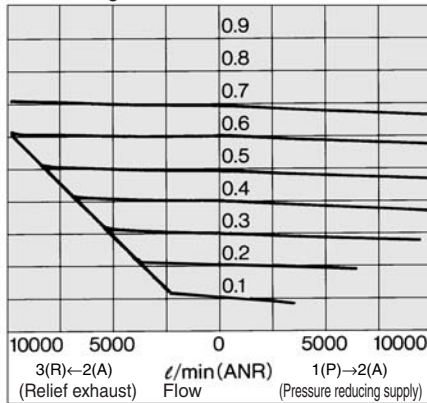
VEX113⁰₃, VEX123⁰₃-02
Port 2(A) pressure (MPa)



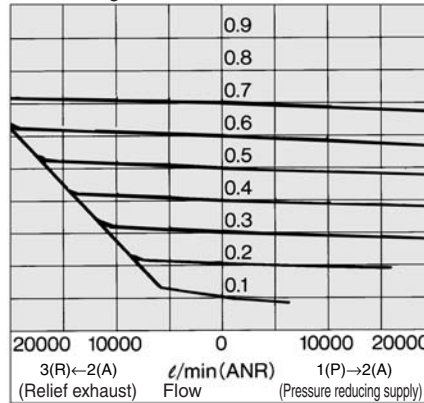
VEX133⁰₃-03
Port 2(A) pressure (MPa)



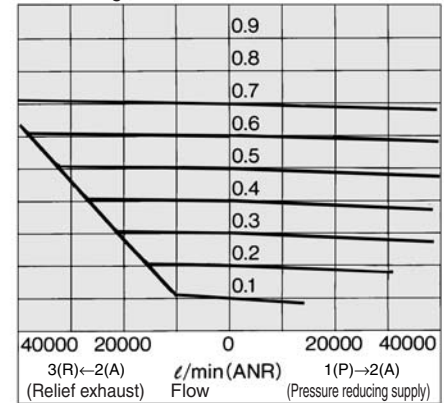
VEX153⁰₃-06 Port 2(A) pressure (MPa)



VEX173⁰₃-12 Port 2(A) pressure (MPa)



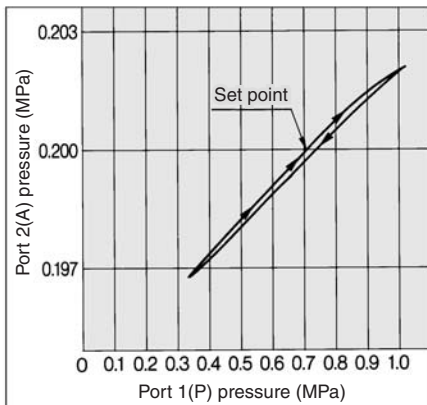
VEX193⁰₃-20 Port 2(A) pressure (MPa)



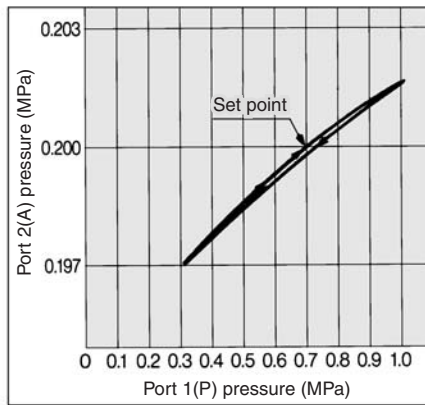
Pressure Characteristics

Port 1(P) pressure: 0.7 MPa, Port 2(A) pressure: 0.2 MPa, Flow: 0 l/min (ANR)

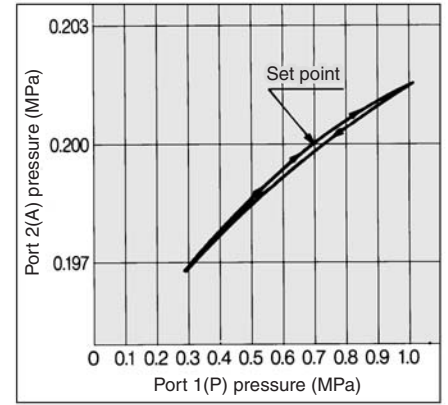
VEX1A33, VEX1B33



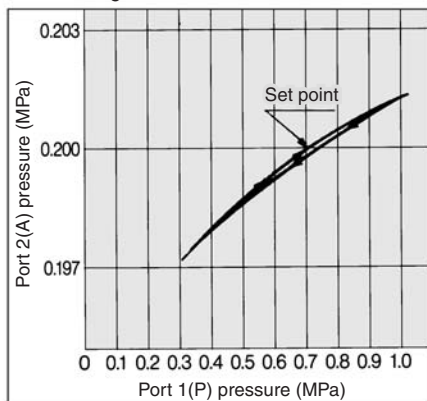
VEX113⁰₃, VEX123⁰₃



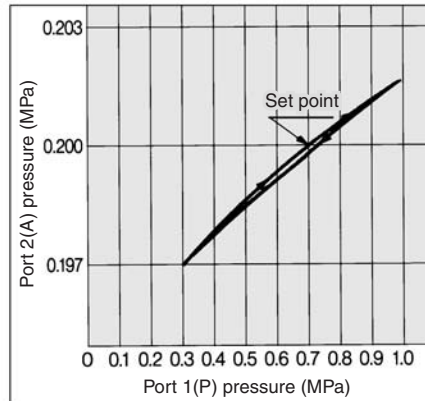
VEX133⁰₃



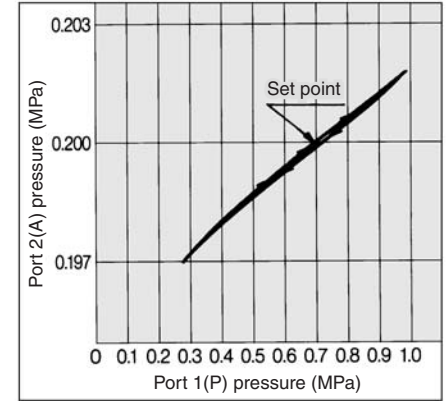
VEX153⁰₃



VEX173⁰₃



VEX193⁰₃



ARJ

AR425 to 935

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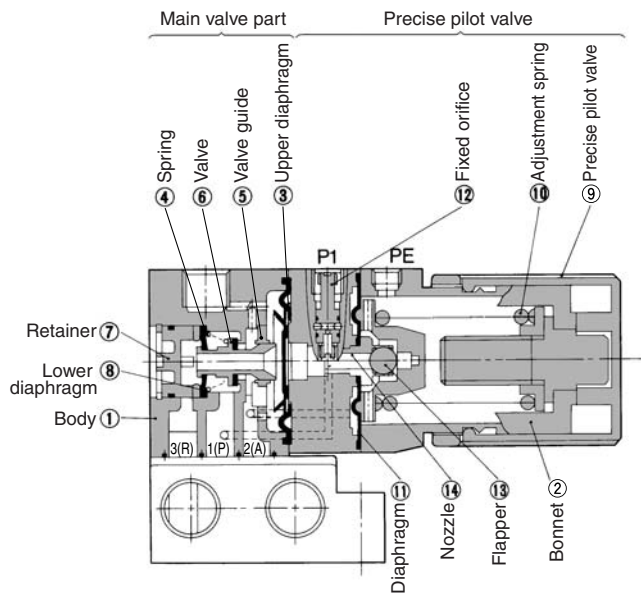
VBA VBAT

AP100

Series VEX1□3₃⁰

Construction/Working Principle

VEX1A33, VEX1B33



When set-handle ⑨ is turned clockwise, the force generated by set spring ⑩ causes flapper ⑬ to close nozzle ⑭, allowing the nozzle back pressure to be applied to the right surface of top diaphragm ③. Then, valve ⑥ moves to the left, allowing the supply air to flow from port 1(P) to port 2(A). The air pressure that has flowed in is applied to the left surface of top diaphragm ③ and counteracts the force generated by the nozzle back pressure; at the same time, it is applied to the left surface of diaphragm ⑪, and balances with the set pressure that counteracts the compression force of set spring ⑩.

When the outlet pressure increases higher than the set pressure, it pushes diaphragm ⑪ towards the right, and the pressure at the right side of top diaphragm ③ decreases, causing top diaphragm ③ to move to the right. Then, valve ⑥ moves away from the left surface of top diaphragm ③, the outlet pressure flows from port 2(A) via the valve hollow and is discharged through port 3(R) (atmosphere). If set handle ⑨ is turned counterclockwise, the movement will be the opposite, the outlet pressure will decrease, and will balance with a newly set pressure.

Component Parts

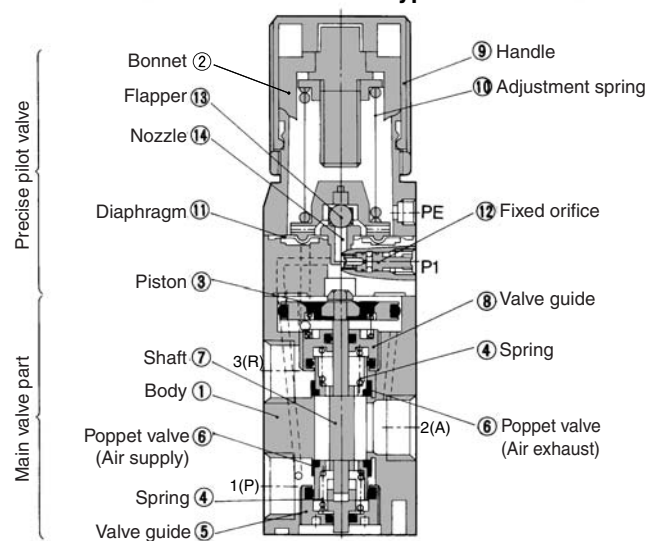
No.	Description	Material
1	Body	Zinc alloy die-casted
2	Bonnet	Aluminum alloy die-casted
3	Upper diaphragm	HNBR/FKM
4	Spring	Stainless steel
5	Valve guide	Stainless steel
6	Valve	HNBR/FKM
7	Retainer	Resin
8	Lower diaphragm	HNBR/FKM

Replacement Parts

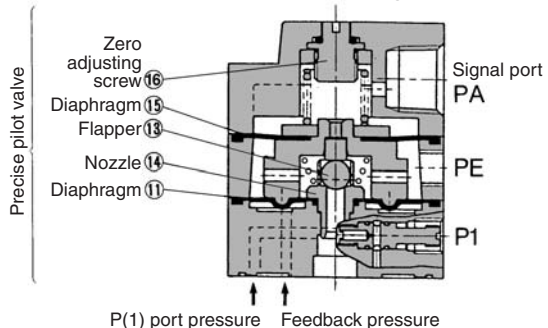
No.	Description	Part no.
9	Handle	VBA1-10

VEX113₃⁰, VEX123₃⁰, VEX133₃⁰, VEX153₃⁰ VEX173₃⁰, VEX193₃⁰

Manual handle type



Air operated type



When set-handle ⑨ is turned clockwise, the force generated by set spring ⑩ causes flapper ⑬ to close nozzle ⑭, allowing the nozzle back pressure to be applied to the top of piston ③. Then, via shaft ⑦, poppet valve (supply air) ⑥ opens, allowing the supply air to flow from port 1(P) to port 2(A). The air pressure that has flowed in is applied to the bottom surface of piston ③ and counteracts the force generated by the nozzle back pressure; at the same time, it is applied to the bottom surface of diaphragm ⑪, and balances with the set pressure that counteracts the compression force of set spring ⑩.

When the outlet pressure increases higher than the set pressure, it pushes the diaphragm ⑪ upward, the pressure at the top surface of piston ③ decreases, causes piston ③ to move upward, opens poppet valve (exhaust) ⑥ via shaft ⑦, and is discharged through port 3(R) to the atmosphere.

If set-handle ⑨ is turned counterclockwise (if the set pressure of the pressure-reducing valve connected to the signal port is decreased), the movement will be the opposite; the outlet pressure will decrease and balance with a newly set pressure.

Note) Those indicated in parentheses are for the air operated type.

Component Parts

No.	Description	Material
1	Body	Aluminum alloy die-casted
2	Bonnet	Aluminum alloy die-casted
3	Regulating piston	Aluminum alloy
4	Spring	Stainless steel
5	Valve guide	Aluminum alloy
6	Poppet valve	HNBR
7	Shaft	Stainless steel
8	Valve guide	Aluminum alloy

Replacement Parts

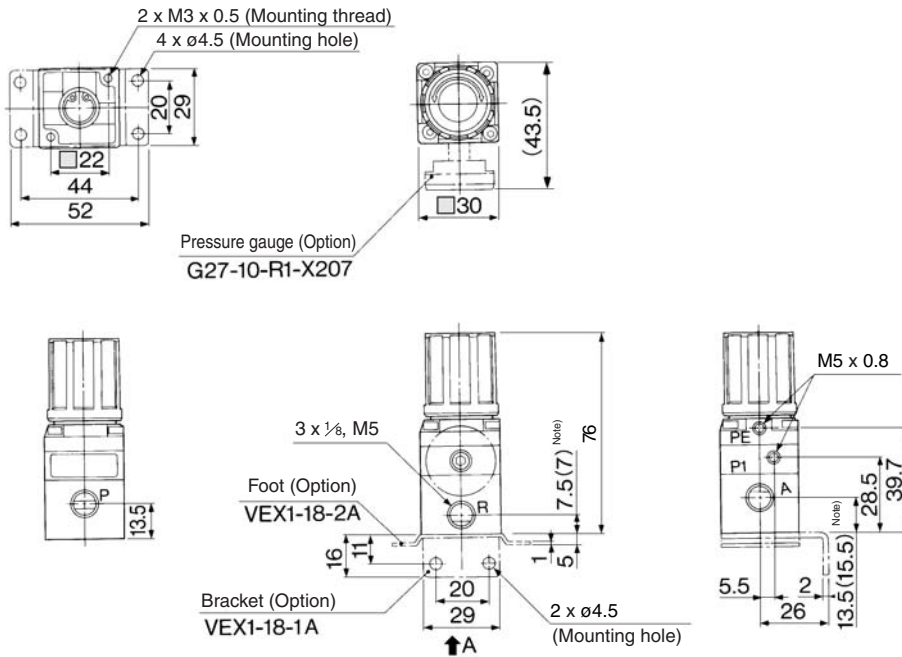
No.	Description	Part no.
9	Handle	VBA1-10



Body Ported

VEX1A33-M5, 01

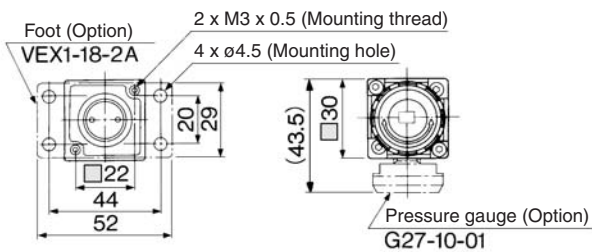
A section view



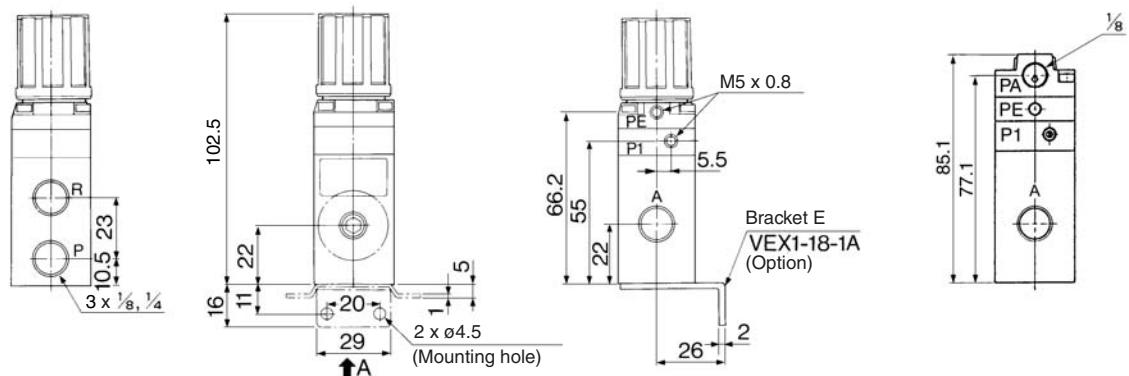
Note () are the dimensions of "M5".

VEX113⁰-01, 02

A section view



Air operated type



ARJ

AR425
to 935

AMR

ARM

ARP

IR

IRV

VEX1□

SRH

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VY2

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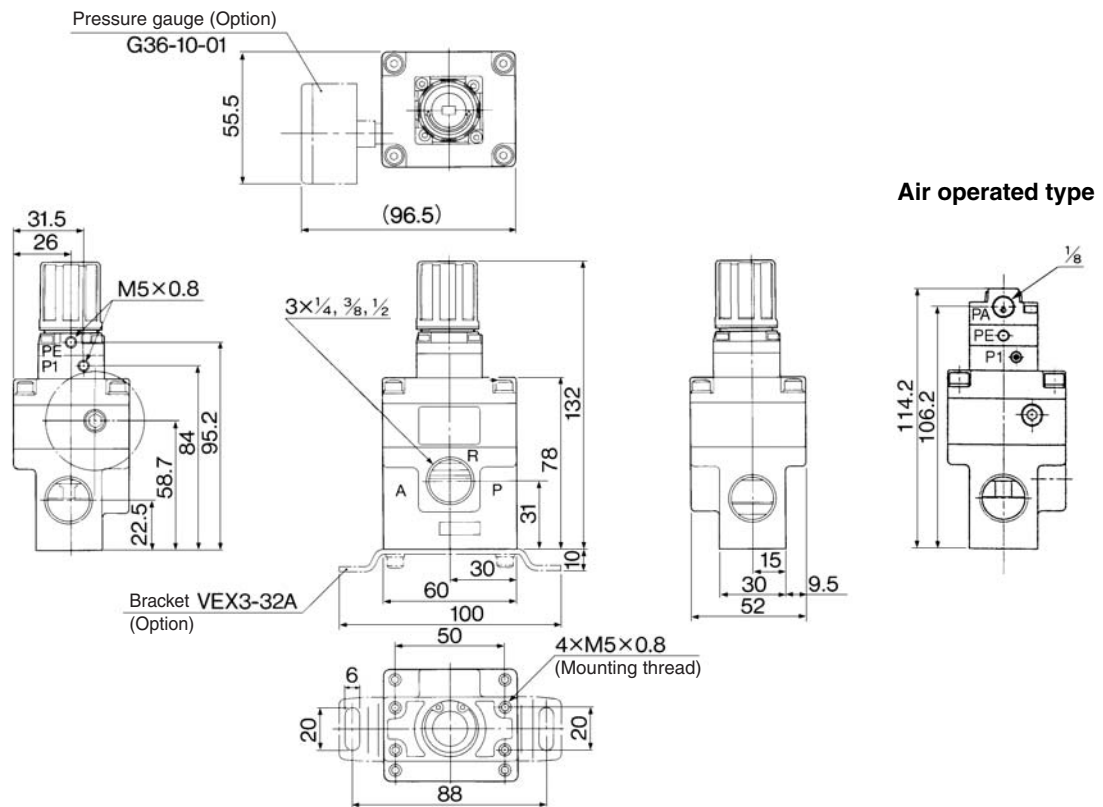
AP100

Series VEX1□3₃⁰



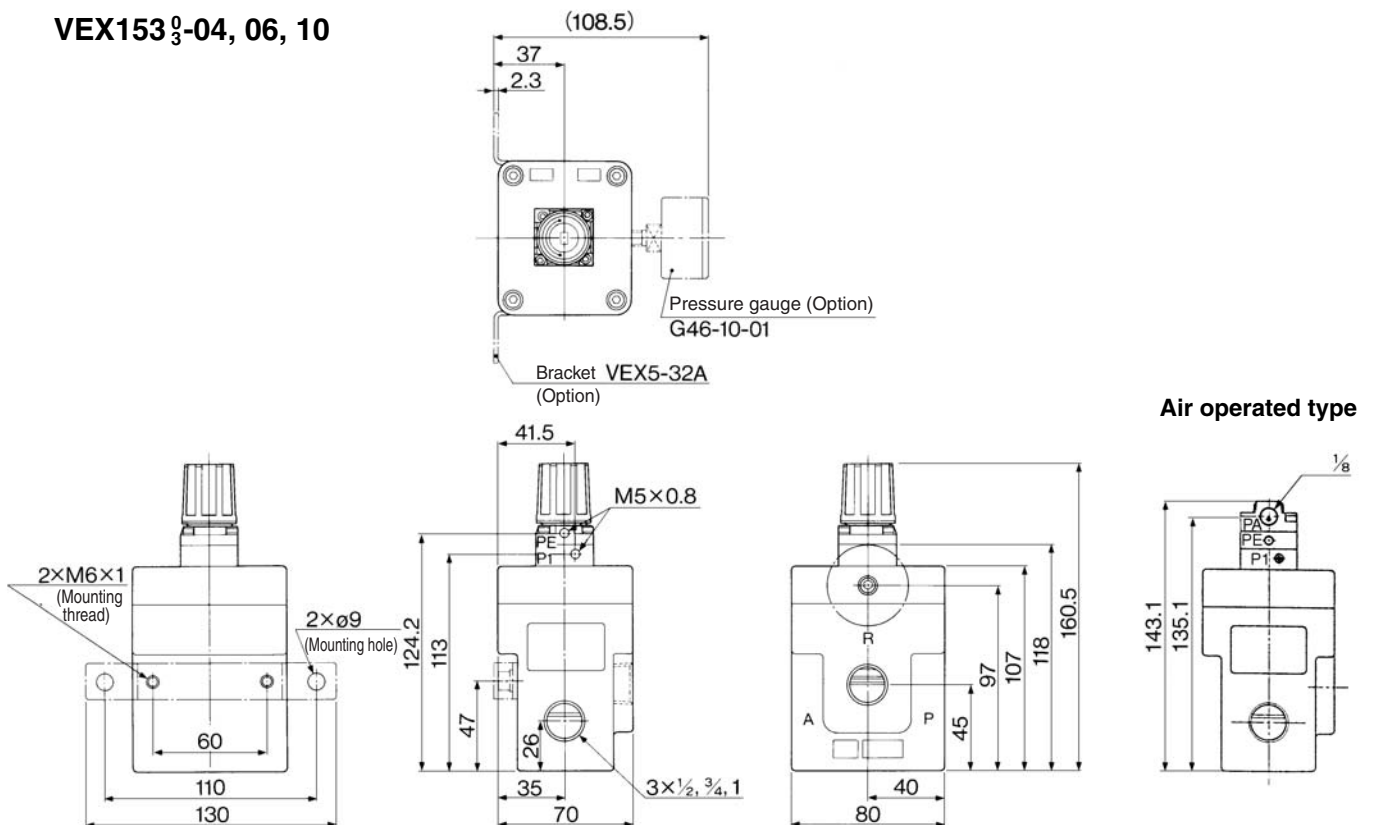
Body Ported

VEX133₃⁰-02, 03, 04



Air operated type

VEX153₃⁰-04, 06, 10

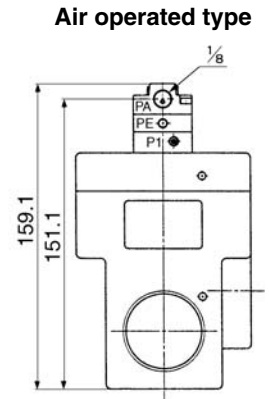
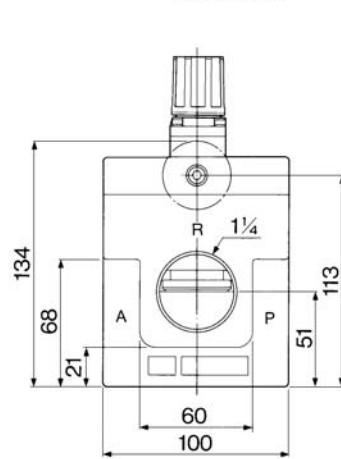
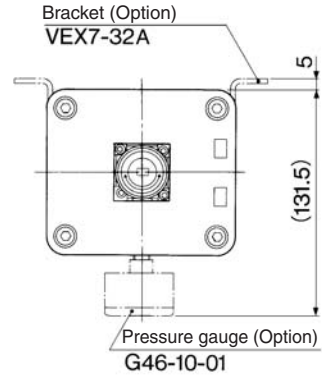
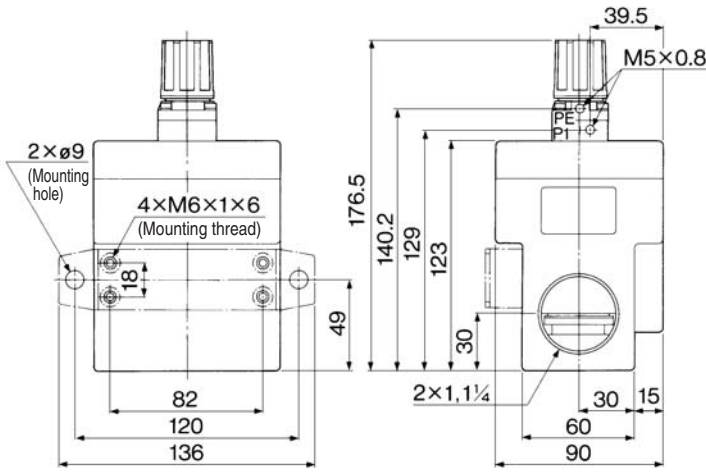


Air operated type

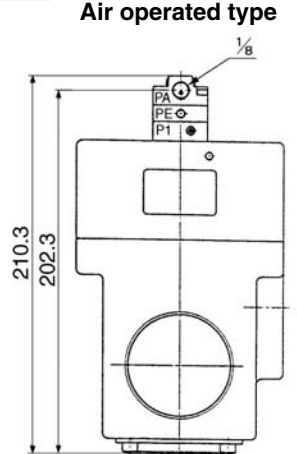
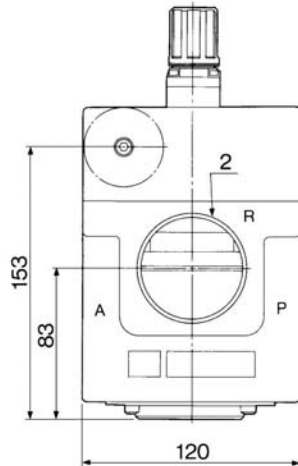
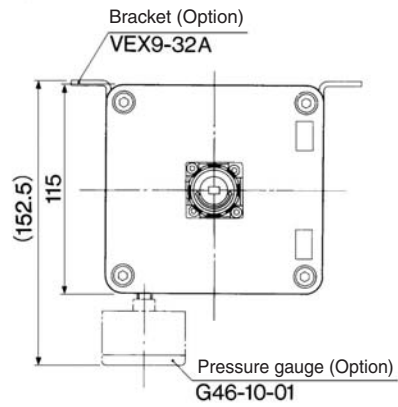
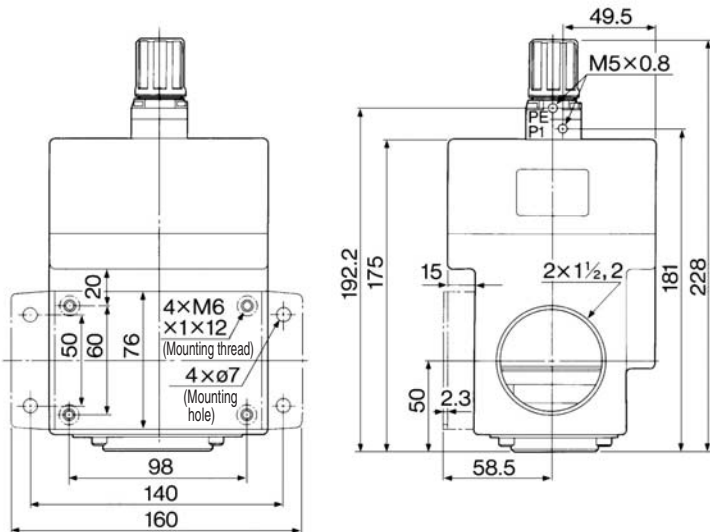


Body Ported

VEX173⁰-10, 12



VEX193⁰-14, 20



ARJ

AR425
to 935

AMR

ARM

ARP

IR

IRV

VEX1□

SRH

SRP

SRF

ARX20

VCHR

ITV

IC

PVQ

VEF
VEP

VER

VEA

VY2

VBA
VBAT

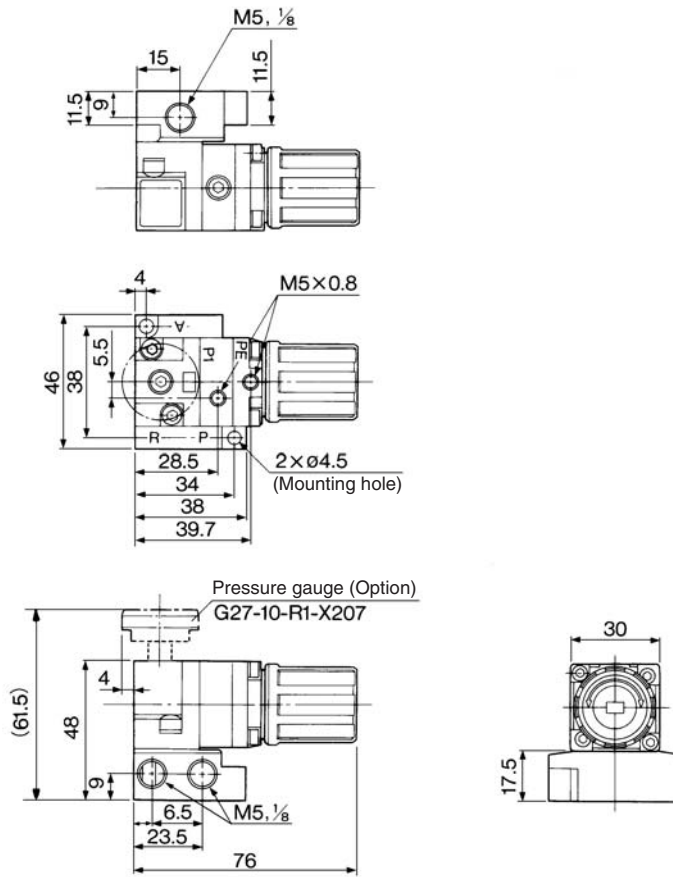
AP100

Series VEX1□3₃⁰

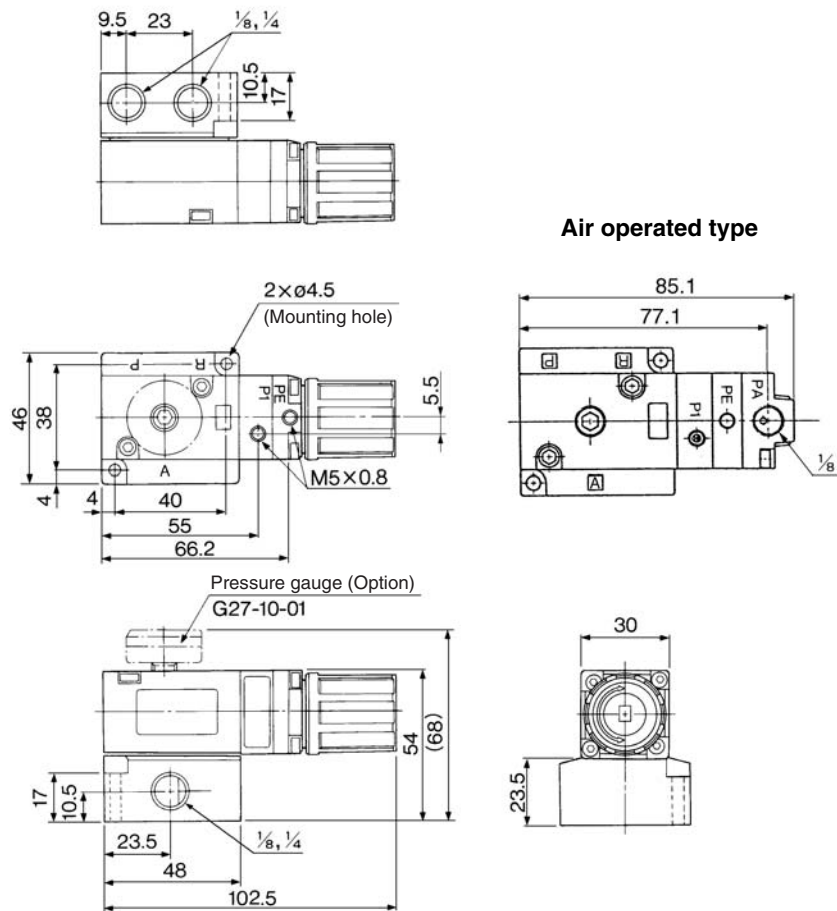


Base Mounted

VEX1B33-M5, 01



VEX123₃⁰-01, 02

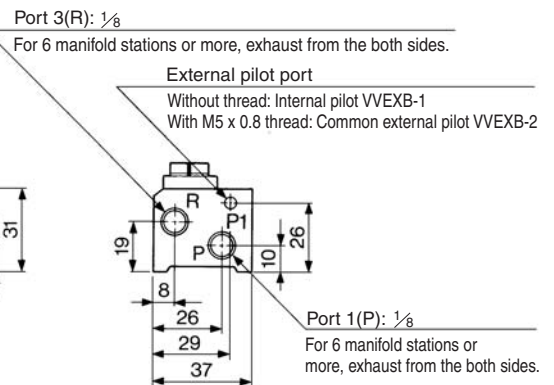
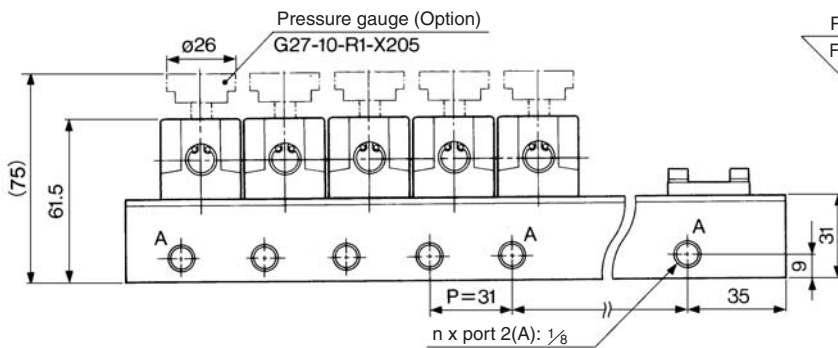
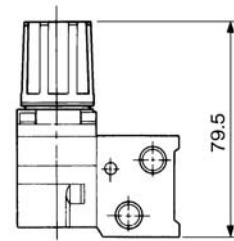
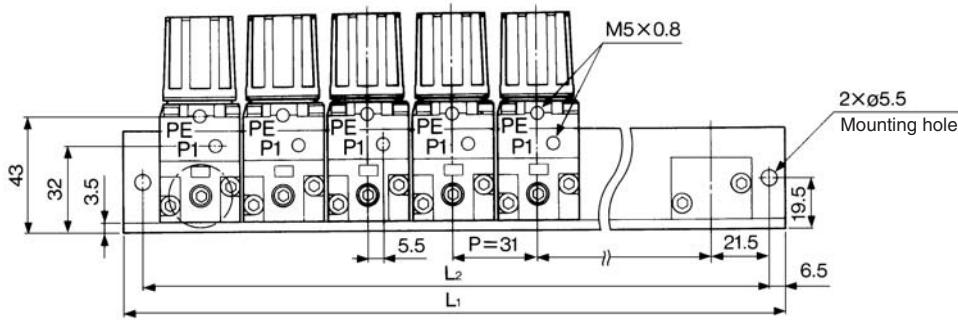
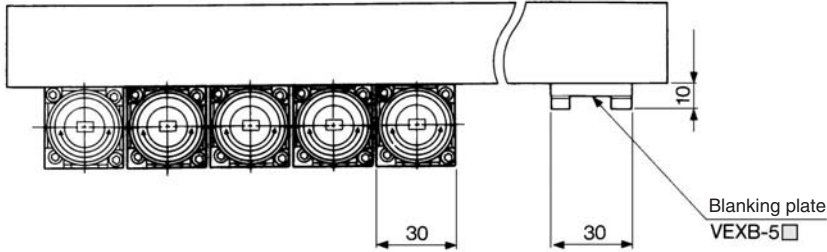
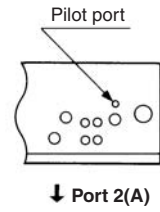




Manifold: VVEXB-□-□-01

Applicable valve: VEX1B33

Valve mounting side



L Dimension

$L_1 = 31n + 25$, $L_2 = 31n + 12$ n: Station

Symbol	n	2	3	4	5	6	7	8	9	10
L ₁		87	118	149	180	211	242	273	304	335
L ₂		74	105	136	167	198	229	260	291	322

- ARJ
- AR425 to 935
- AMR
- ARM
- ARP
- IR
- IRV
- VEX1□
- SRH
- SRP
- SRF
- ARX20
- VCHR
- ITV
- IC
- PVQ
- VEF VEP
- VER
- VEA
- VY2
- VBA VBAT
- AP100

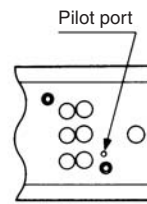
Series VEX1□3₃⁰



Manifold: VVEX2-□-□-02

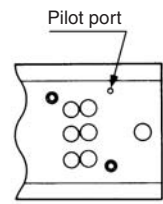
Applicable valve: VEX123₃⁰

Valve mounting side



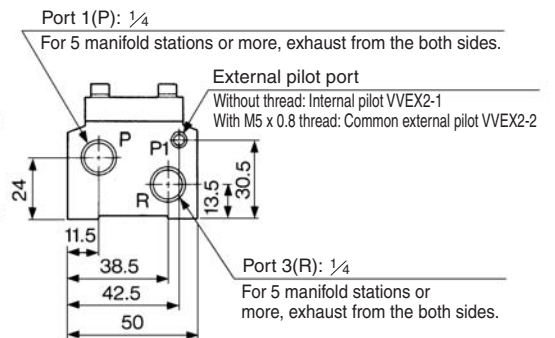
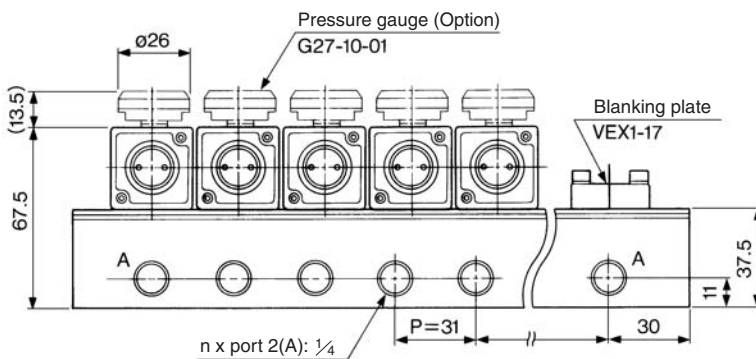
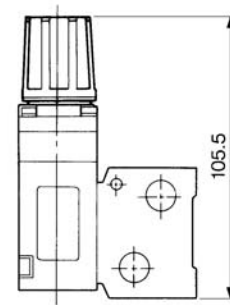
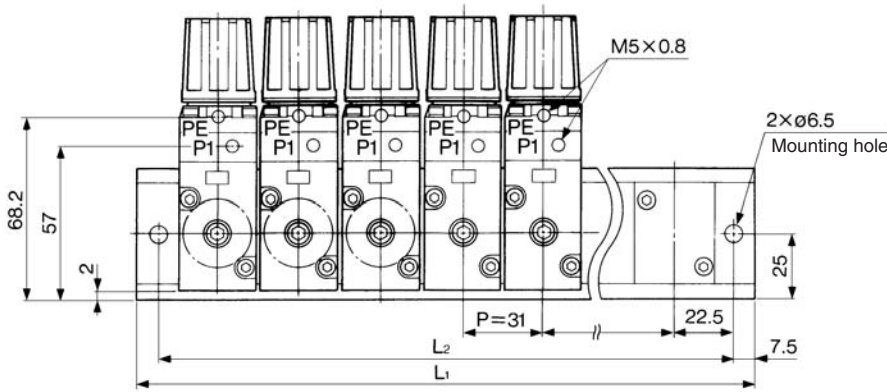
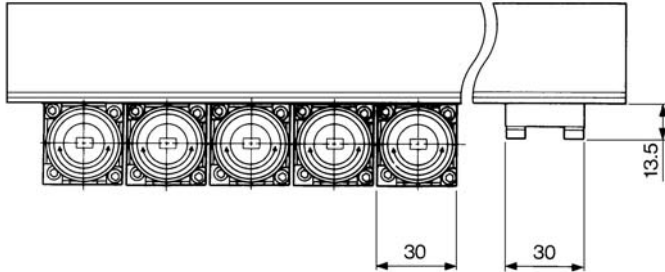
Port 2(A)

Internal pilot
VVEX2-1



Port 2(A)

Common external pilot
VVEX2-2



L Dimension

$L_1 = 31n + 29$, $L_2 = 31n + 14$ n: Station

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

⚠️ Precautions

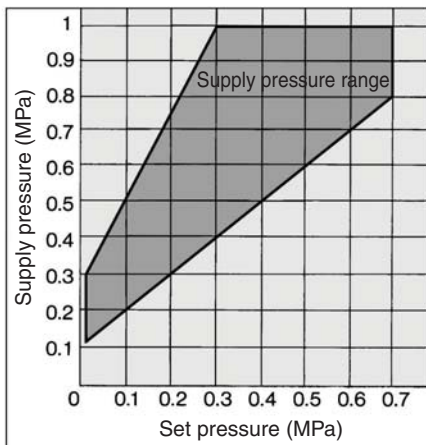
Be sure to read before handling. Refer to front matters 42 and 43 for Safety Precautions and pages 287 to 291 for Precautions on every series.

Operating Fluid

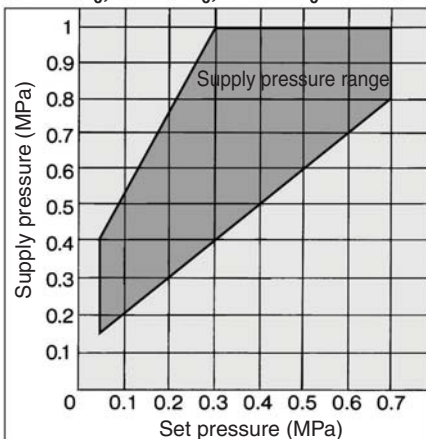
⚠️ Caution

- If drainage or debris is present in the supply pressure line, the fixed orifice becomes clogged, resulting in a malfunction. Therefore, in addition to the air filter (SMC's AF series), make sure to use a mist separator (SMC's AM, AFM series). Concerning the quality of the operating air, refer to SMC's the air preparation equipment selection guide (pages 2 and 3).
- Make sure to perform a maintenance periodically on air filter and mist separator (by discharging the drain and cleaning a filter element or replacing with new one).
- Never use a lubricator on the supply side with the internal pilot remaining in place, doing so will cause the fixed orifice to become clogged, invariably leading to a malfunction.
- When lubrication to terminal device is required: Connect a lubricator on the supply [port 1(P)] side using the external pilot type. Use mist separator passage on the pilot air [port P1] side.
- Use a supply pressure in the recommended range (the range indicated in the diagram below).

VEX1A33, VEX1B33



VEX113₀³, VEX123₀³, VEX133₀³ VEX153₀³, VEX173₀³, VEX193₀³



Piping

⚠️ Warning

- If a (solenoid or mechanical) directional switching valve is installed on the supply side of the precision regulator and the valve is turned ON-OFF repeatedly, it will increase the wear of the nozzle flapper, which could lead the set value to deviate. Therefore, avoid using a directional switching valve on the supply side. To install a directional switching valve, do so on the output side of the pressure-reducing valve. Referring to the flow characteristics on page 577, select an applicable valve size which gives enough flow on both reduced pressure supply and relief exhaust sides. If reduced pressure supply and relief exhaust supply cause extreme flow changes repeatedly, it may damage internal parts more quickly.

⚠️ Caution

- Tightening the fittings and their torque**
When screwing fittings into the valve, make sure to tighten them to the proper torque values given below.

Tightening Torque when Piping

Connection thread	Applicable torque (N·m)
M5 x 0.8	Approx. 1/6 rotation after manual tightening
1/8	7 to 9
1/4	12 to 14
3/8	22 to 24
1/2	28 to 30
3/4	28 to 30
1	36 to 38
1 1/4	40 to 42
1 1/2	48 to 50
2	48 to 50

- Ordinarily, air is discharged from the bleed port (PE). The consumption of air through this discharge is normal, owing to the construction of the precision pressure regulator.

Regulator for Signals (Air operated type only)

⚠️ Caution

- Applicable model
Regulator Series IR2000
Series VEX1₃₃³
- In the case of multiple pressure control, consider using series ITV or the E-P HYREG^R series VY, which can simplify your system.

Zero Adjustment Screw

⚠️ Caution

- The zero adjustment screw has been adjusted at the time of shipment to set the signal pressure and the output pressure as close to 1:1 as possible. Thus, it is not necessary to adjust it for operational purposes.

Vibration

⚠️ Caution

Vibration is likely to occur under the following conditions.

- Supply pressure is relatively high (approx. 0.5 MPa or higher), set pressure is low (approx. 0.1 MPa or lower) and the outlet side is open to the atmosphere.**
- Capacity of the precision regulator outlet side is extremely small.**

The following measures can be taken.

- Set the supply pressure extremely low (+0.1 MPa or more of the set pressure).
- Make the capacity of the precision regulator outlet side larger.
- Install an exhaust throttle valve with a silencer (ASN2-M5) on the bleed port (PE). Vibration can be avoided by adjusting the exhaust throttle. However, if the bleed is throttled too much, sensitivity may be reduced, resulting in poor performance. Be sure not to apply excessive throttle.

Related Products:

Silencer (Series AN)

- Noise reduction capability of over 30 dB.
- Provides a sufficient effective area.



Model	Connection R	Effective area (mm ²)
AN120	M5 x 0.8	5
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

For details, refer to Best Pneumatics No. 6.

Exhaust cleaner (Series AMC)

- Provides noise reduction and oil mist recovery functions.
- Can also be used in an intensive piping system.



Model	Connection R	Effective area (mm ²)	Max. flow (d/min (ANR))
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

- Oil mist removal of 99.9%
- Noise reduction of over 35 dB.

For details, refer to Best Pneumatics No. 6.

ARJ

AR425 to 935

AMR

ARM

ARP

IR

IRV

VEX1□

SRH

SRP

SRF

ARX20

VCHR

ITV

IC

PVQ

VEF VEP

VER

VEA

VY2

VBA VBAT

AP100

Power Valve: Regulator Valve

Series VEX1

Large capacity relief regulator

Rapid tank internal pressure setting, air blow, constant pressure supply and driving, balance and driving, 2 steps directional control setting and multiple steps pressure control



Air operated

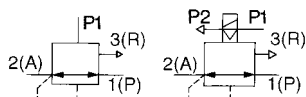


External pilot solenoid

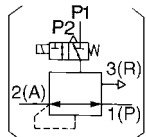
JIS Symbol

Air operated

External pilot solenoid



(Constructive symbol)



Specifications

Model	VEX110□-01-02	VEX120□-01-02	VEX130□-02-03-04	VEX150□-04-06-10	VEX170□-10-12	VEX190□-14-20									
Operation type	Air operated, External pilot solenoid														
Fluid	Air/Inert gas														
Proof pressure	1.5 MPa														
Max. operating pressure	1.0 MPa														
Set pressure range	Air operated	0.05 to 0.9 MPa													
	Solenoid	0.05 to 0.7 MPa		0.05 to 0.9 MPa											
Ambient and fluid temp.	0 to 50°C (Air operated: 0 to 60°C) No condensation														
Hysteresis	0.03 MPa														
Repeatability	0.01 MPa														
Sensitivity	0.01 MPa														
Mounting	Free														
Lubrication	Not required (Use turbine oil Class 1 ISO VG32, if lubricated.)														
Port size Rc	Port	01	02	01	02	02	03	04	04	06	10	10	12	14	20
	P										1	1	1 1/4	1 1/2	2
	A	1/8	1/4	1/8	1/4	1/4	3/8	1/2	1/2	3/4	1	1 1/4	1 1/4	1 1/2	2
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

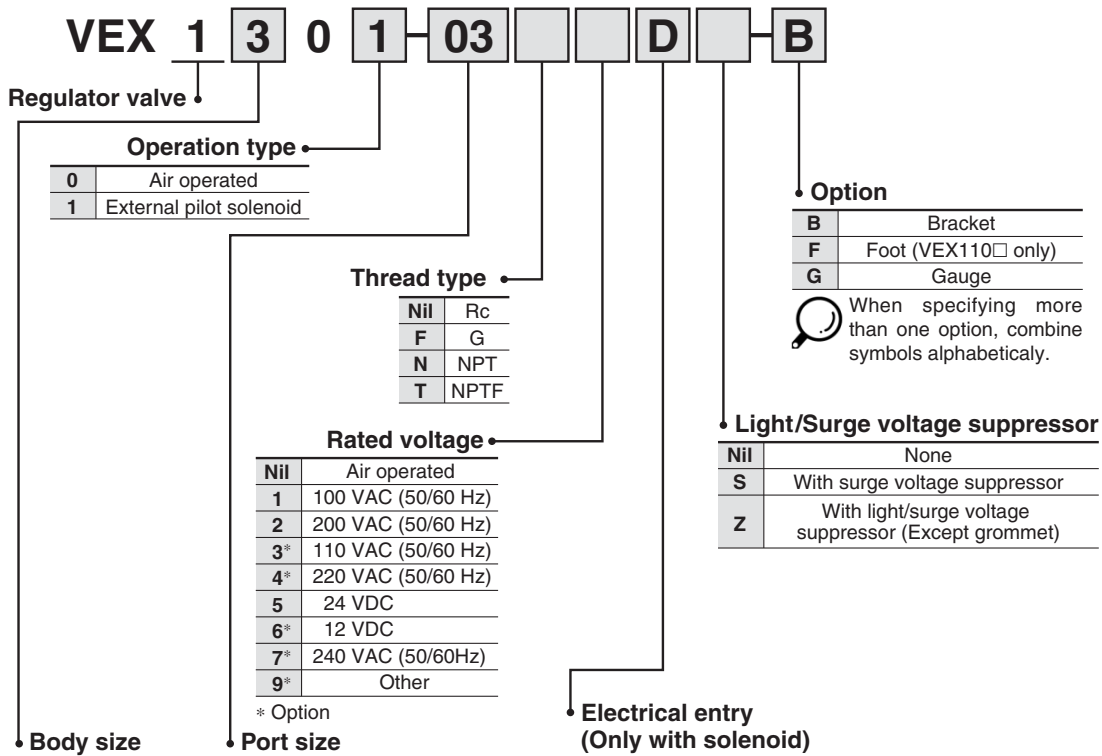
Model	VEX1101/1201/1301	VEX1501/1701/1901
Pilot valve	VK334-□□□	VO307-□□□
Electrical entry	Grommet, DIN terminal	Grommet, Grommet terminal, Conduit terminal, DIN terminal
Coil rated voltage (V)	AC (50/60 Hz)	100 V, 110 V, 200 V, 220 V, 240 V
	DC	6 V, 12 V, 24 V, 48 V
Allowable voltage	±10% of rated voltage	-15 to +10% of rated voltage
Coil insulation	Class B (130°C) or equivalent	
Temperature rise	55°C or less (Rated voltage)	50°C or less (Rated voltage)
Apparent power	AC Inrush	9.5 VA/50 Hz, 8 VA/60 Hz
	DC Holding	7 VA/50 Hz, 5 VA/60 Hz
Power consumption	AC	12.7 VA (50 Hz), 10.7 VA (60 Hz)
	DC	7.6 VA (50 Hz), 5.4 VA (60 Hz)
Manual override	Non-locking push type	

Option

Description	Part no.					
	VEX110□-01-02	VEX120□-01-02	VEX130□-02-03-04	VEX150□-04-06-10	VEX170□-10-12	VEX190□-14-20
Bracket (With bolt and washer)	B VEX1-18-1A	—	VEX3-32A	VEX5-32A	VEX7-32A	VEX9-32A
Pressure gauge ^{Note)}	F VEX1-18-2A	—	—	—	—	—
	G	G27-10-01	G36-10-01	G46-10-01		

Note) When requiring a gauge different than that mentioned above, specify the model number. Option is packed with it. (Refer to Best Pneumatics Vol. 14.) Example: VEX1300-03 G36-4-01

How to Order



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

Model

Model	Operation type		Port size Rc	
	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 1/4
	VEX1900	VEX1901	1 1/2, 2	2

⚠ Caution

Refer to pages 5-11-2 to 5-11-6 for Safety Instructions and Solenoid Valve Precautions.

VEX

AN

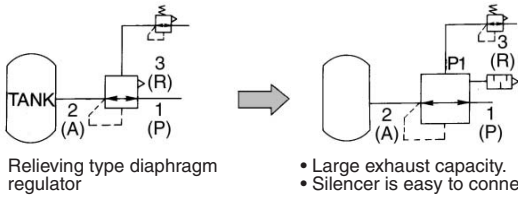
AMC

Series VEX1

Application Example

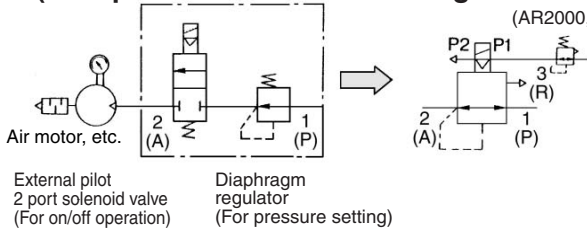
1. Relief regulator (Rapid tank internal pressure setting)

(Relieving type regulator e.g. AR2000)

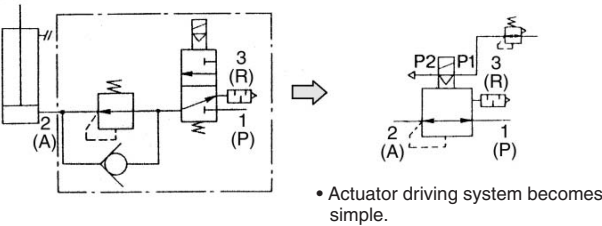
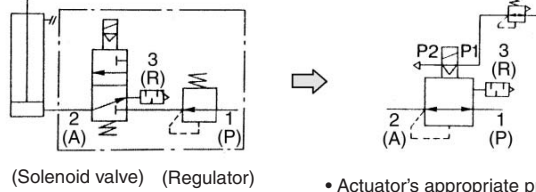


2. Air blow (As 2 port directional control regulator valve)

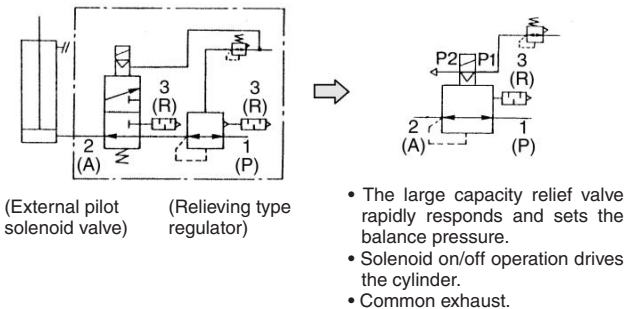
(AR2000, etc.)



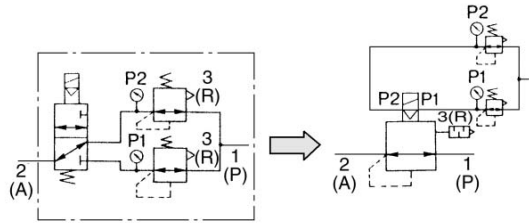
3. Constant pressure supply and driving (As 3 port directional control regulator valve)



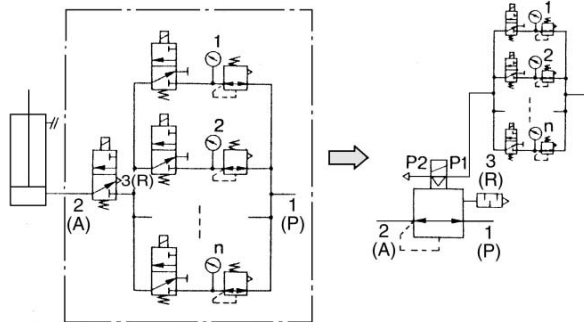
4. Balance and driving



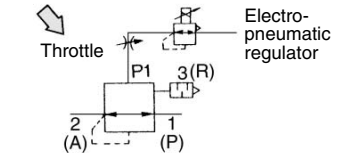
5. 2 steps directional control setting



6. Multiple steps pressure control (Toward stepless control)



- The main driving system is simple consisting of one VEX1 only.
- Remotely controlled by compact pilot system.



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

⚠ Caution

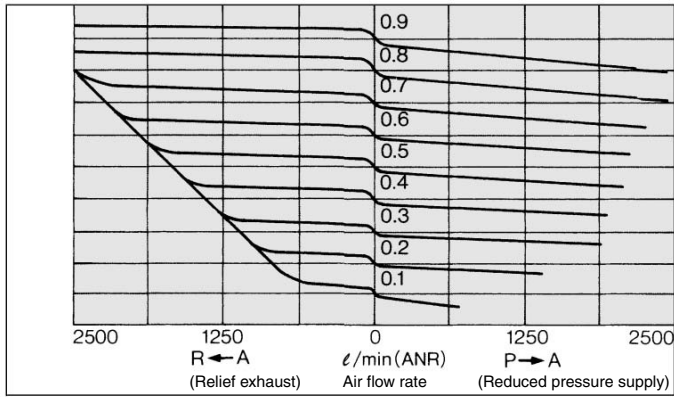
- When the VEX outlet side capacity is small, install a speed controller AS2000, in the pilot pipe to lower the pilot pressure for vibration prevention. (Meter-in)

⚠ Caution

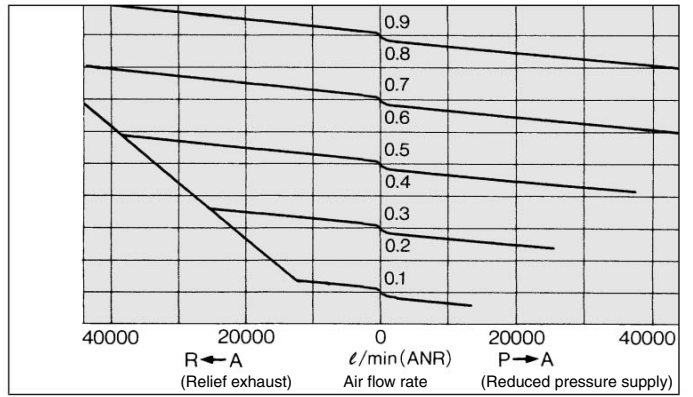
- Relieving type regulator such as AR2000, etc. should be used as pilot regulator in the application.
- A sensitive regulator such as the ARP3000, etc. should be used as a pilot regulator on the low pressure side, particularly with 5. 2 steps directional control setting.

Flow Characteristics

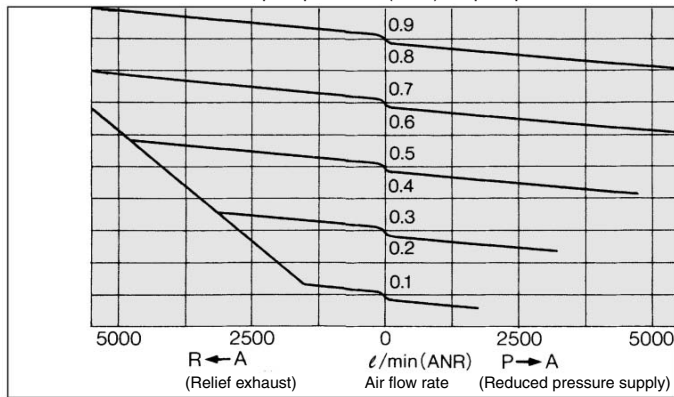
VEX110□/120□ A port pressure (MPa) P port pressure 1.0 MPa



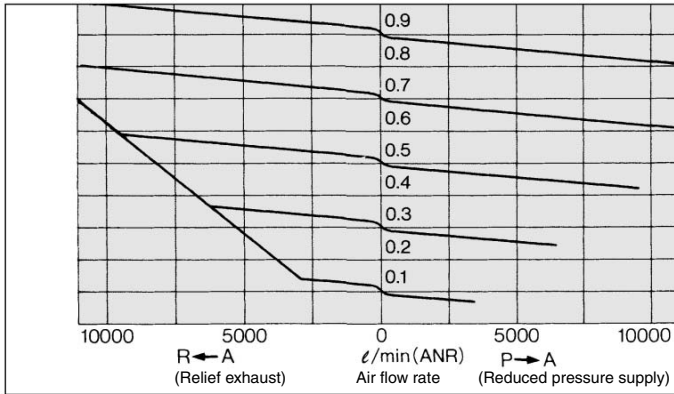
VEX190□ A port pressure (MPa) P port pressure 1.0 MPa



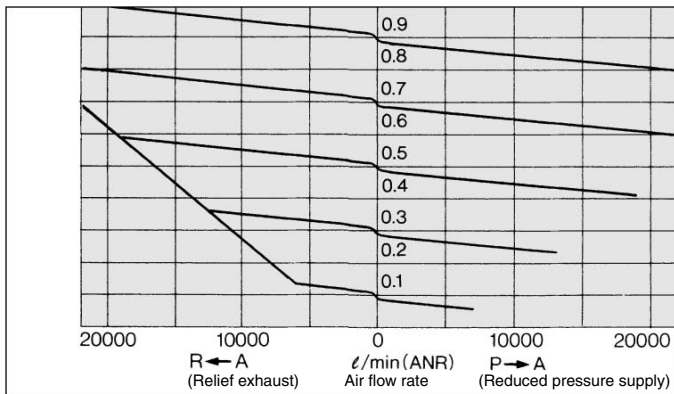
VEX130□ A port pressure (MPa) P port pressure 1.0 MPa



VEX150□ A port pressure (MPa) P port pressure 1.0 MPa

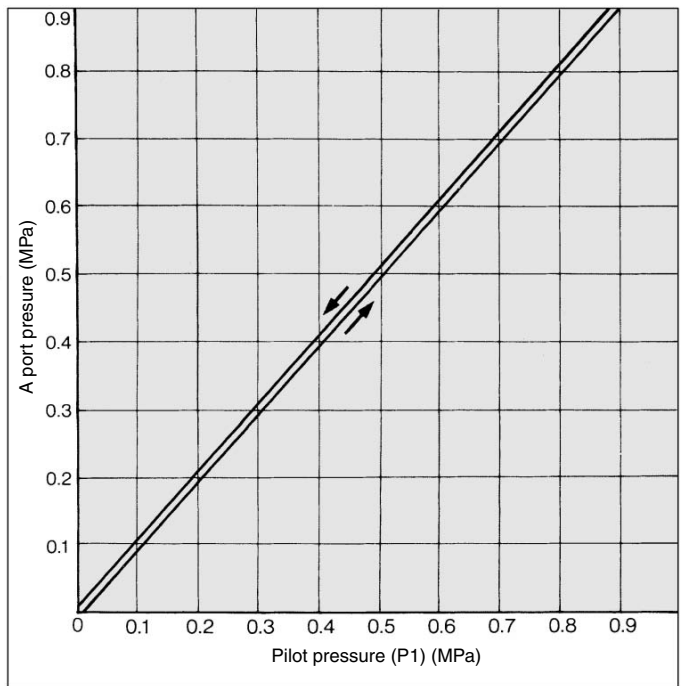


VEX170□ A port pressure (MPa) P port pressure 1.0 MPa



Setting Pressure Characteristics

A port pressure is set according to pilot pressure.



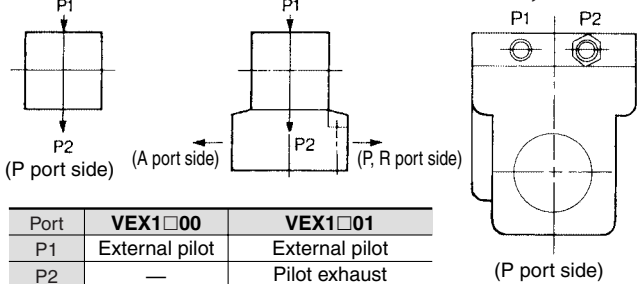
VEX

AN

AMC

External Pilot Piping

VEX110□ **VEX120□** **VEX130□, VEX150□**
VEX170□, VEX190□

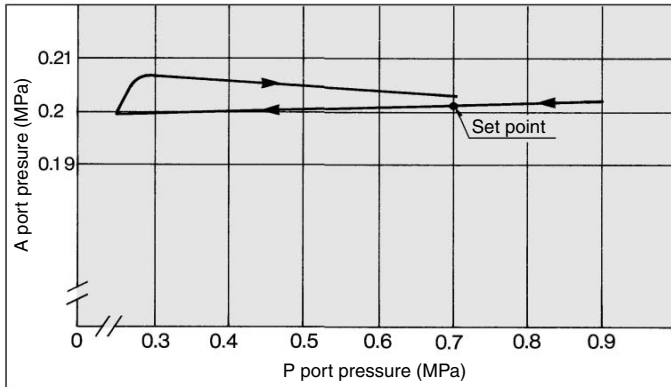


Series VEX1

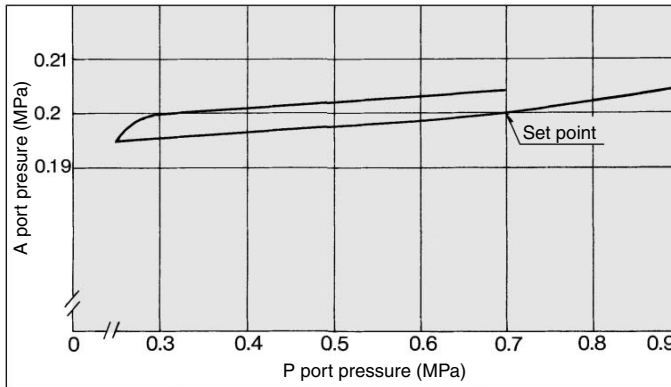
Pressure Characteristics

Shows the outlet pressure (A port) change against the inlet pressure (P port) change. They conform to JIS B 8372 (Air pressure regulator).

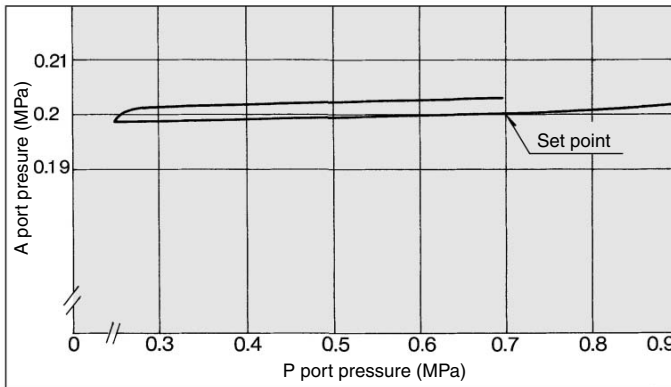
VEX110□/20□



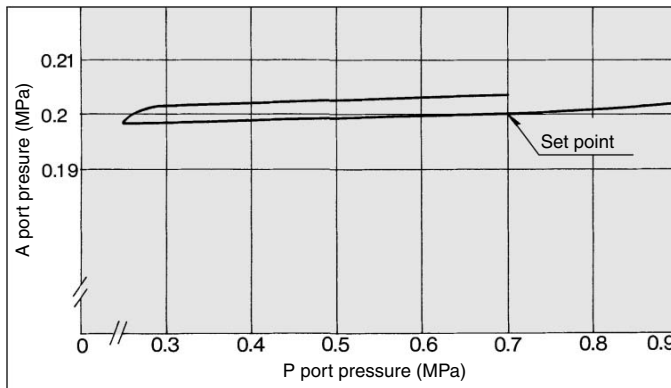
VEX130□



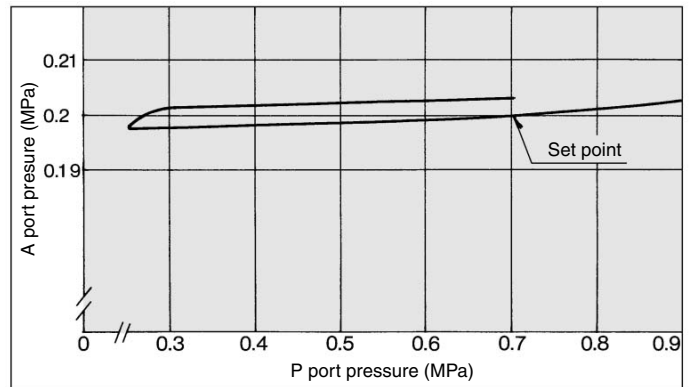
VEX150□



VEX170□

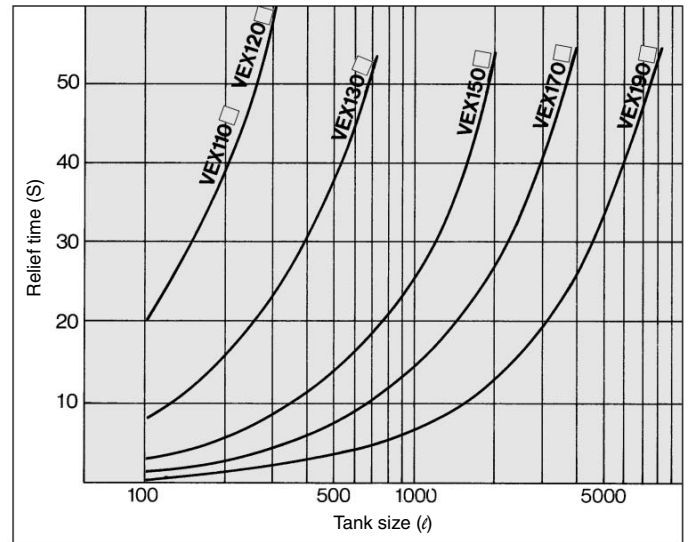


VEX190□

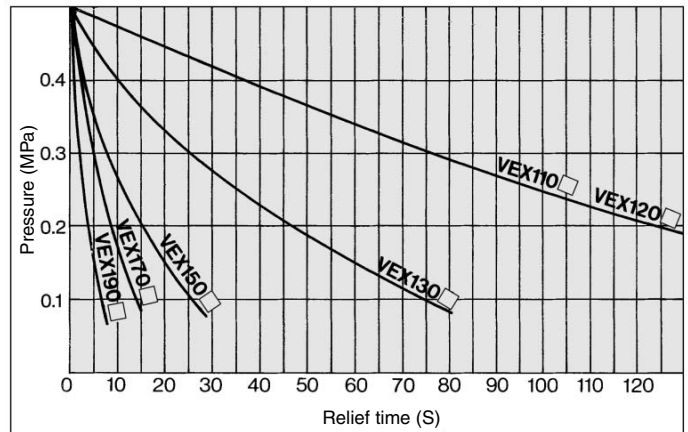


Relief Time

1. Relief time from 0.5 MPa to 1 MPa



2. Relief time from 1000 ℓ tank



3. Relief time from an arbitrary pressure

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

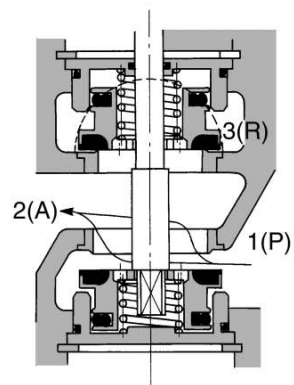
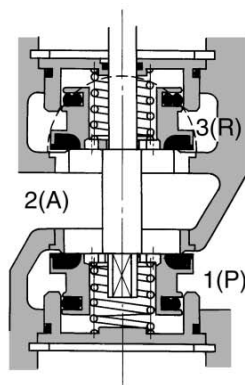
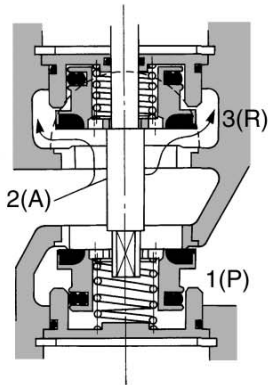
- a) In graph 2.
-
- b) The relief time for the 2000 ℓ tank is found by conversion as shown below.
- $$t = \frac{\text{Tank capacity}}{1000} \times \left[\text{Relief time that is read} \right]$$
- $$= \frac{2000}{1000} \times 23$$
- $$= 46$$
- The result is 45 s.
- From above, the relief time is 26 - 3 = 23 s

Construction/Working Principle/Component Parts

(1) When A port pressure is high Relief exhausting.

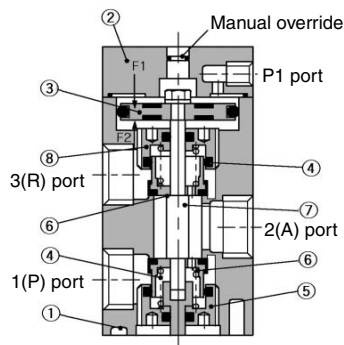
(2) Setting pressure condition

(3) When A port pressure is low Pressure reducing supply.

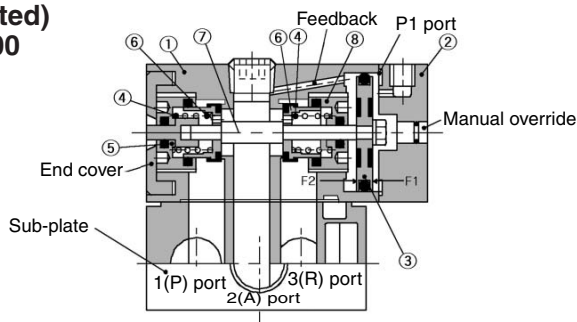


- The balance between the acting force F_1 of the pilot pressure (P1 port) over the upper surface of the pressure regulating piston (3) and the acting force F_2 of the pressure at A port leading to a space under the piston through the feed back flow root closes a couple of poppet valves (6) and sets 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 DRW (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.

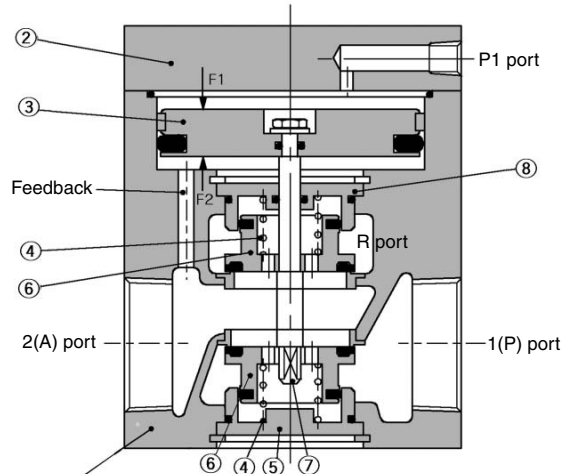
(Air operated)
VEX1100



(Air operated)
VEX1200



(Air operated)
VEX1300/1500/1700/1900



Component Parts

No.	Description	Material
①	Body	Aluminum alloy casted
②	Cover	Aluminum alloy casted
③	Regulation piston	Aluminum alloy
④	Spring	Stainless steel
⑤	Valve guide	Aluminum alloy
⑥	Poppet valve	Aluminum alloy, NBR
⑦	Shaft	Stainless steel
⑧	Valve guide	Aluminum alloy

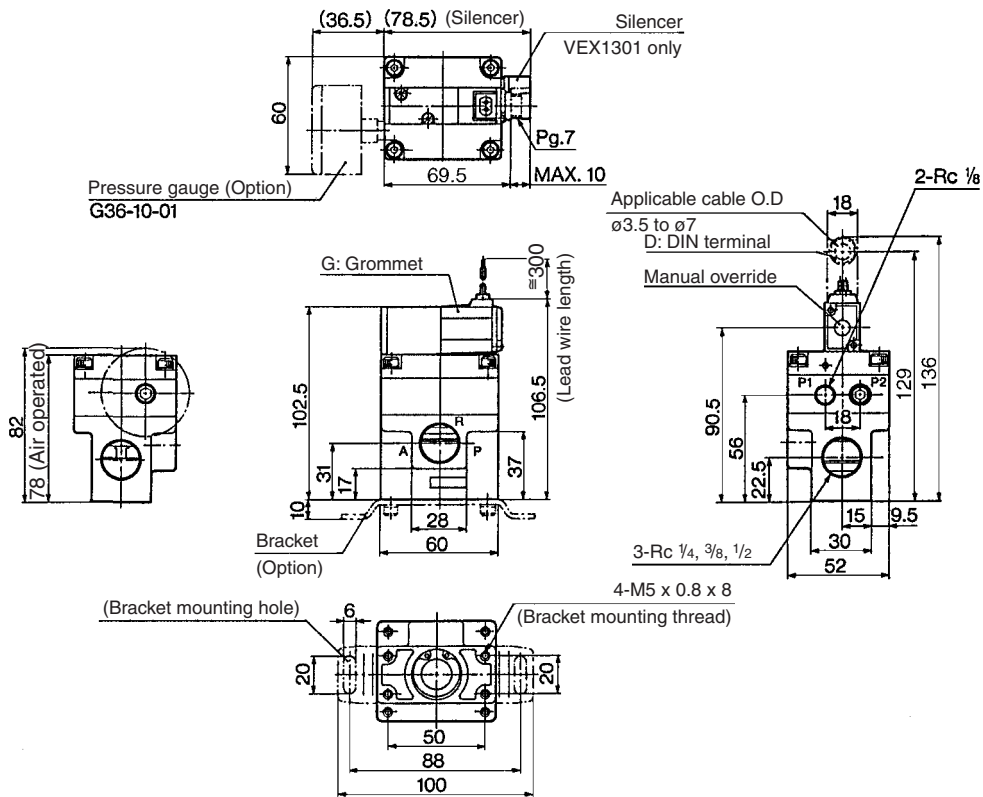
VEX

AN

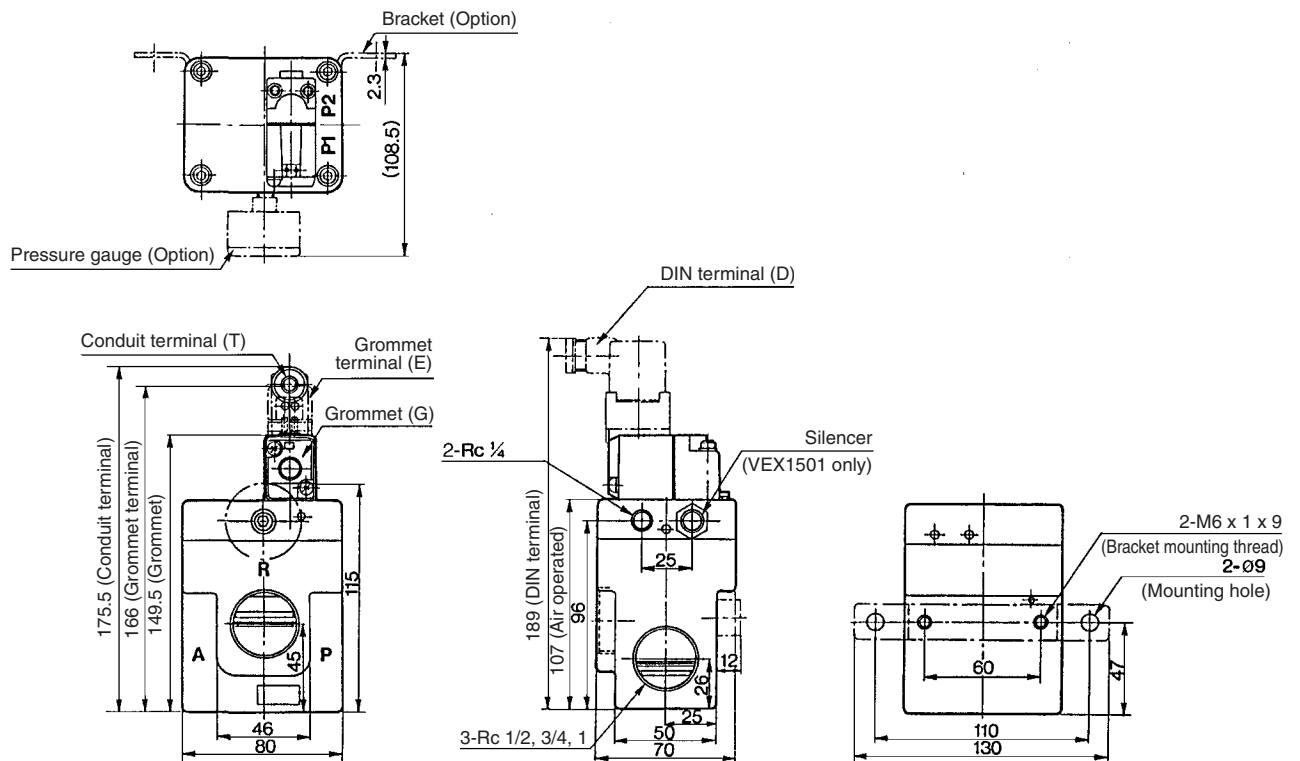
AMC

Dimensions

Air operated: VEX1300
External pilot solenoid: VEX1301



Air operated: VEX1500
External pilot solenoid: VEX1501

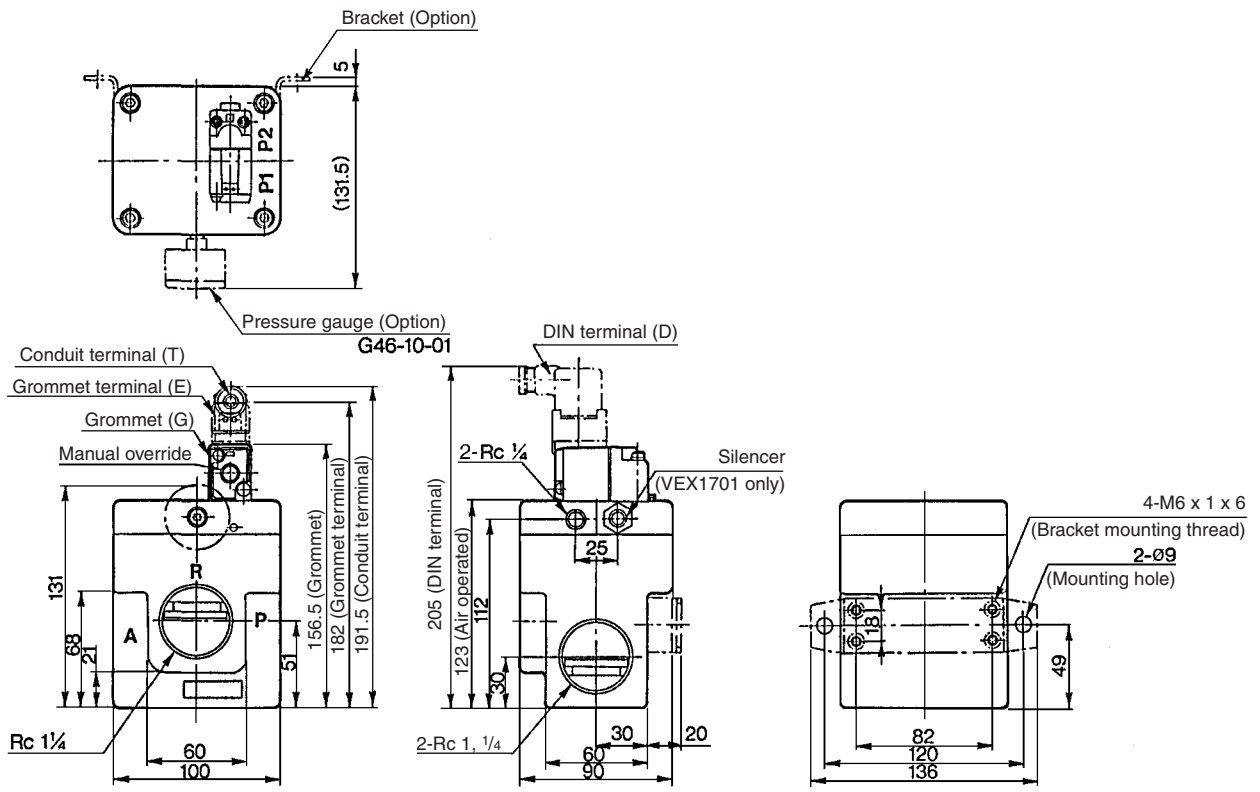


VEX
AN
AMC

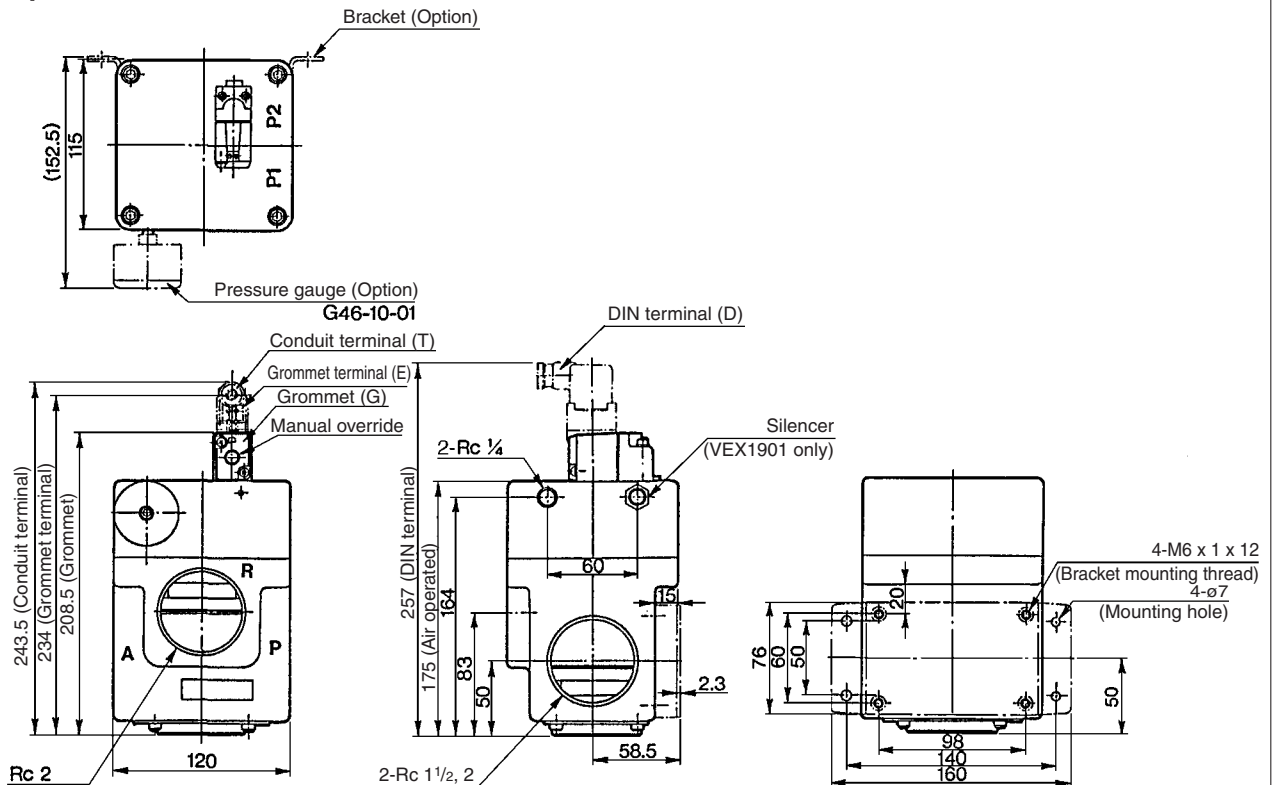
Series VEX1

Dimensions

Air operated: VEX1700
External pilot solenoid: VEX1701

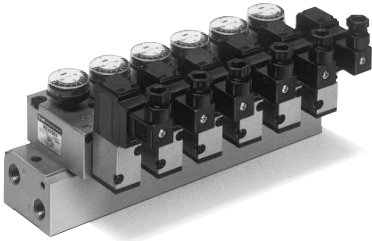


Air operated: VEX1900
External pilot solenoid: VEX1901



Series VEX1

Manifold Specifications



Specifications

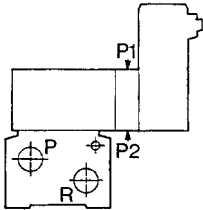
Valve stations	2 to 8 ⁽¹⁾
Port specifications	Common SUP, EXH
Port size P, A, R port	Rc, NPTF, G, NPT 1/4
Applicable valve	VEX1200/1201 ⁽²⁾
Applicable blanking plate	VEX1-17 (With gasket, screw)

- 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

External Pilot Piping

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



VVEX2-1-6-02

Series VEX1
Manifold

Valve stations

2	2 stations
⋮	⋮
8	8 stations

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

P, A, R port size

02	Rc 1/4
----	--------

Example for ordering a manifold base:

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

(Ex.) VVEX2-1-5-02N..... 1 5 station manifold base, Port thread NPT

* VEX1201-5DOZ-G.... 4 Regulator valve, External pilot solenoid valve, 24 VDC, DIN terminal (without connector), with light/surge voltage suppressor, Option.... with pressure gauge

* VEX1-17..... 1 Blanking plate

Note) In the case of manifold, pressure gauge: G27-10-01 only (O.D. ø26)

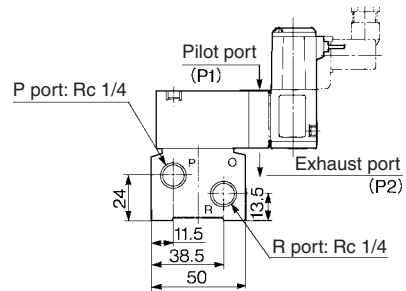
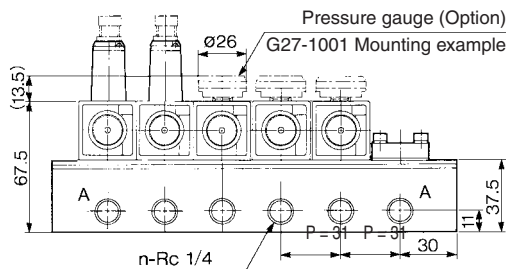
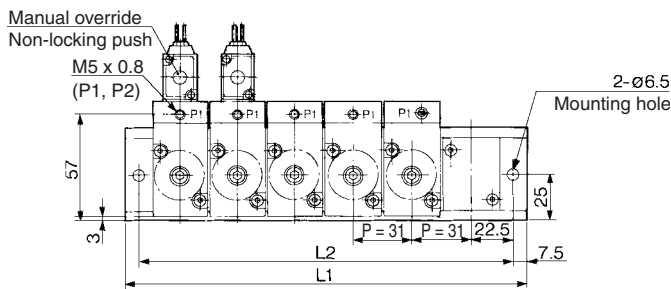
VEX

AN

AMC

Dimensions

VVEX2-1-1-Station-02

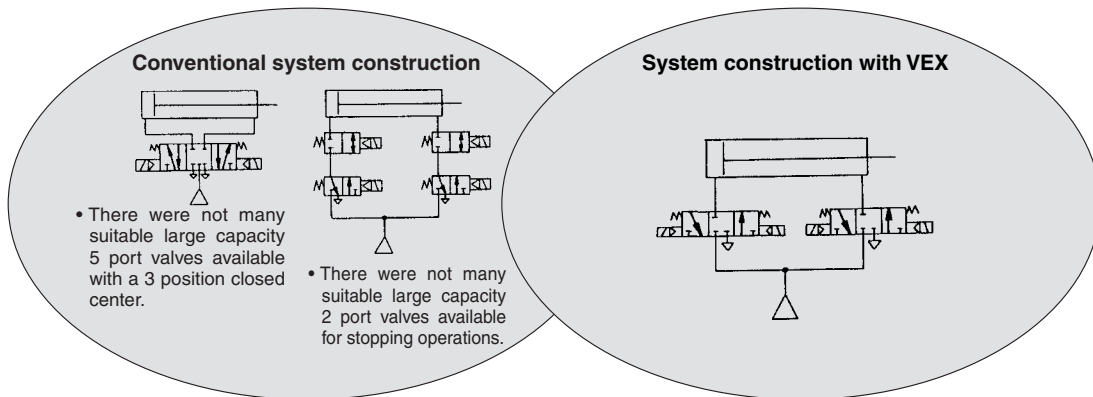


L	n	2	3	4	5	6	7	8	Calculation
L1		91	122	153	184	215	246	277	L1 = 31 x n + 29
L2		76	107	138	169	200	231	262	L2 = 31 x n + 14

Power Valve: 3 Position Valve

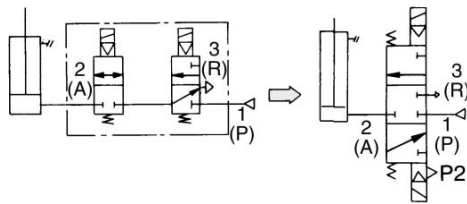
Series *VEX3*

A variety of circuits in simple construction
■ Intermediate and emergency stops with a large size cylinder



Intermediate and emergency cylinder stops

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

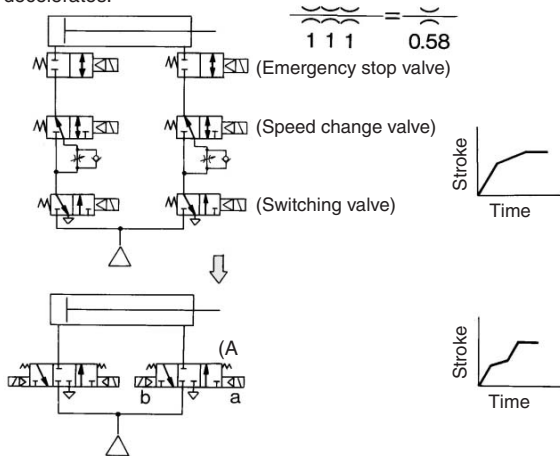


- A large capacity system without connection loss.
- $\frac{11}{0.71}$
(Valves and piping can be made smaller.)

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

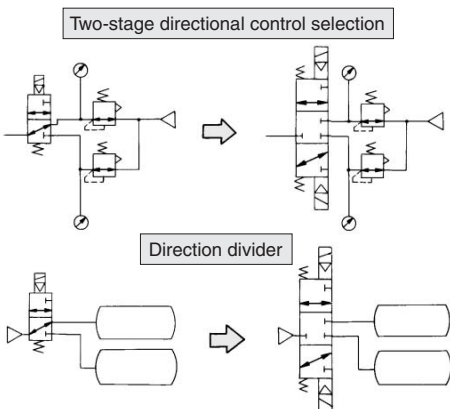
The simple system configuration permits sharp response. The large capacity system configuration without connection loss allows the use of smaller valves and piping.

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



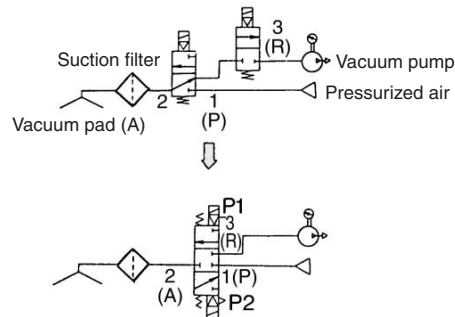
Universal porting could be used as a selector/divider valve

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.



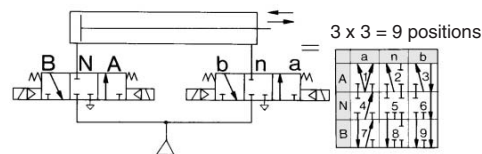
- Sequential switching operation prevents the inflow of pressurized air into the vacuum pump system.

⚠ Caution

- To maintain the vacuum of port A via the closed center, be aware that the vacuum could be decreased due to 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 } — Reciprocation
 - 1 — Pressure center
 - 5 — Closed center
 - 9 — Exhaust center
 - 2 } — Pressure & closed center
 - 4 } — Pressure & closed center
 - 6 } — Exhaust & closed center
 - 8 } — Exhaust & closed center
- } Slow stopping or deceleration

⚠ Caution

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

VEX

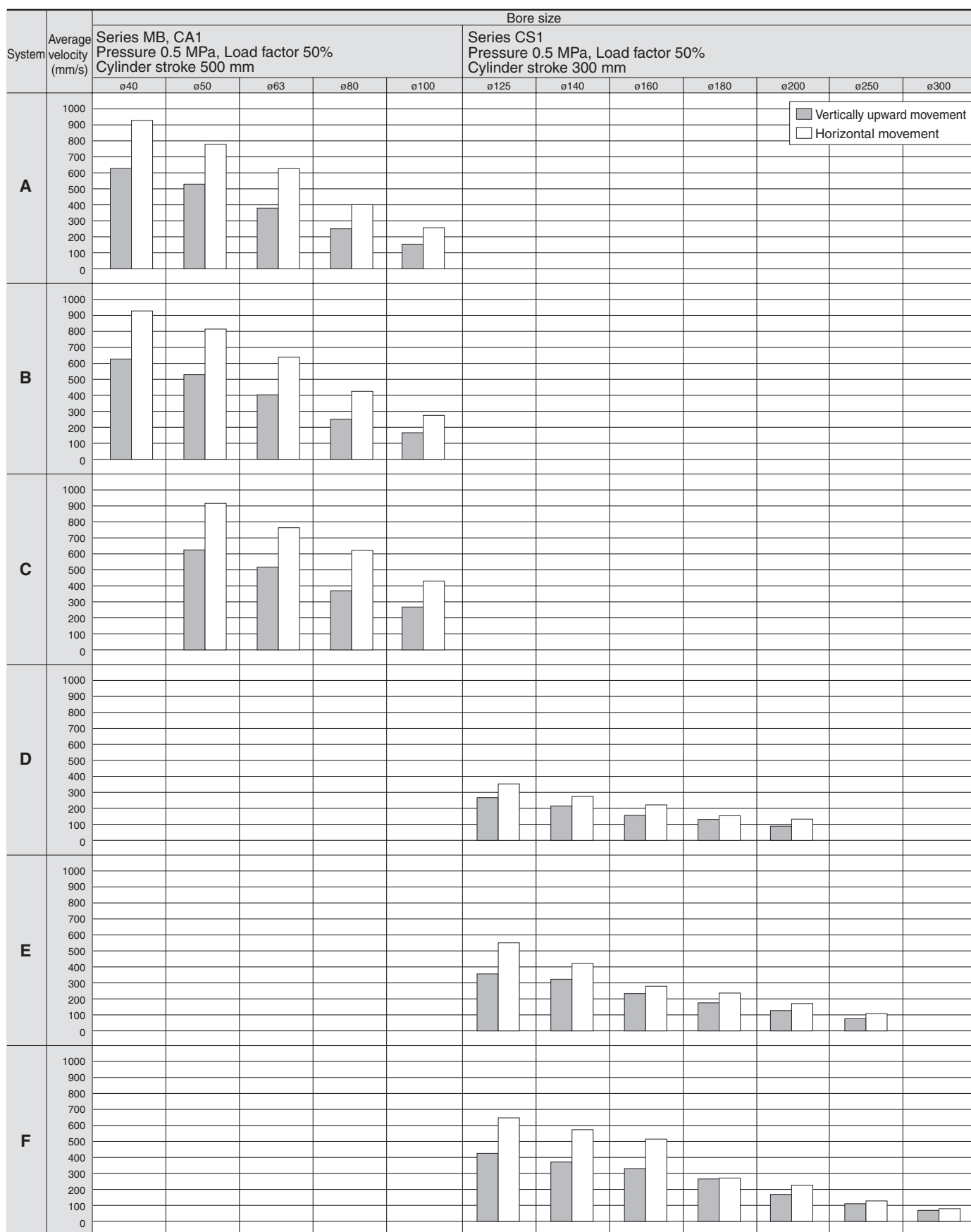
AN

AMC

Series VEX3

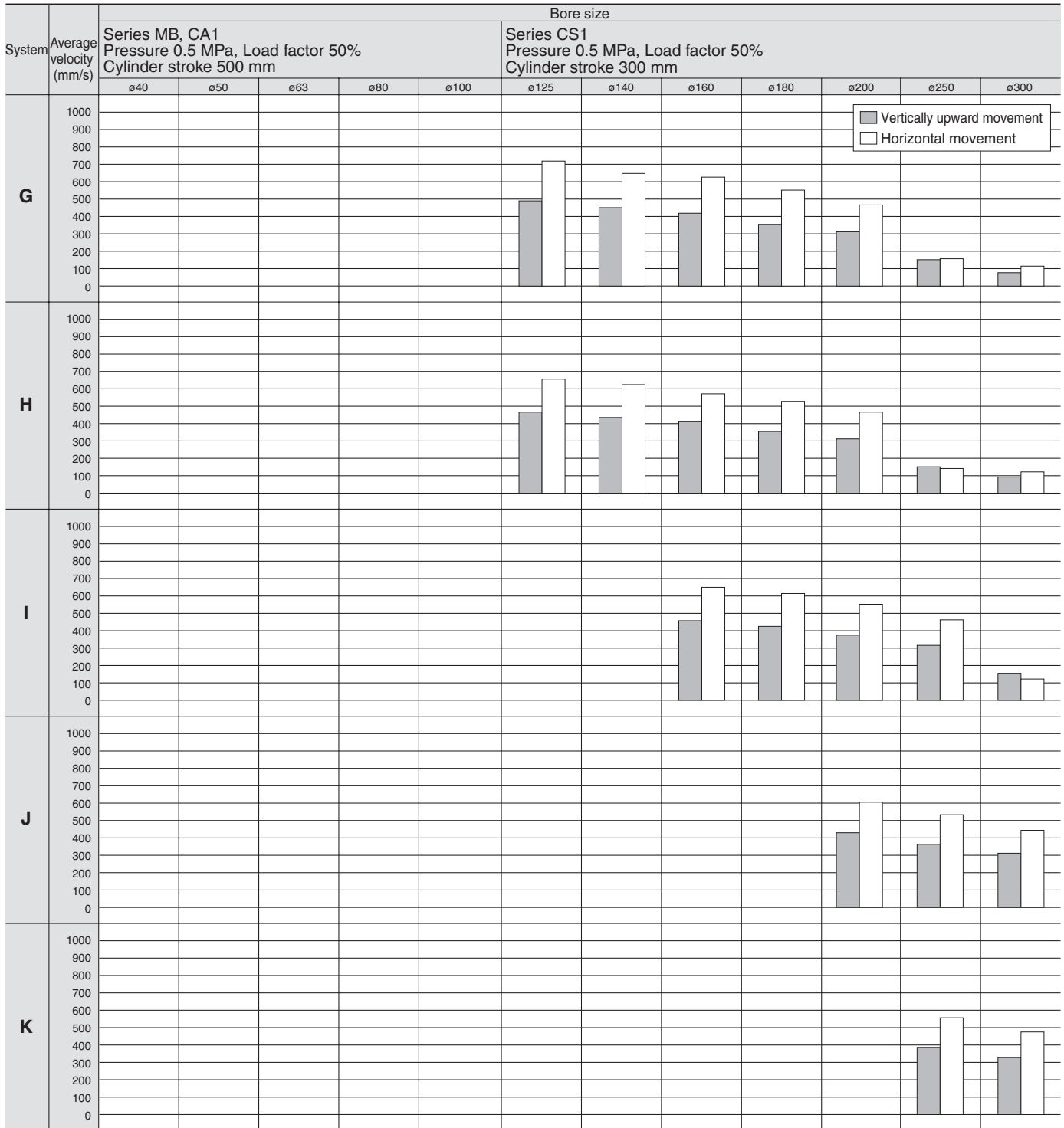
Please assume the chart is offered as the guideline. For details about various each condition, please make use of SMC Model Selection Software and then decide it.

Cylinder Speed Chart



- * When the cylinder is extended, the speed controller is metered-out, is connected with the cylinder directly, and its needle is fully open.
- * Values on the average velocity of a cylinder are obtained from the stroke length divided by full stroke time.
- * Load proportion is $((\text{load weight} \times 9.8) / \text{theoretical force}) \times 100\%$

Power Valve: 3 Position Valve Series VEX3



VEX
AN
AMC



- * When the cylinder is extended, the speed controller is metered-out, is connected with the cylinder directly, and its needle is fully open.
- * Values on the average velocity of a cylinder are obtained from the stroke length divided by full stroke time.
- * Load proportion is ((load weight x 9.8)/theoretical force) x 100%

Conditions of Speed Chart

System	Solenoid valve	Speed controller	Silencer	Tubing diameter x Length
A	VEX3 1/2 2□-02	AS4000-02	AN200-02	ø10 x 1 m
B				ø12 x 1 m
C	VEX3 3/4 2□-03	AS420-03	AN300-03	ø12 x 1 m
D		AS420-04	AN400-04	SGP15A x 1 m
E	VEX350□-04	AS420-04	AN400-04	SGP15A x 1 m
F		AS500-06	AN500-06	SGP20A x 1 m
G	VEX350□-10	AS600-10	AN600-10	SGP25A x 1 m
H		AS600-10	AN600-10	SGP25A x 1 m
I	VEX370□-12	AS800-12	AN700-12	SGP32A x 1 m
J		AS900-14	AN800-14	SGP40A x 1 m
K	VEX390□-20	AS900-20	AN900-20	SGP50A x 1 m

How to Order



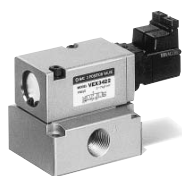
Body size	Port size		
	Port	P, A port	R port
12	01		1/8
	02		1/4
32	02		1/4
	03		3/8
50	04		1/2
	06		3/4
70	10		1
	12	1	1 1/4
90	14	1 1/4	
	20	2	2

Electrical entry (Only with solenoid)

Body size	Symbol	Electrical entry
12 32	G	Grommet, Lead wire length 300 mm
	H	Grommet, Lead wire length 600 mm
	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 terminal
	DO	DIN terminal, without connector
50 70 90	G	Grommet, Lead wire length 300 mm
	H	Grommet, Lead wire length 600 mm
	E	Grommet terminal
	T	Conduit terminal
	D	DIN terminal

Body ported **VEX3 12 0 01 5 D B**

Base mounted **VEX3 22 0 01 5 D B**



Operation type

0	Air operated
1	External pilot solenoid
2	Internal pilot solenoid

Option

B	Bracket (Except VEX332□)
F	Foot (VEX312□ and VEX332□ only)
N	Silencer for pilot exhaust (P2) port (Only with solenoid)

Body size	Port size		
	Port	P, A port	R port
22	Nil	Without sub-plate	
	01		1/8
	02		1/4
42	Nil	Without sub-plate	
	02		1/4
	03		3/8
	04		1/2

Thread type

Nil	Rc
T	G
F	NPT
N	NPTF

Voltage (Only with solenoid)

1	100 VAC (50/60 Hz)
2	200 VAC (50/60 Hz)
3*	110 VAC (50/60 Hz)
4*	220 VAC (50/60 Hz)
5	24 VDC
6*	12 VDC
7*	240 VAC (50/60 Hz)
9*	Other

* Option

Light/Surge voltage suppressor

Nil	None
S	With surge voltage suppressor
Z	With light/surge voltage suppressor (Except grommet)

Electrical entry

Symbol	Electrical entry
G	Grommet, Lead wire length 300 mm
H	Grommet, Lead wire length 600 mm
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 terminal
DO	DIN terminal, without connector

⚠ Caution

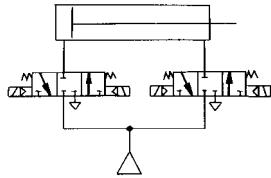
Refer to pages 5-11-2 to 5-11-6 for Safety Instructions and Solenoid Valve Precautions.

Power Valve: 3 Position Valve Series VEX3

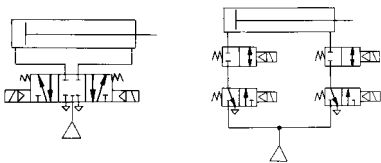
Variety of circuits in simple construction

3 position valve suitable for intermediate and emergency stop of large size cylinder.

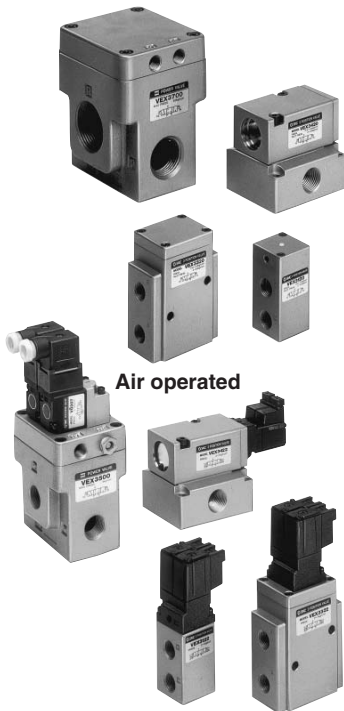
System construction with VEX



Conventional system construction



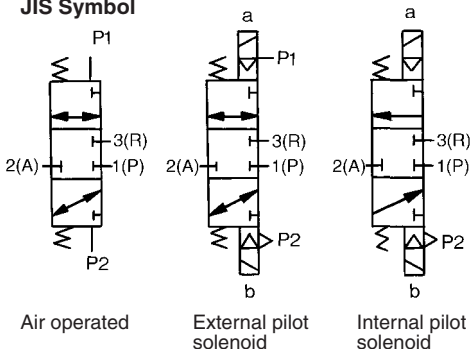
- There were not many suitable large capacity 5 port valves available with a 3 position closed center.
- There were not many suitable large capacity 2 port valves available for stopping operations.



Air operated

Internal pilot solenoid/External pilot solenoid

JIS Symbol



Specifications

Model	Body ported	VEX312□- ⁰¹ / ₀₂	VEX332□- ⁰² / _{03 04}	VEX350□- ⁰⁴ / _{06 10}	VEX370□- ¹⁰ / ₁₂	VEX390□- ¹⁴ / ₂₀	
	Base mounted	VEX322□- ⁰¹ / ₀₂	VEX342□- ⁰² / _{03 04}	—	—	—	
Operation type	Air operated, External pilot solenoid, Internal pilot solenoid						
Fluid	Air						
Proof pressure	1.5 MPa						
Pressure range	Air operated	Low vacuum to 1.0 MPa					
	External pilot solenoid	External pilot pressure 0.2 to 1.0 MPa				External pilot pressure 0.2 to 1.0 MPa	
		Low vacuum to 1.0 MPa					
Internal pilot solenoid	0.2 to 0.7 MPa		0.2 to 0.9 MPa				
Ambient and fluid temperature	Max. 50°C (Air operated 60°C)						
Response time (Pilot pressure 0.5 MPa)	40 ms or less		60 ms or less				
Max. operating frequency	3 cycles/sec.						
Mounting	Free						
Lubrication	Not required (Use turbine oil Class 1 ISO VG32, if lubricated.)						

Solenoid Specifications

Model	VEX3121, VEX3221, VEX3321, VEX3421 VEX3122, VEX3222, VEX3322, VEX3422	VEX3501, VEX3701, VEX3901 VEX3502, VEX3702, VEX3902
Pilot valve	Exclusive pilot valve	
Electrical entry	Grommet, L plug connector, M plug connector, DIN terminal	
Coil rated voltage (V)	AC (50/60 Hz)	100 V, 110 V, 200 V, 220 V, 240 V
	DC	6 V, 12 V, 24 V, 48 V
Allowable voltage	-15 to +10% of rated voltage	
Coil insulation	Class E (120°C) or equivalent	Class B (130°C) or equivalent
Temperature rise	45°C or less (Rated voltage)	
Apparent power	AC	4.5 VA/50 Hz, 4.2 VA/60 Hz
	Inrush Holding	12.7 VA (50 Hz), 10.7 VA (60 Hz)
Power consumption	AC	3.5 VA/50 Hz, 3 VA/60 Hz
	DC	1.8 W
Manual override	Non-locking push type	

VEX

AN

AMC

Option

Description	Part no.						
	VEX312□- ⁰¹ / ₀₂	VEX322□- ⁰¹ / ₀₂	VEX332□- ⁰² / _{03 04}	VEX342□- ⁰² / _{03 04}	VEX350□- ⁰⁴ / _{06 10}	VEX370□- ¹⁰ / ₁₂	VEX390□- ¹⁴ / ₂₀
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

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

Series VEX3

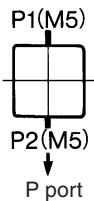
Flow Characteristics

Model		Port size	Flow characteristics											
			1→2 (P→A)			2→1 (A→P)			3→2 (R→A)			2→3 (A→R)		
			C [dm ³ /(s·bar)]	b	Cv	C [dm ³ /(s·bar)]	b	Cv	C [dm ³ /(s·bar)]	b	Cv	C [dm ³ /(s·bar)]	b	Cv
Body ported	VEX312□-01	Rc 1/8	2.4	0.19	0.59	2.4	0.31	0.59	2.3	0.36	0.59	2.5	0.22	0.61
	VEX312□-02	Rc 1/4	3.5	0.35	0.89	3.3	0.49	0.89	3.1	0.46	0.89	3.5	0.33	0.93
	VEX332□-02	Rc 1/4	4.1	0.36	1.1	4.3	0.42	1.1	4.1	0.41	1.1	4.6	0.25	1.2
	VEX332□-03	Rc 3/8	8.7	0.29	2.2	7.9	0.52	2.2	7.8	0.51	2.4	8.7	0.33	2.4
	VEX332□-04	Rc 1/2	9.8	0.37	2.7	9.6	0.52	2.7	9.1	0.53	3.0	11	0.37	3.0
	VEX350□-04	Rc 1/2	24	0.32	6.4	24	0.30	6.4	25	0.31	6.4	22	0.27	5.7
Base mounted (With sub-plate)	VEX322□-01	Rc 1/8	3.3	0.34	0.86	3.5	0.39	0.86	3.3	0.37	0.86	3.5	0.36	0.87
	VEX322□-02	Rc 1/4	4.1	0.28	0.99	4.1	0.39	0.99	3.8	0.38	0.97	4.4	0.23	1.1
	VEX342□-02	Rc 1/4	8.1	0.34	2.0	7.9	0.39	2.0	8.2	0.33	2.1	8.1	0.37	2.2
	VEX342□-03	Rc 3/8	12	0.26	3.2	12	0.29	3.2	12	0.28	3.1	13	0.28	3.3
	VEX342□-04	Rc 1/2	13	0.20	3.3	13	0.24	3.3	12	0.29	3.2	14	0.20	3.3

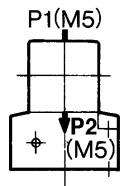
Model	Port size	Effective area (mm ²)	Cv	
Body ported	VEX350□-06	Rc 3/4	160	8.9
	VEX350□-10	Rc 1	180	10
	VEX370□-10	Rc 1	300	17
	VEX370□-12	Rc 1 1/4	330	18
	VEX390□-14	Rc 1 1/2	590	33
	VEX390□-20	Rc 2	670	37

External Pilot Piping

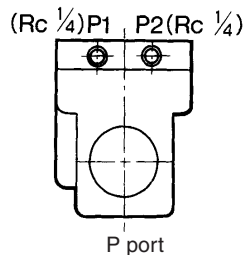
VEX312□



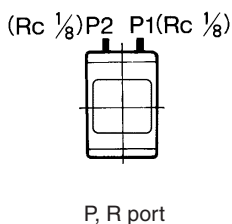
VEX322□



VEX350□
VEX370□
VEX390□

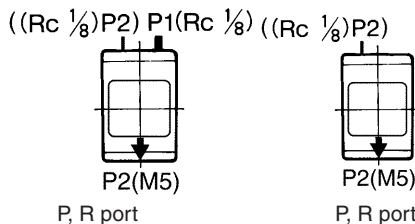


VEX3320
Air operated

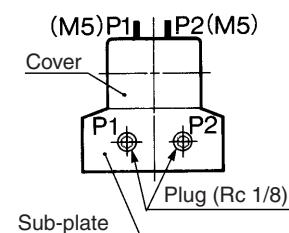


VEX3321
External pilot solenoid

VEX3322
Internal pilot solenoid

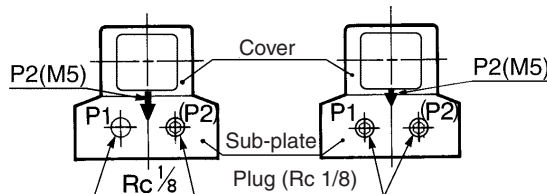


VEX3420
Air operated
for sub-plate



VEX3421
External pilot solenoid
for subplate

VEX3422
Internal pilot solenoid
for subplate



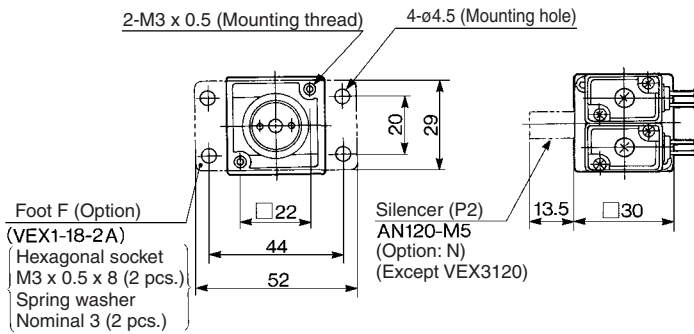
Port	VEX3□□0	VEX3□□1	VEX3□□2
P1	External pilot	External pilot	Plug
P2	External pilot	Pilot exhaust	Pilot exhaust

Caution

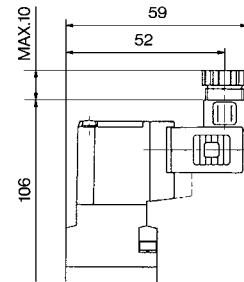
- VEX3420 (Air operated)
When the VEX3420 air operated power valve is delivered from our factory, the M5 threaded pilot ports P1 and P2 in the cover are open and the Rc 1/8 pilot port in the sub-plate is plugged. Before connecting pipes to P1 and P2 ports in the sub-plate, remove the 1/8 plug from the sub-plate and put M5 plugs into P1 and P2 ports in the cover.
M5 plug — M-5P
- VEX3₄2₂¹ (Solenoid)
When the VEX3240 air operated power valve is delivered from our factory, the M5 threaded pilot port P2 in the cover is open and the Rc 1/8 pilot port in the sub-plate is plugged. Before connecting pipes to P2 port in the sub-plate, remove the 1/8 plug from the sub-plate and put M5 plugs into P2 port in the cover.
Note) The VEX332₂¹, Rc 1/8 body port; and the VEX342₂¹, Rc 1/8 sub-plate port are plugged at the factory.

Body Ported: VEX312□

Air operated: VEX3120 External pilot solenoid: VEX3121 Internal pilot solenoid: VEX3122



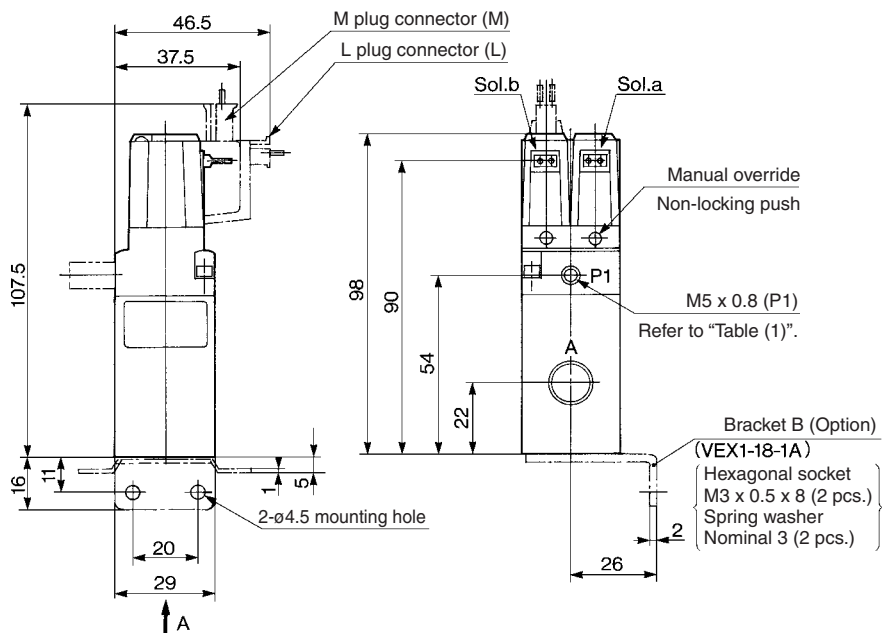
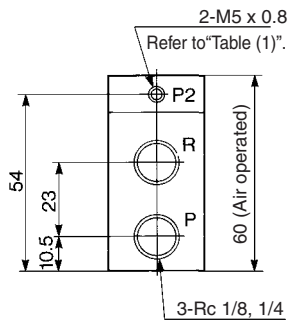
DIN terminal (D)



A perspective drawing

Table (1)
With/Without Plug for M5 Port

Model	P1	P2
VEX3120	None	None
VEX3121	None	None
VEX3122	With plug	None



VEX

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⚠ Caution

How to Use Plug Connector Applicable Model: VEX312¹/322¹/332¹/342¹

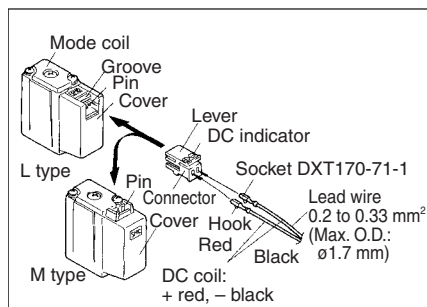
Attaching/Detaching of a plug

1. To install the connector

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.

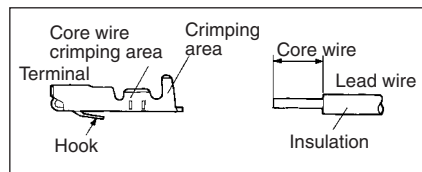
2. To deinstall the connector

Press the lever against the connector and pull the connector away straight 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 with 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)



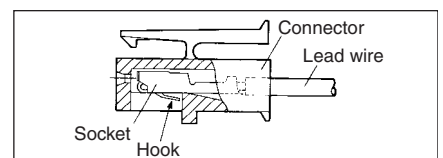
Attaching/Detaching of a socket with lead wire

1. Attaching

Insert a socket into the square hole (indicated at +, -) of connector, push fully the lead wire and lock by hanging the hook of a 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. Detaching

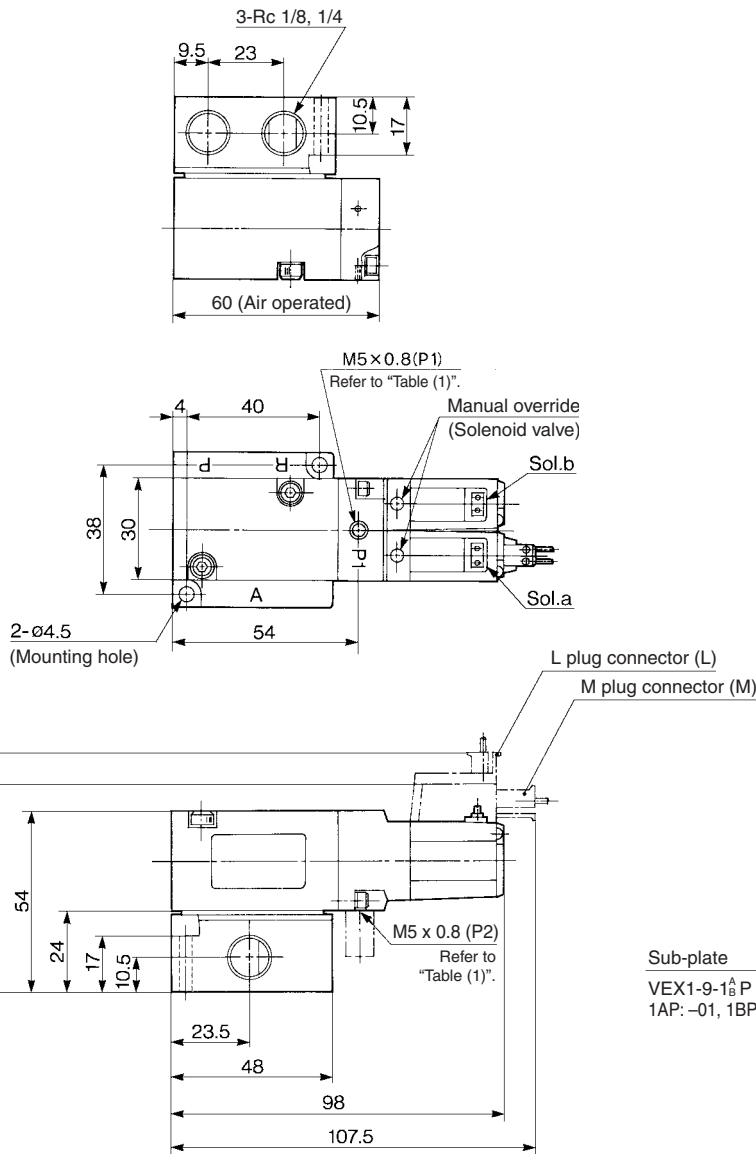
For pulling out a socket from connector, pull out the lead wire while pushing the hook of a socket with a stick with a fine point (1 mm). If a socket is to be re-used as it is, return the hook to the outside.



Series VEX3

Base Mounted: VEX322□

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



DIN terminal (D)

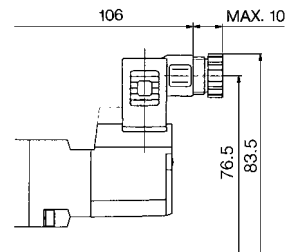
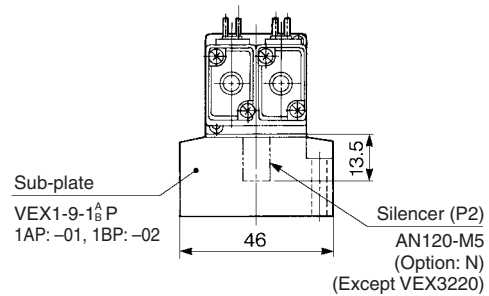


Table (1)
With/Without Plug for M5 Port

Model	P1	P2
VEX3220	None	None
VEX3221	None	None
VEX3222	With plug	None



⚠ Caution

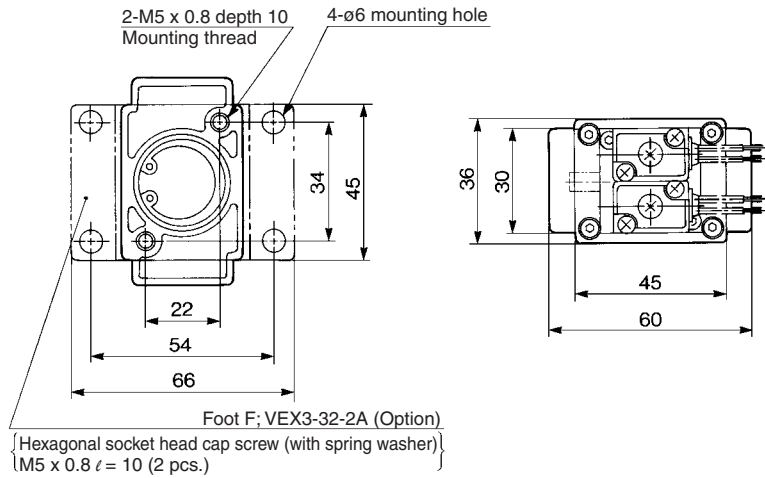
How to Use DIN Terminal



Refer to Best Pneumatics Vol. 3.

Body Ported: VEX332□

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



A perspective drawing

DIN terminal (D)

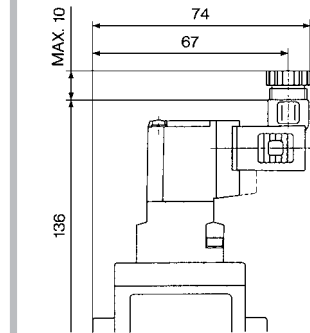
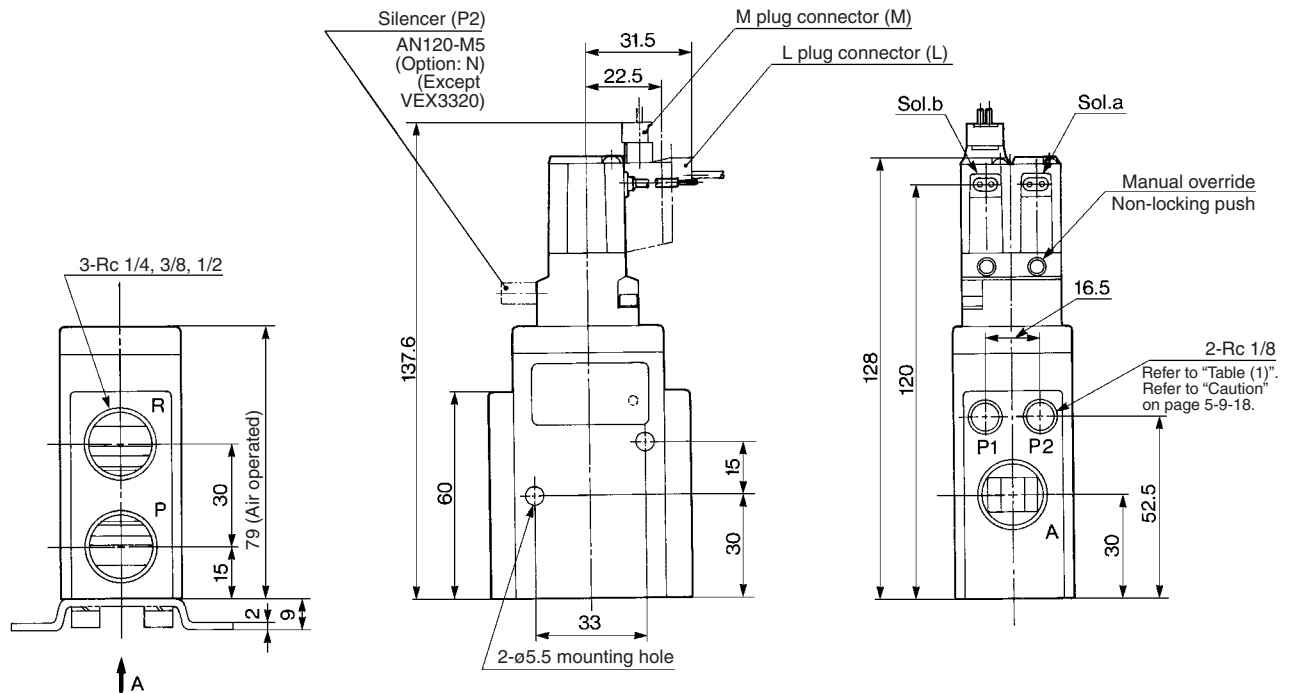


Table (1)
With/Without Plug for Rc 1/8 Port

Model	P1	P2
VEX3320	None	None
VEX3321	None	With plug
VEX3322	With plug	With plug



VEX

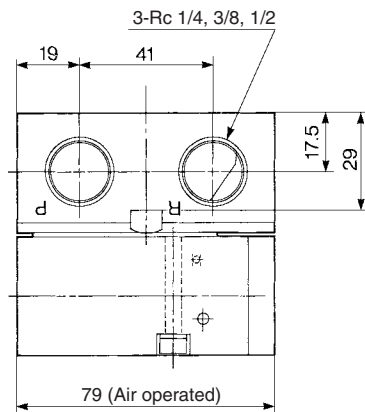
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Series VEX3

Base Mounted: VEX342□

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



DIN terminal (D)

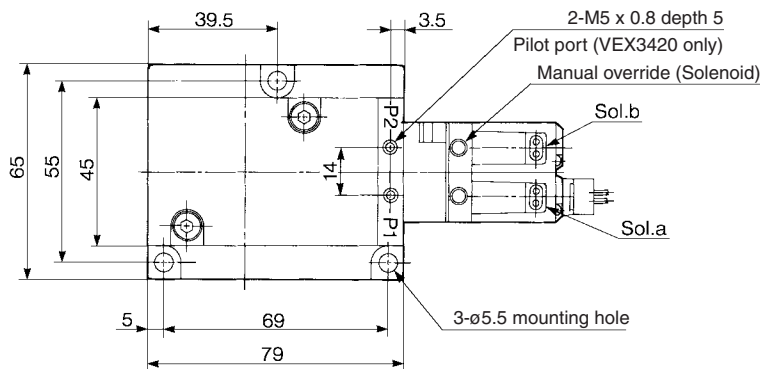
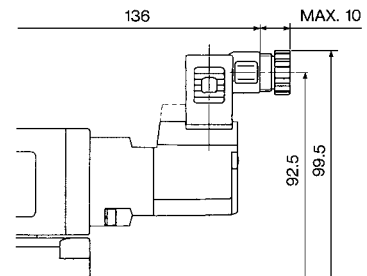
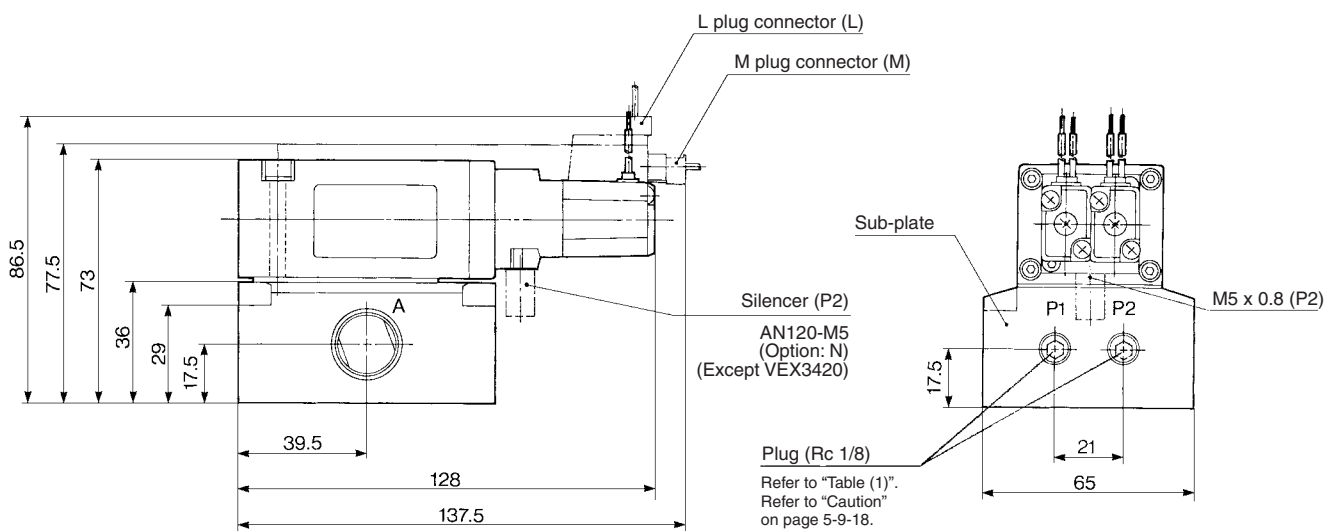


Table (1)
With/Without Plug for Sub-plate

Model	P1	P2
VEX3420	With plug	With plug
VEX3421	None	With plug
VEX3422	With plug	With plug



Power Valve: 3 Position Valve Series VEX3

Body Ported: VEX350□/370□

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

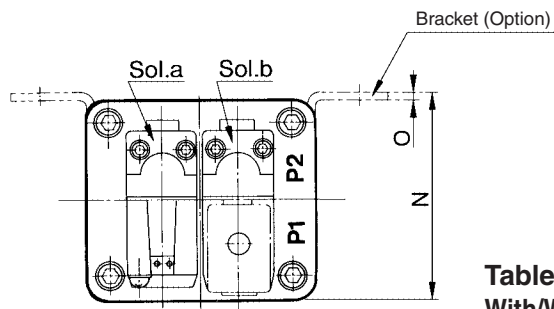
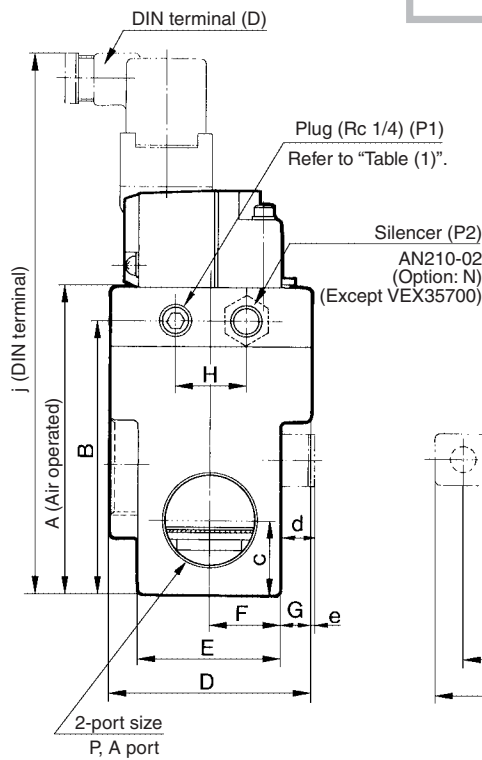
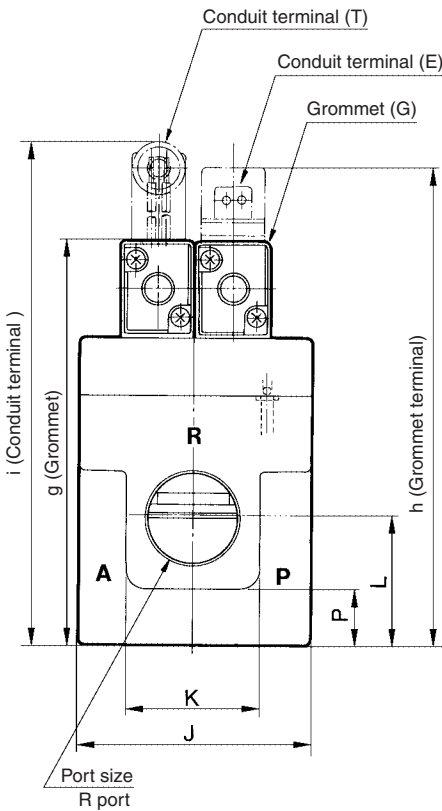
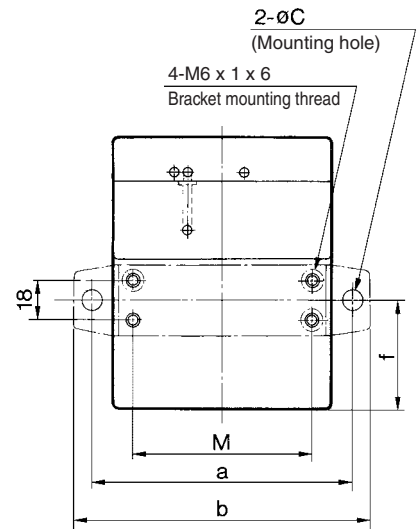


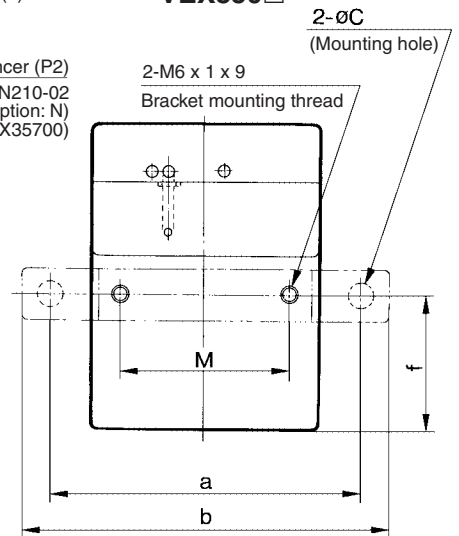
Table (1)
With/Without Plug for Rc 1/4 Port

Model	P1	P2
VEX3 ⁵ 00	None	None
VEX3 ⁵ 01	None	None
VEX3 ⁵ 02	With plug	None

VEX370□



VEX350□



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 1/2, 3/4, 1		107	96	26	70	50	25	10	25	80	46	45	60	72	2.3
VEX370□	Rc 1, 1 1/4	Rc 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 terminal
	a	b	∅c	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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Series VEX3

Body Ported: VEX390□

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

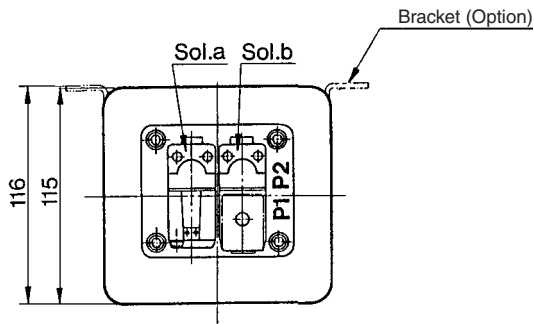
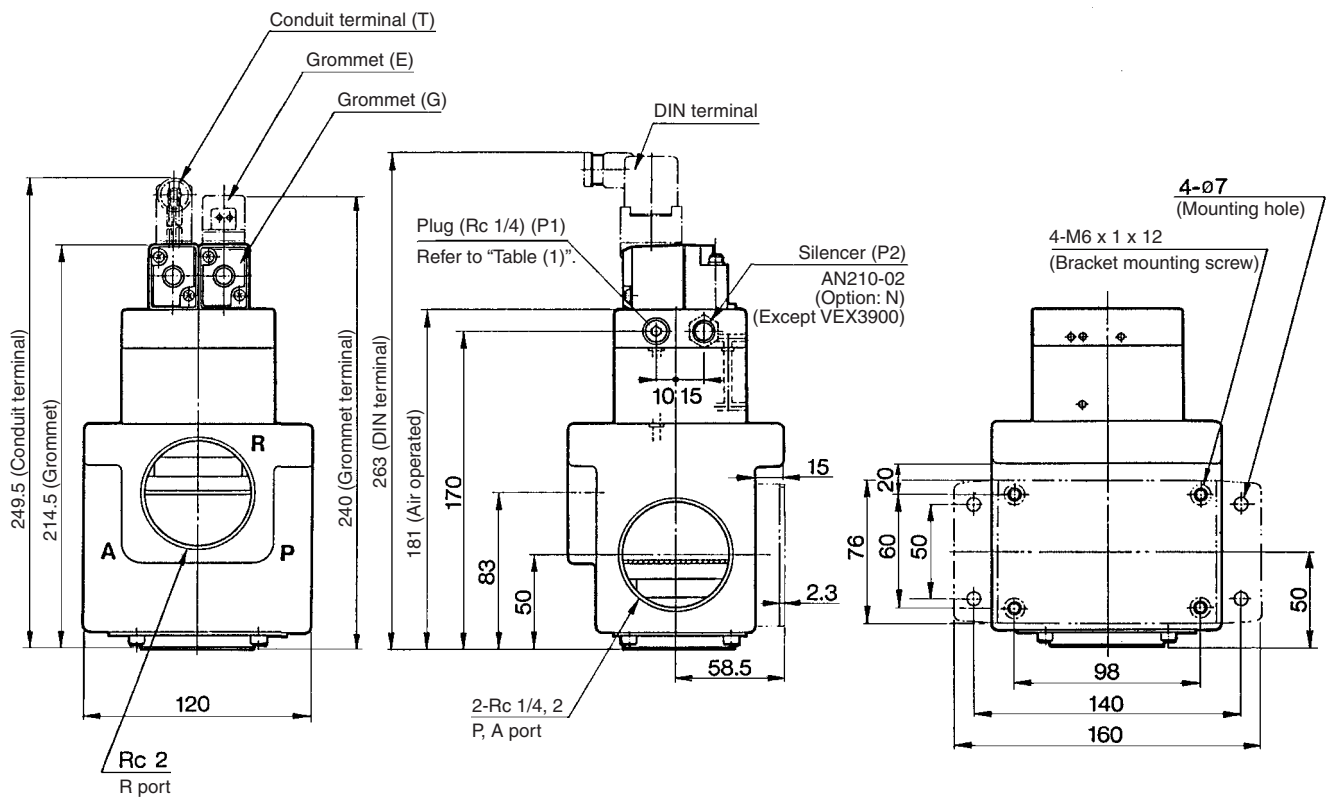


Table (1)
With/Without Plug for Rc 1/4 Port

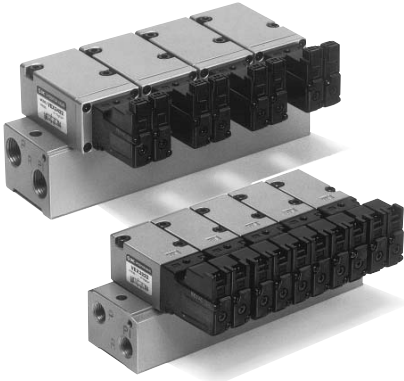
Model	P1	P2
VEX3900	None	None
VEX3901	None	None
VEX3902	With plug	None



Series VEX3

Manifold Specifications

Manifold: Series VVEX



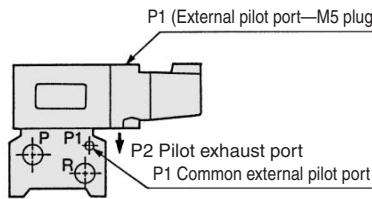
Specifications

Model	VVEX2	VVEX4			
Applicable valve	VEX3220/3222	VEX3420/3422			
Valve stations (Note)	2 to 8	2 to 6			
Port specifications	Common SUP, EXH				
Pilot type	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				
Applicable blanking plate	VEX1-17 (With gasket, screw)		VEX4-5 (With gasket, screw)		

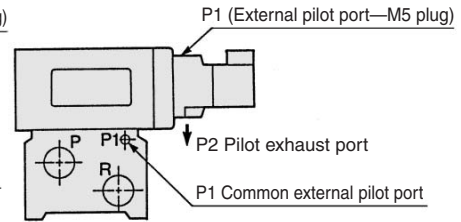
Note) When series VVEX2 is used with more than 5 stations, or Series VVEX4 is used with more than 4 stations, apply pressure to the P port on both sides and exhaust from the R port on both sides.

External Pilot Piping

VVEX2-2



VVEX4-2



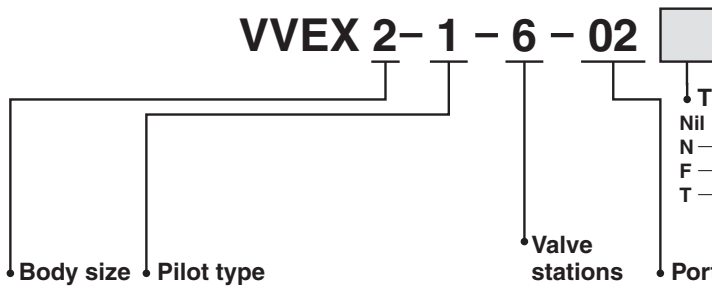
VEX

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How to Order Manifold Base

VVEX 2-1-6-02



• Thread type
 Nil — Rc
 N — NPT
 F — G
 T — NPTF

Body size	Pilot type	Applicable valve	Valve stations	Port size			
				Port	P	R	A
2	1 Internal pilot	VEX3222	2 2	02	1/4		
		(Air operated: VEX3220 (Note))	6 6				
	2 Common external pilot	8 8					
4	1 Internal pilot	VEX3422	2 2	A	3/8	1/4	
		(Air operated: VEX3420 (Note))	6 6				
	2 Common external pilot	8 8	B				3/8
				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 for 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)

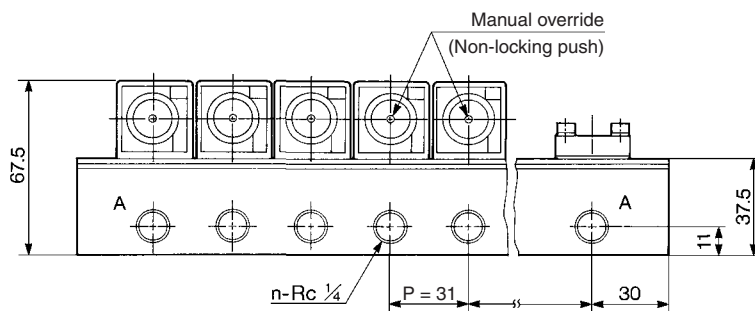
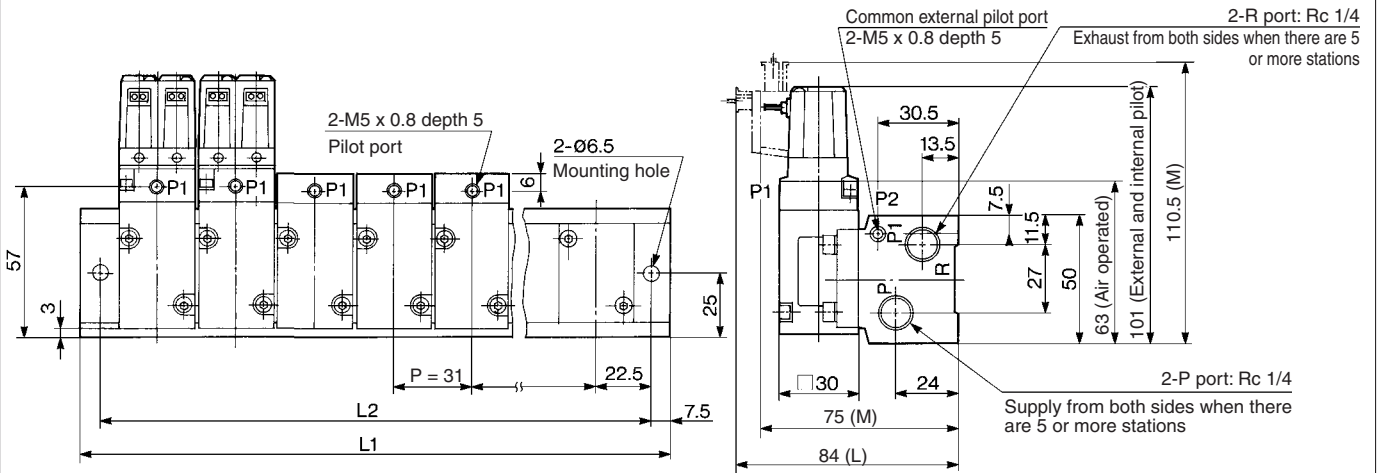
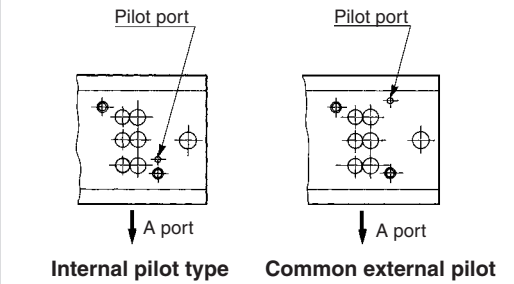
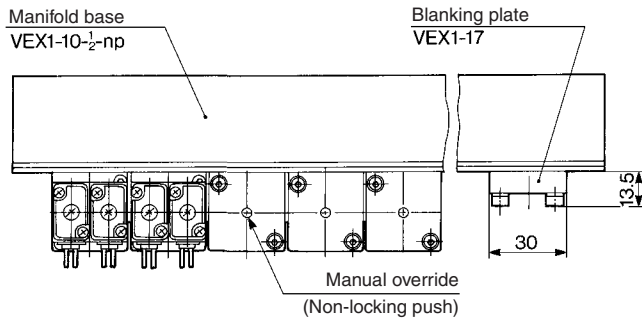
VVEX2-2-7-02N
 *VEX3222-1LN — 6 pcs. } Solenoid
 *VEX1-17 — 1 pc. }
 VVEX4-2-6-A
 *VEX3420 — 5 pcs. } Air operated
 *VEX4-5 — 1 pc. }

Series VEX3

Manifold: VVEX2-□

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

Valve mounting side



L Dimension Equation $L_1 = 46n + 31$, $L_2 = 46n + 15$ n: Station

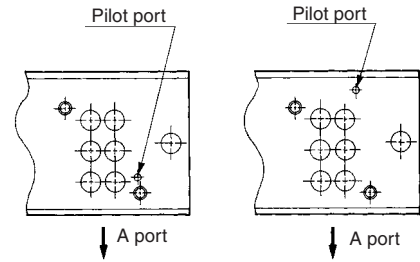
n	2	3	4	5	6	7	8
L1	91	122	153	184	215	246	277
L2	76	107	138	169	200	231	262

Power Valve: 3 Position Valve Series VEX3

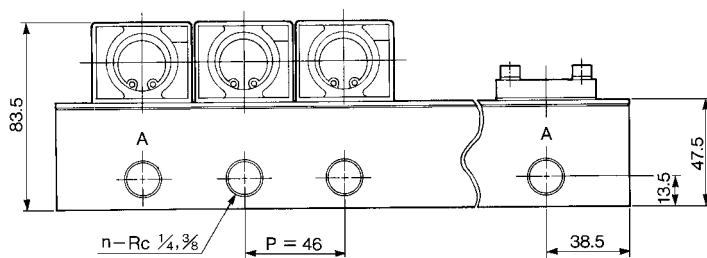
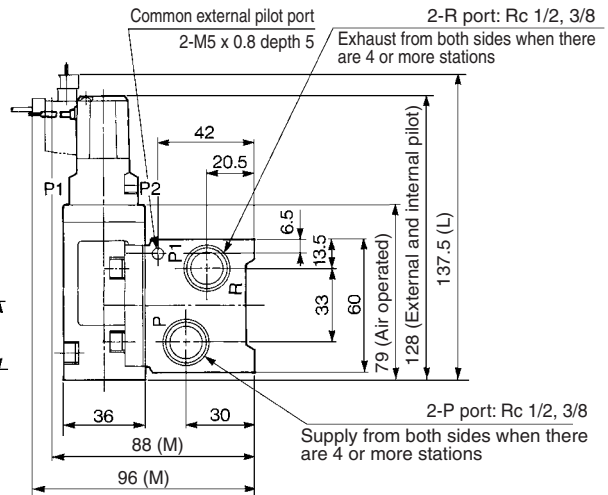
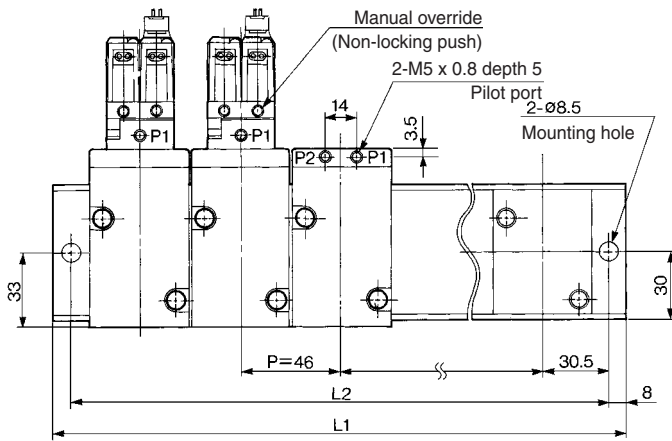
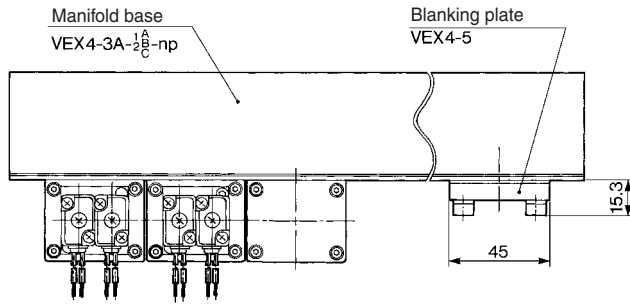
Manifold: VVEX4-□

VVEX4-1 Applicable valve: VEX3420/3422
 VVEX4-2 Applicable valve: VEX3420/3422

Valve mounting side



Internal pilot type Common external pilot



VEX
 AN
 AMC

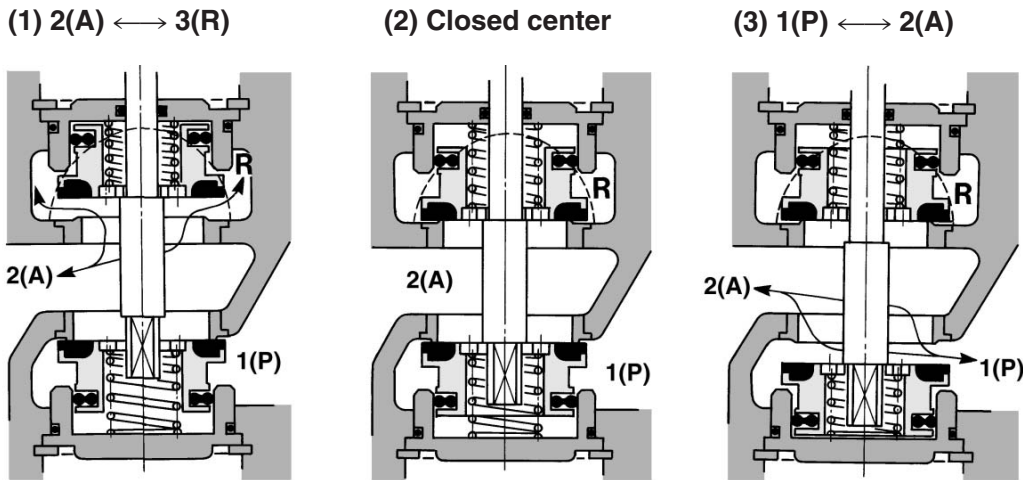
L Dimension

$L_1 = 46n + 31$, $L_2 = 46n + 15$ n: Station

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

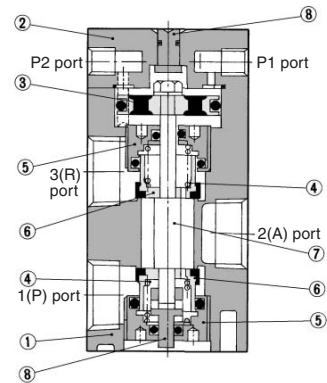
Series VEX3

Construction/Working Principle/Component Parts

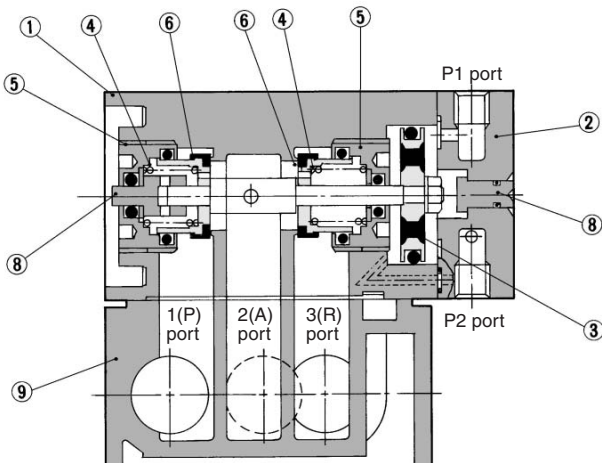


- This is a 3 port switch valve in which the shaft ⑦ - extending from the driving piston ③ opens/closes a pair of poppet valves ⑥. The poppet valve has a pressure balancing mechanism in which A port pressure is constantly applied from the back and the center spring ④ is acting as a backup.
- When neither 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 type), no force will act on the working piston, and the spring closes the poppet valve, thus the valve assumes the closed center position (DRW (2)).
- When the pilot solenoid valve "a" is energized (or when pressurized air enters through the P1 port of the air operated type), 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 (DRW (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 type), 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 (DRW (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)

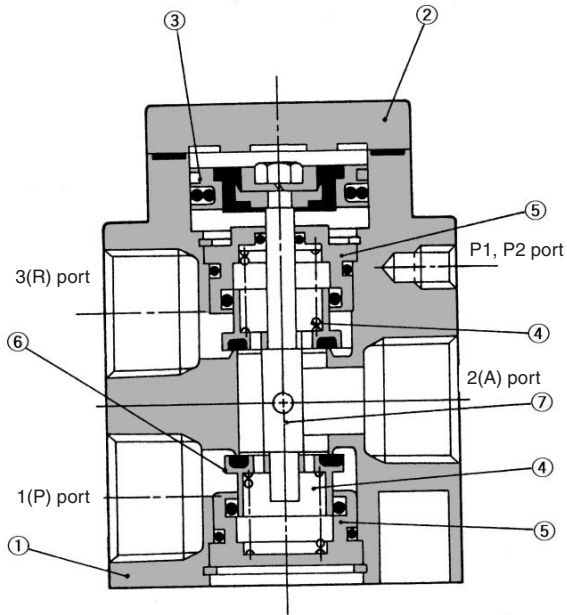


Component Parts

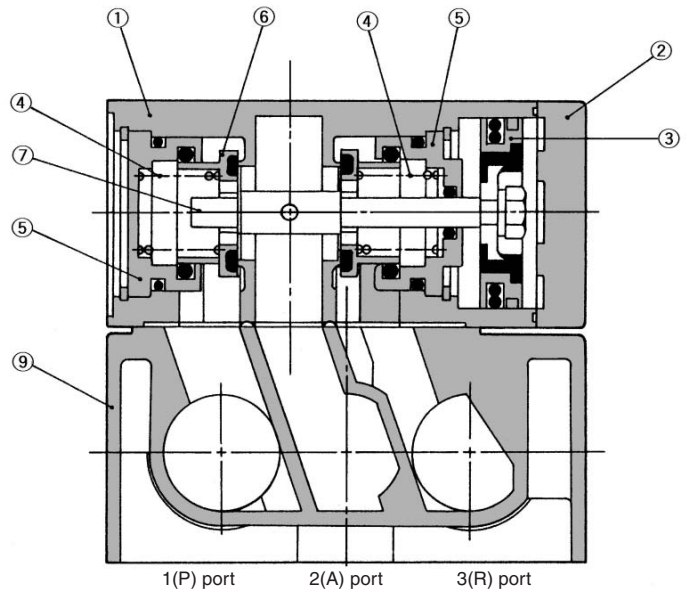
No.	Description	Material
①	Aluminum alloy, NBR	Aluminum alloy
②	Cover	Aluminum alloy
③	Working piston	Aluminum alloy
④	Center spring	Stainless steel
⑤	Valve guide	Aluminum alloy
⑥	Poppet valve	Aluminum alloy, NBR
⑦	Shaft	Stainless steel
⑧	Manual override	POM
⑨	Sub-plate	Aluminum alloy

Construction/Working Principle/Component Parts

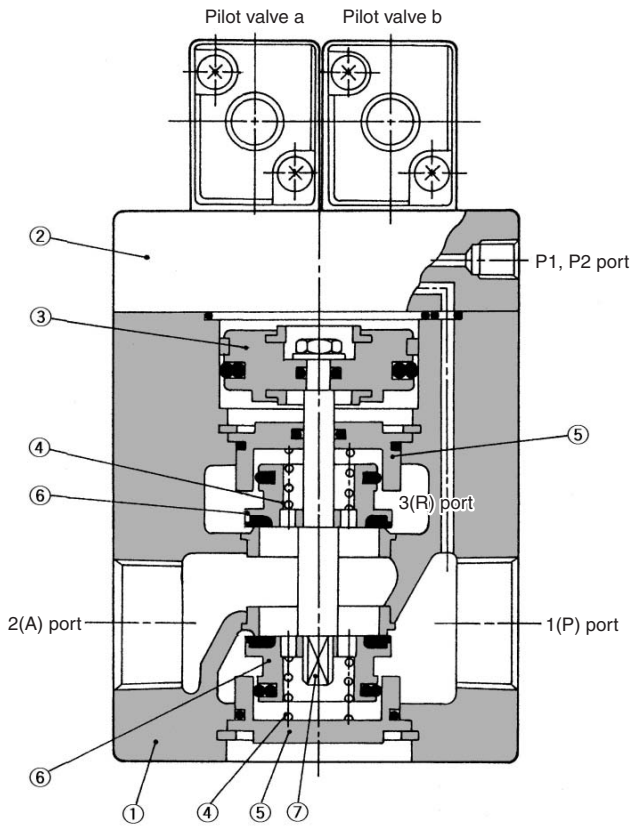
VEX3320 (Air operated)



VEX3420 (Air operated)



VEX350□/370□/390□ (Solenoid)



VEX
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Power Valve: Economy Valve Series VEX5

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

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

A large capacity and economical system.

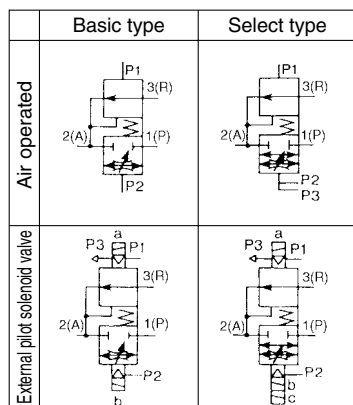
This valve provides twice the system capacity of the conventional circuit. Therefore, it is possible to downsize 1 or 2 sizes (for example, a conventional 32A circuit can be changed to a 25A or a 20A). It is economical, as its performance cost (system price/effective area) is one half of the conventional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



Basic type



Select type



Standard Specifications

Model	VEX55□□- ⁰⁴ ₀₆ ¹⁰	VEX57□□- ¹⁰ ₁₂	VEX59□□- ¹⁴ ₂₀					
Operation type	Air operated, External pilot solenoid							
Fluid	Air							
Proof pressure	1.5 MPa							
Pressure range	0 to 1.0 MPa							
Set pressure range	0.05 to 0.9 MPa							
Ambient and fluid temperature	Max. 50°C (Air operated 60°C)							
Pilot pressure	P1: 0.05 to 0.9 MPa P2: 0.2 to 0.9 MPa (Air operated: P2, P3: 0.2 to 0.9 MPa P2 ≤ P3)							
Repeatability	0.01 MPa							
Sensitivity	0.01 MPa							
Response time	60 ms or less							
Max. operating frequency	3 cycles/sec.							
Number of needle rotations	6 turns	8 turns						
Mounting	Free							
Lubrication	Not required (Use turbine oil Class 1 ISO VG32, if lubricated.)							
Port size Rc	Port	04	06	10	10	12	14	20
	P				1		1 1/4	
	A	1/2	3/4	1		1 1/4		2
Effective area	R				1 1/4		2	
	mm ²	130	160	180	300	330	590	670
	Cv	7.2	8.9	10	17	18	33	37
Weight (kg)	Air operated	Basic type	2.0		3.2		4.7	
		Select type	2.3		3.5		5.0	
	Solenoid	Basic type	2.2		3.5		4.9	
		Select type	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 terminal (D)		
Coil rated voltage (V)	AC (50/60 Hz)	100 V, 200 V, Other (Option)	
	DC	24 V, Other (Option)	
Allowable voltage	-15 to +10% of rated voltage		
Coil insulation	Class B (130°C) or equivalent		
Temperature rise	35°C or less (Rated voltage)		
Apparent power	AC	Inrush	5.6 VA (50Hz), 5.0 VA (60Hz)
		Holding	3.4 VA (50Hz), 2.3 VA (60Hz)
Power consumption	DC	1.8 W	
Manual override	Non-locking push type		
Pilot port silencer	AN210-02		

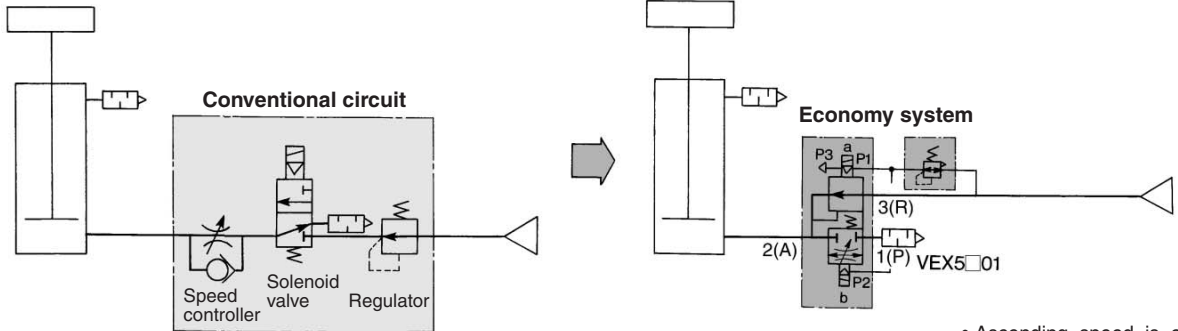
Accessory/Part No.

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

Applicable System/Example of Single Acting Circuit

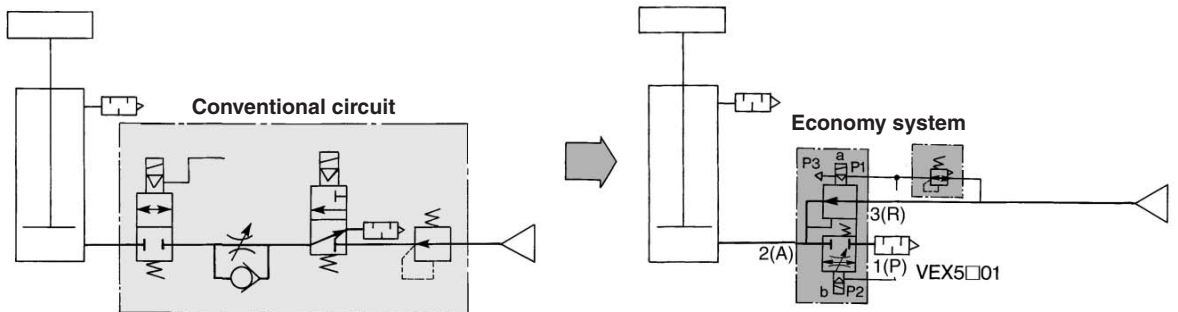
(The valves can be used also for double acting circuits, too. Please consult with SMC for details.)

1. Speed control

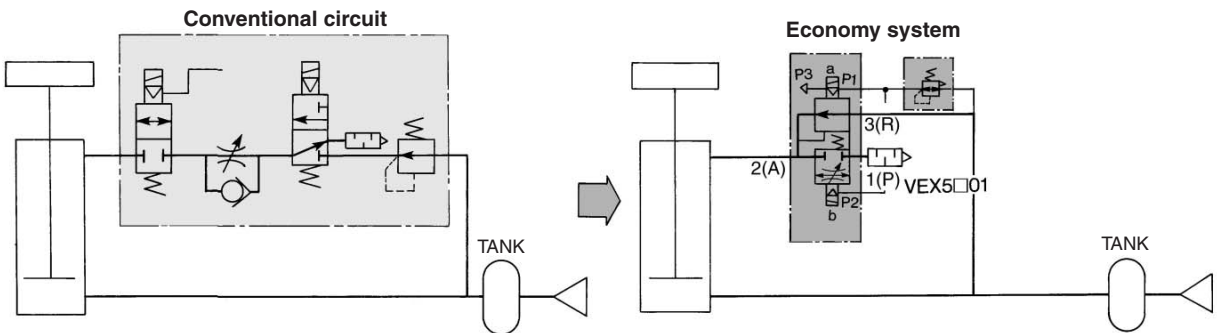


- Ascending speed is controlled by a pilot regulator.
- Descending speed is controlled by needle setting.

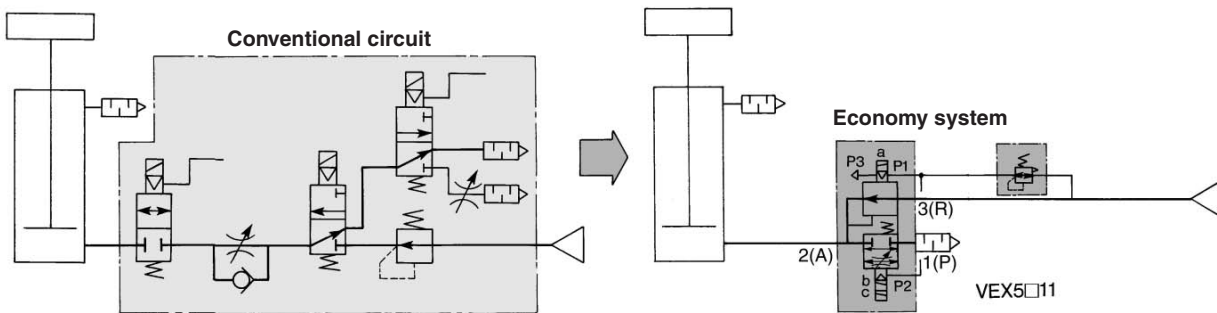
2. Intermediate (emergency) stop



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



4. Two speed driving



VEX

AN

AMC

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.

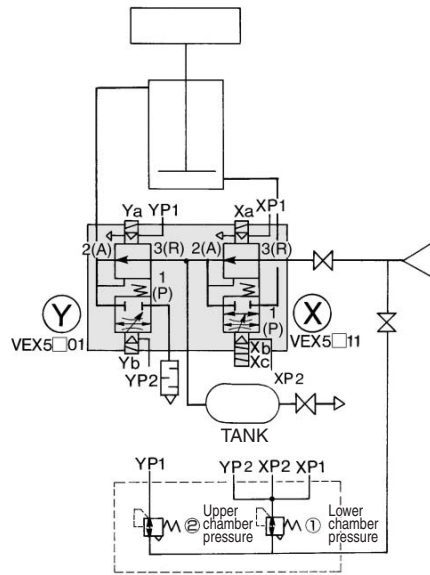
- **Excellent operation control**

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) X and Y 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	ON	OFF	ON	
Upward	High speed	●	●	—	●	—	a
	Low speed	—	●	●	●	—	b
Downward	High speed	—	●	—	—	●	c
	Low speed	—	●	●	—	●	d
Stop	—	—	—	—	—	—	e

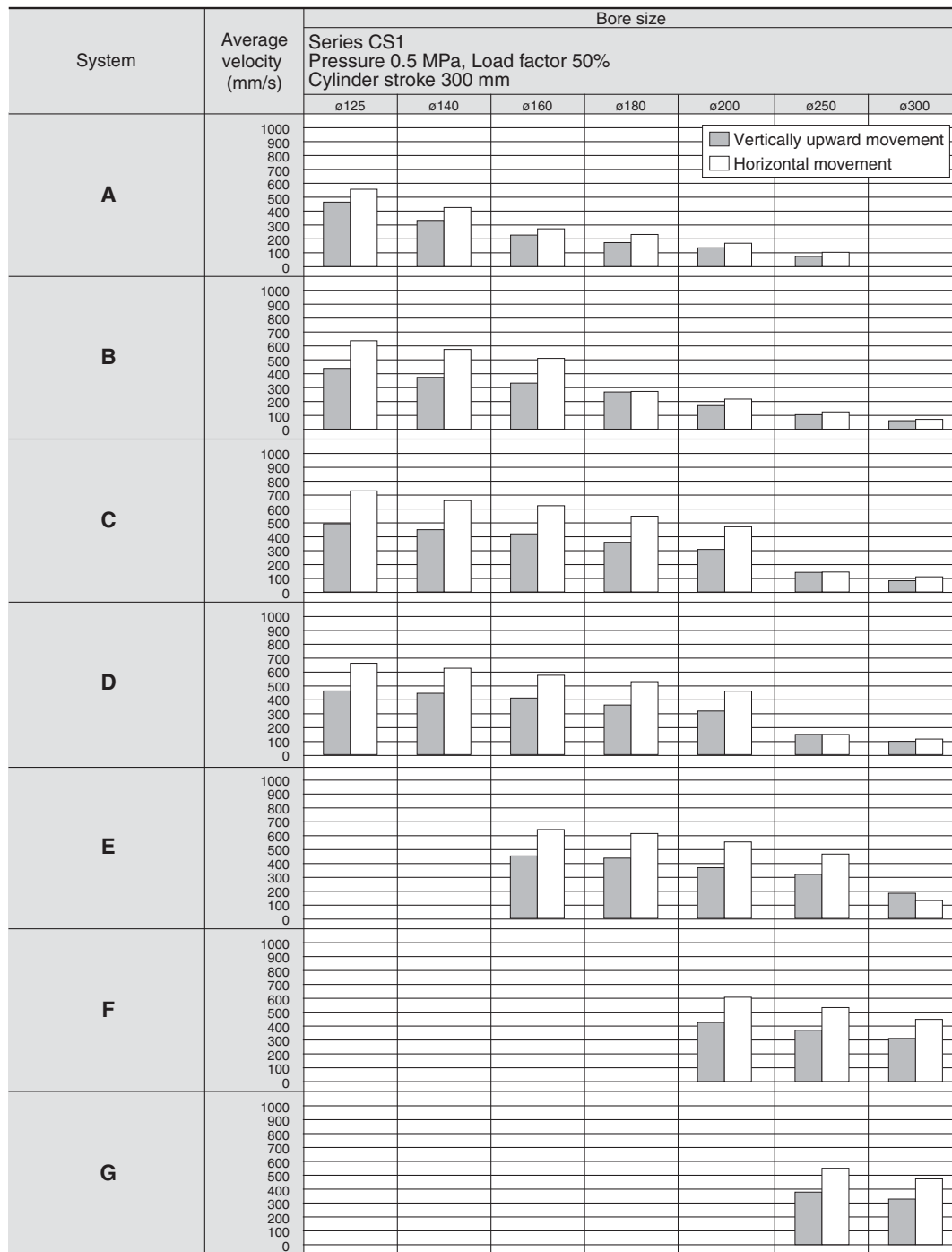
- a: The air in the upper cylinder chamber is exhausted from the P port of VEXY, and the air in the tank flows in through the P port of VEXX.
- b: Air flows into the lower cylinder chamber through a throttled opening, set by a needle, from the A to P port of VEXX.
- c: The air in the tank flows into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

⚠ Caution

* A lifter circuit can be composed of air operated valves. Please contact SMC for details.

Cylinder Speed Chart

Please assume the chart is offered as the guideline. For details about various each condition, please make use of SMC Model Selection Software and then decide it.



VEX
AN
AMC

- * When the cylinder is extended, the speed controller is metered-out, is connected with the cylinder directly, and its needle is fully open.
- * Values on the average velocity of a cylinder are obtained from the stroke length divided by full stroke time.
- * Load proportion is $((\text{load weight} \times 9.8) / \text{theoretical force}) \times 100\%$

Conditions of Speed Chart

System	Solenoid valve	Speed controller	Silencer	Tubing diameter x Length
A	VEX55□□- ⁰⁴ / ₀₆ / ₁₀	AS420-04	AN400-04	SGP15A x 1 m
B		AS500-06	AN500-06	SGP20A x 1 m
C		AS600-10	AN600-10	SGP25A x 1 m
D	VEX57□□- ¹⁰ / ₁₂	AS600-10	AN600-10	SGP25A x 1 m
E		AS800-12	AN700-12	SGP32A x 1 m
F	VEX59□□- ¹⁴ / ₂₀	AS900-14	AN800-14	SGP40A x 1 m
G		AS900-20	AN900-20	SGP50A x 1 m

Series VEX5

How to Order

VEX5 5 1 1 06 2 E Z B

Economy valve

Type

0	Basic
1	Select

Operation type

0	Air operated
1	External pilot solenoid

Body size **Port size**

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

Option

B	Bracket
G	Pressure gauge

Light/Surge voltage suppressor

Nil	None
S	With surge voltage suppressor (Grommet only)
Z	With light/surge voltage suppressor (Except grommet)

Coil rated voltage

1	100 VAC 50/60 Hz
2	200 VAC 50/60 Hz
3*	110 VAC 50/60 Hz
4*	220 VAC 50/60 Hz
5	24 VDC
6*	12 VDC
7*	240 VAC 50/60 Hz
9*	Other

* Option

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

Electrical entry (only with solenoid)

G	Grommet, Lead wire length 300 mm
H	Grommet, Lead wire length 600 mm
E	Grommet terminal
T	Conduit terminal
D	DIN terminal

How to order pilot valves

SF4 - **20**

Electrical entry

Coil rated voltage

(Ex.) **SF4-1G-20**

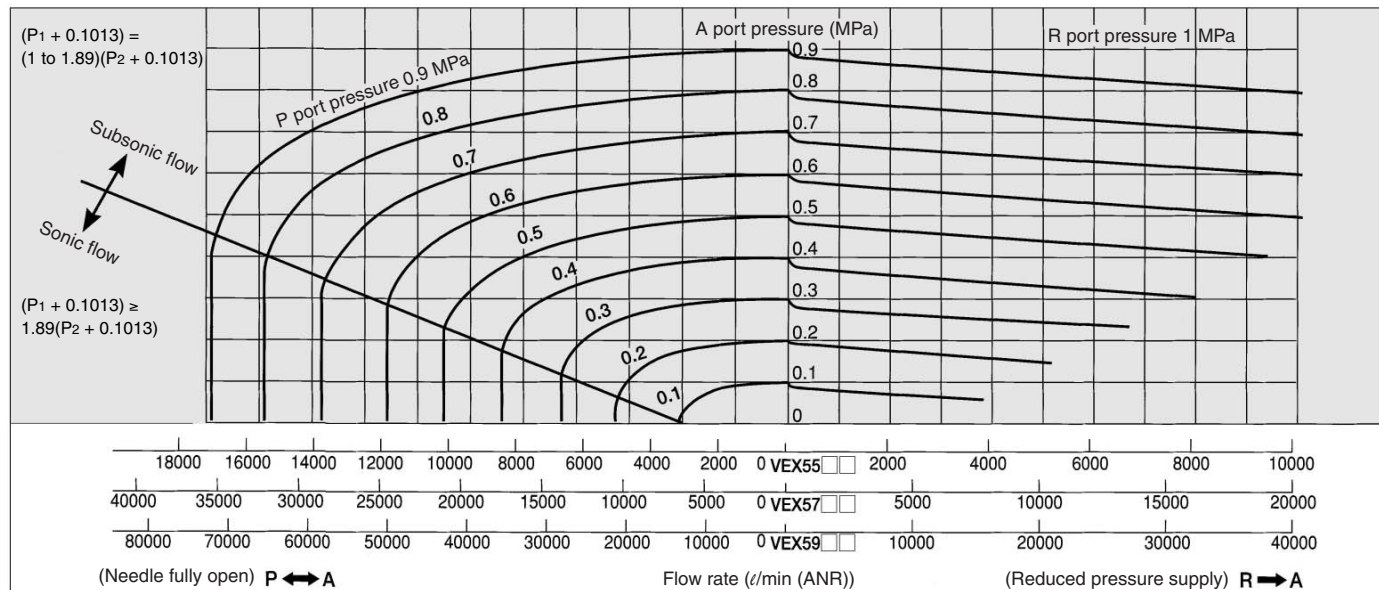
100 VAC, Grommet

(Ex.)
VEX5511-062EZ-BG
Body size 5, Select, External pilot solenoid
Port size Rc 3/4
200 VAC, Grommet terminal, with light/surge voltage suppressor
Option---Bracket, with pressure gauge

Model

Model	Basic type		Select type		Port size Rc	
	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

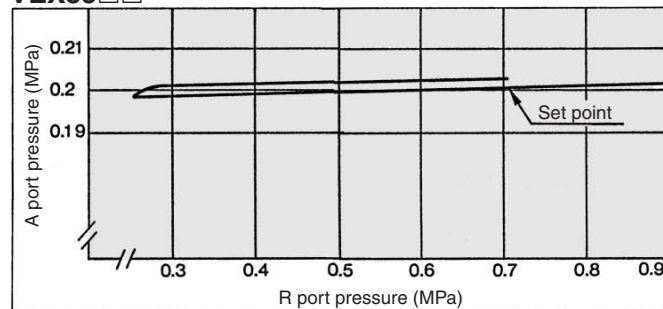
Flow Characteristics



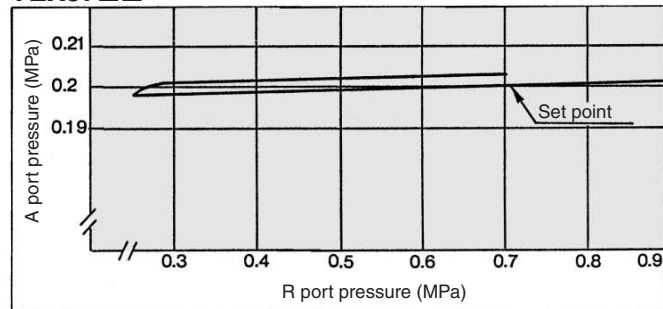
Pressure Characteristics

Shows the outlet pressure (A port) change against the inlet pressure (R port) change. They conform to JIS B 8372 (Air pressure regulator).

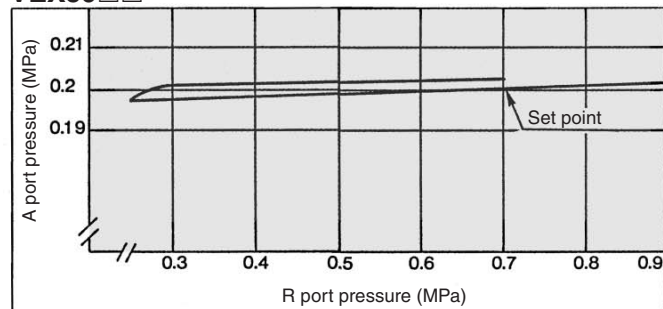
VEX55 □ □



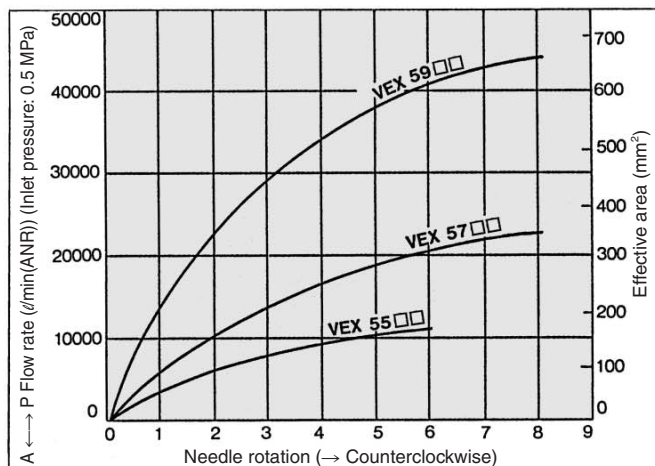
VEX57 □ □



VEX59 □ □



Needle Characteristics A ↔ P



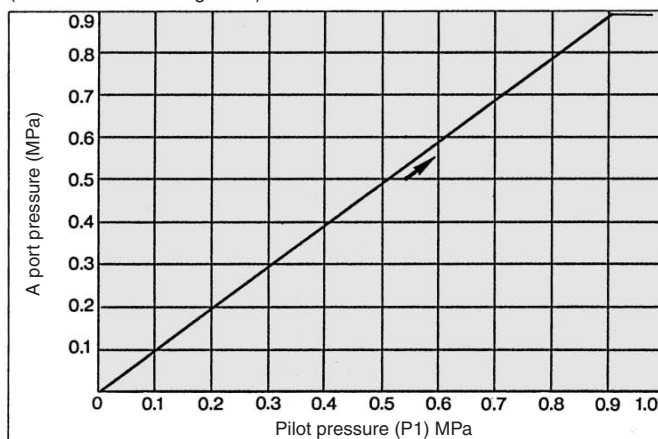
VEX

AN

AMC

Setting Pressure Characteristics

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

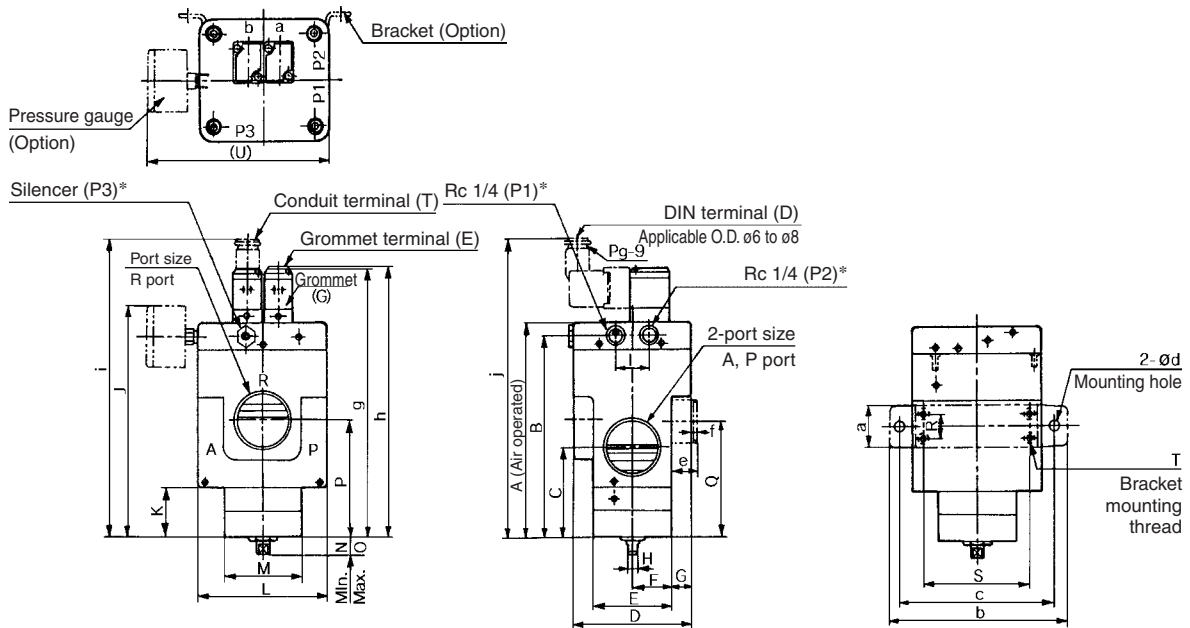


Series VEX5

Basic Type Dimensions

VEX5500/5501
VEX5700/5701

* Refer to page 5-9-38.

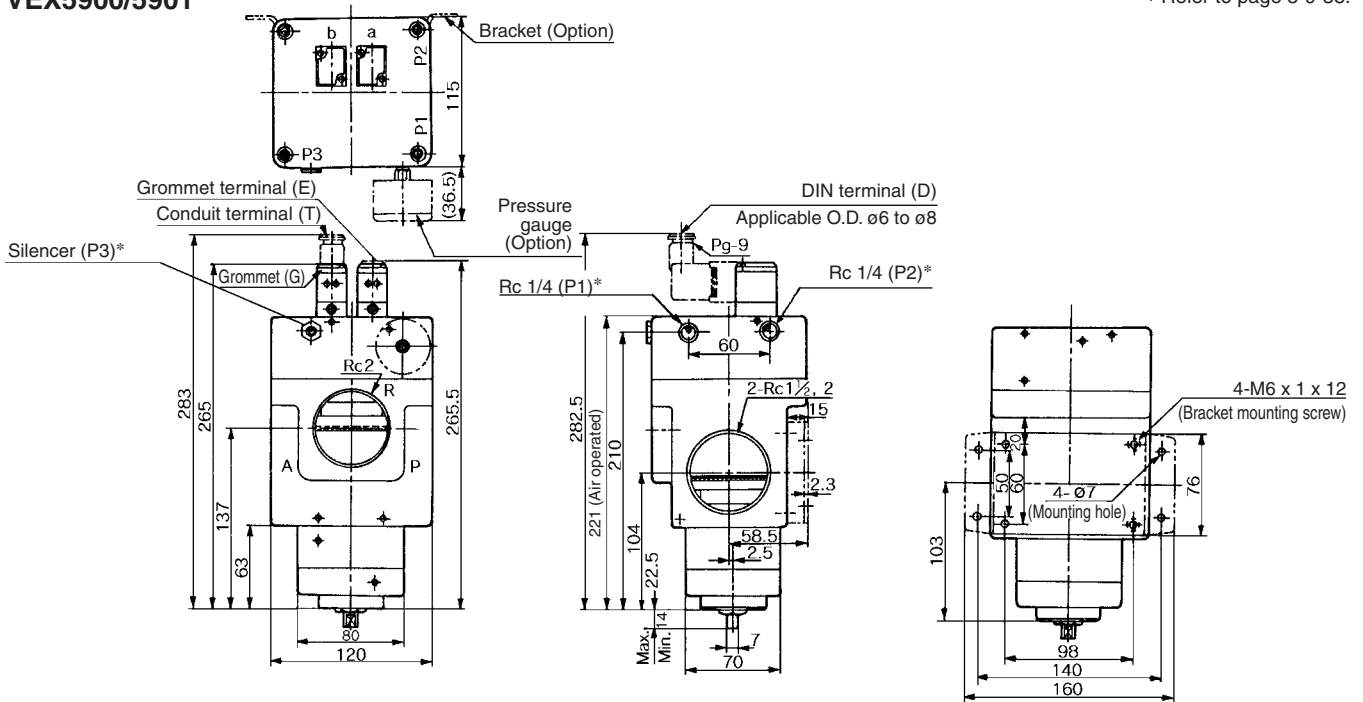


Model	Port size		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
	A, P port	R port																					
VEX5500 VEX5501	Rc 1/2, 3/4, 1	Rc 1/2, 3/4, 1	143.5	133.5	62.5	70	50	25	10	7	25	156.5	36.5	80	60	16.5	20	81.5	83.5	Center	60	2-M6 x 1 x depth 9	116.5
VEX5700 VEX5701	Rc 1, 1 1/4	Rc 1 1/4	160.5	150.5	62.5	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

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

VEX5900/5901

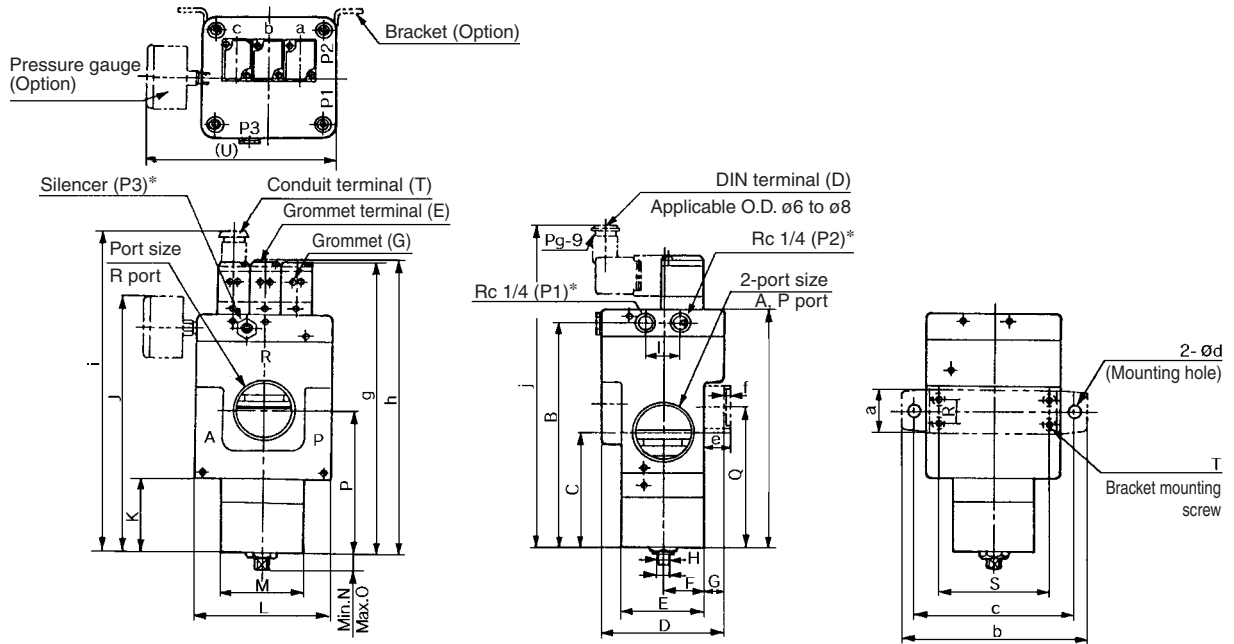
* Refer to page 5-9-38.



Select Type Dimensions

VEX5510/5511
VEX5710/5711

* Refer to page 5-9-38.

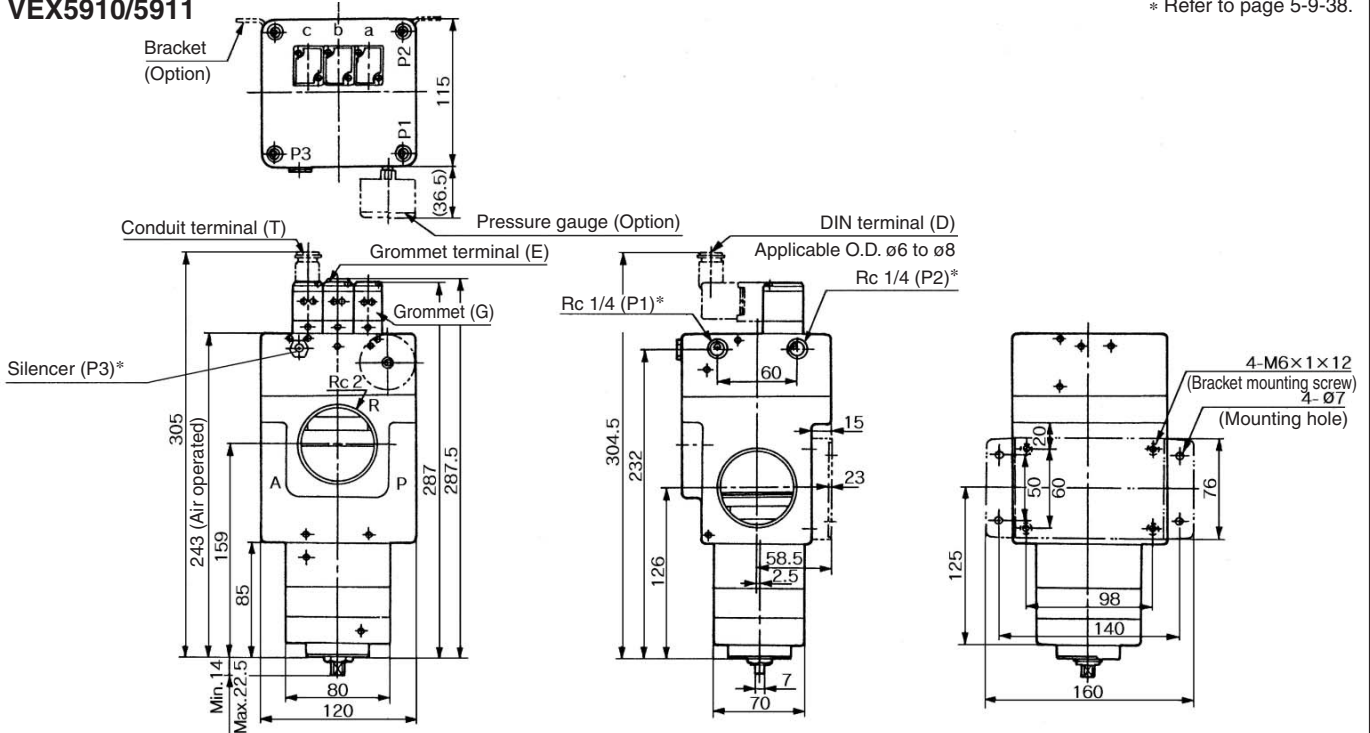


Model	Port size		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
	A, P port	R port																					
VEX5510 VEX5511	Rc 1/2, 3/4, 1	Rc 1/2, 3/4, 1	160	150	79	70	50	25	10	7	25	173	53	80	60	13	18	98	100	Center	60	2-M6 x 1 x depth 9	116.5
VEX5710 VEX5711	Rc 1, 1 1/4	Rc 1 1/4	177.5	167.5	84.5	90	60	30	15	7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

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

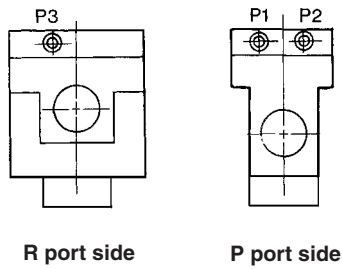
VEX5910/5911

* Refer to page 5-9-38.



Series VEX5

External Pilot Piping



⚠ Caution

Refer to pages 5-11-2 to 5-11-6 for Safety Instructions and Solenoid Valve Precautions.

Model	P1	P2	P3
VEX5□00	External pilot	External pilot	Plug
VEX5□01	External pilot	External pilot	Pilot exhaust ^{Note)}
VEX5□10	External pilot	External pilot	External pilot
VEX5□11	External pilot	External pilot	Pilot exhaust ^{Note)}

Note) For pilot exhaust port, silencer AN210-02 is mounted.

Related Products:

Silencer (Series AN)

- Over 30 dB noise reduction
- Sufficient effective area



Model	Connection R	Effective area (mm ²)
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 page 5-10-1 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.



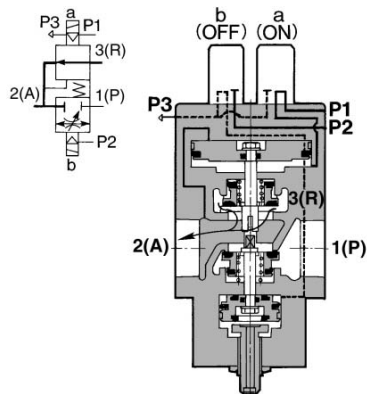
Model	Connection R	Effective area (mm ²)	Max. air flow (ℓ/min)
AMC310	3/8	16	300
AMC510	3/4	55	1,000
AMC610	1	165	3,000
AMC810	1 1/2	330	6,000
AMC910	2	550	10,000

- 99.9% of oil mist removal.
 - Over 35 dB noise reduction.
- Refer to page 5-11-1 for details.



Basic Type Construction/Working Principle/Component Parts

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

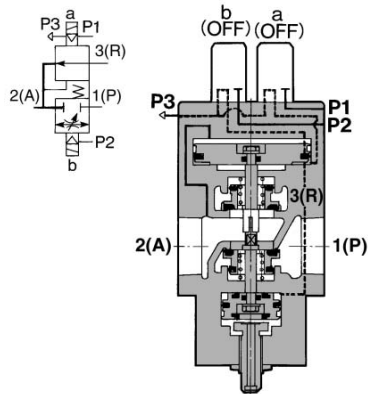


When the pilot solenoid valve "a" is energized (or when pilot pressure is applied to the P1 port of the air operated type) while the P1 port is under the pilot pressure, reduced pressure is supplied from the R port to the A port.

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

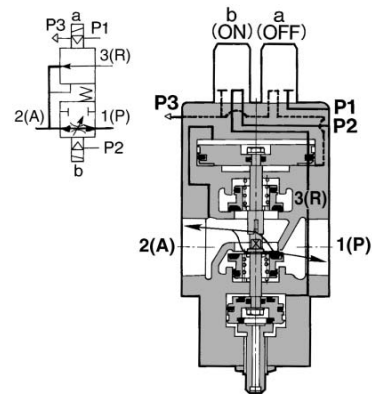


When neither the pilot solenoid valves "a" or "b" is energized (or when no pilot pressure is applied to the P1 and P2 ports of the air operated type), no acting force is applied to the pressure control piston (3) and operation piston (9), and the spring (4) closes both poppet valves (6), thus the valves assume 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 is released from the P1 port of the air operated type).

(R → A: Non relief regulator)

3. 2(A) ↔ 1(P) Throttled exhaust

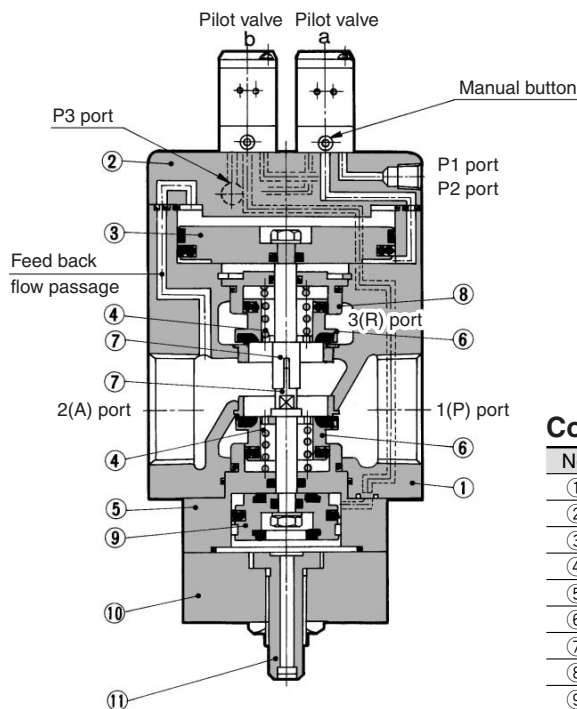


When the pilot solenoid valve "b" is energized while pilot pressure is in the P2 port (or when the pilot pressure is applied to the P2 port of the air operated type), an acting force generated above the operation piston (9) pushes the operation piston down, and thus the P and A ports are connected.

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



(Basic type: External pilot solenoid)

Component Parts

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

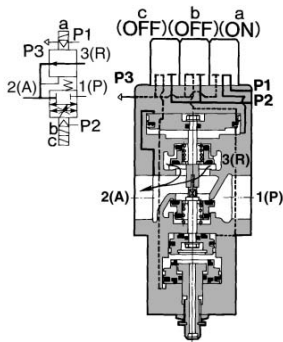
VEX

AN

AMC

Select Type Construction/Working Principle/Component Parts

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



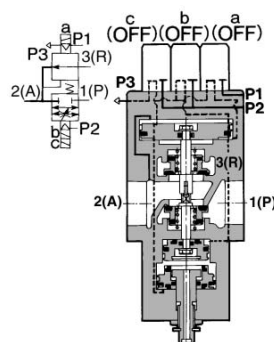
When the pilot solenoid valve "a" is energized while the P1 port is under the pilot pressure, reduced pressure is supplied from the R port to the A port.

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 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

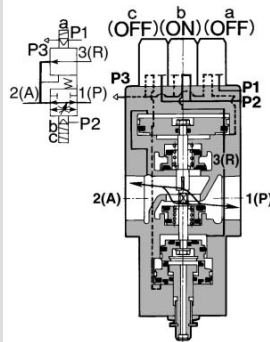


When neither the pilot solenoid valve "a" nor "b" is energized (or when no pilot pressure is applied to the P1 and P2 ports of the air operated type), no acting force is applied to the pressure control piston ③ and operation piston ⑨, and the spring ④ closes both poppet valves ⑥, thus the valve assumes 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 is released from the P1 port of the air operated type).

(R → A: Non relief regulator)

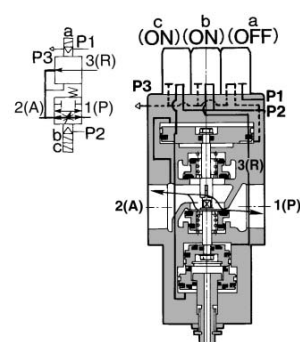
3. 2(A) ↔ 1(P) Fully open exhaust



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 type), an acting force generated above the operation piston ⑨, and pushes down the operation piston, and thus the P and A parts are connected.

At that time, the lower poppet valve y 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 type), 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.

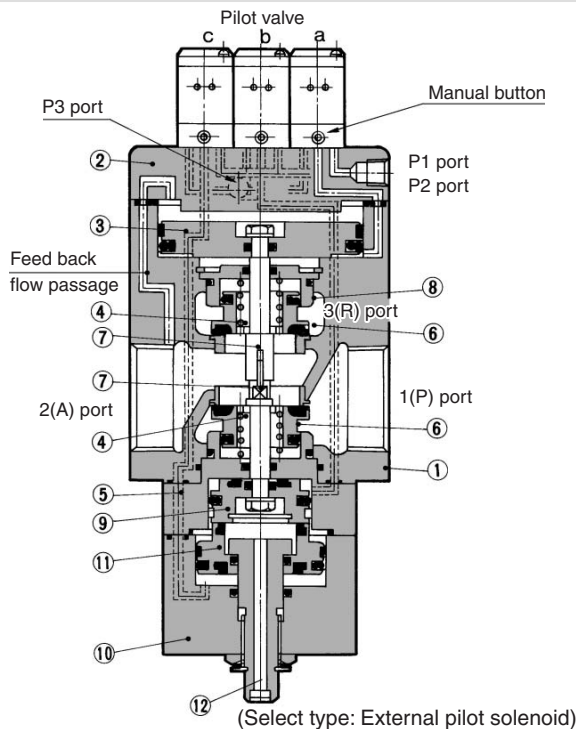
At that time, the lower poppet valve ⑥ opens by the degree preset by the needle ⑫. (Counterclockwise rotation of the needle opens the poppet valve.)

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 type), 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 type).

By turning on/off the pilot solenoid valve "c" (or by supplying/exhausting pilot pressure to/from the P3 port of the air operated type) 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 type), either throttling or fully open exhaust can be selected (deceleration/acceleration) for the A ↔ P port.

Construction



(Select type: External pilot solenoid)

Component Parts

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