

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

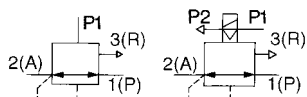


External pilot solenoid

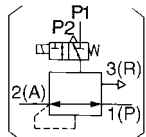
JIS Symbol

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
R											1 1/4	1 1/4	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

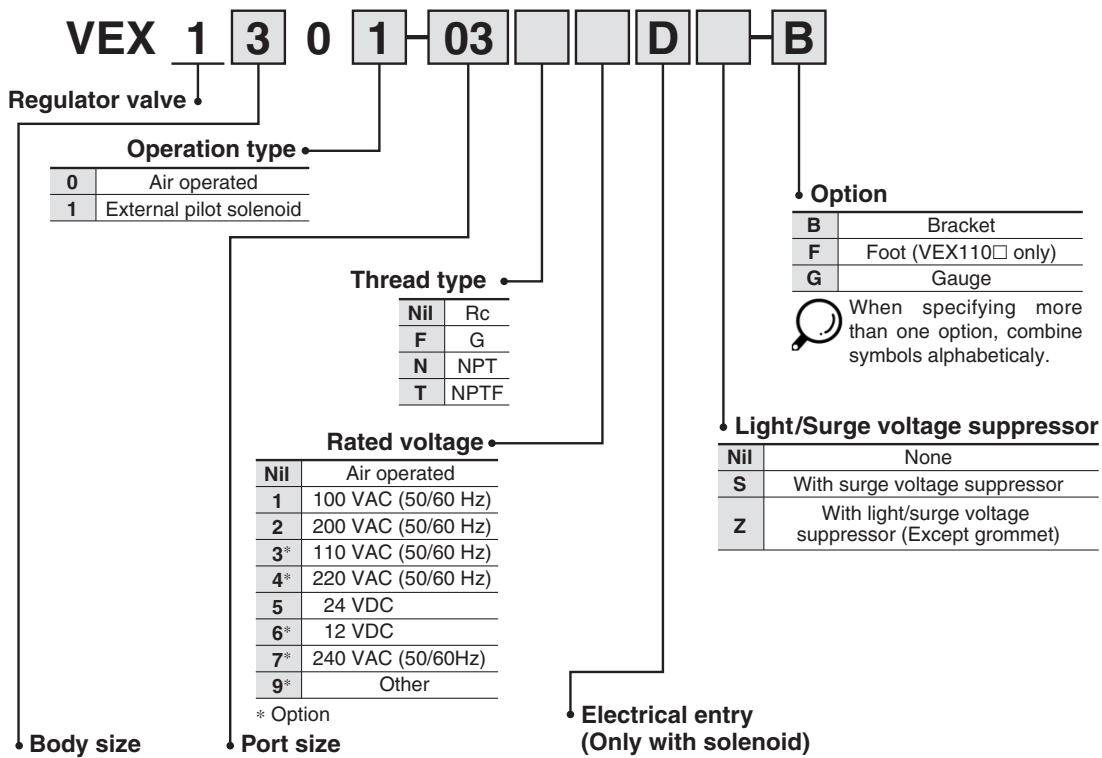
Model	VEX1101/1201/1301	VEX1501/1701/1901
Pilot valve	VK334-□□□	VO307-□□□
Electrical entry	Grommet, DIN terminal	Grommet, Grommet terminal, Conduit terminal, DIN terminal
Coil rated voltage (V)	AC (50/60 Hz)	100 V, 110 V, 200 V, 220 V, 240 V
	DC	6 V, 12 V, 24 V, 48 V
Allowable voltage	±10% of rated voltage	-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
	F VEX1-18-2A	—	—	—	—	—
Pressure gauge ^{Note)}	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)
		2	01	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.

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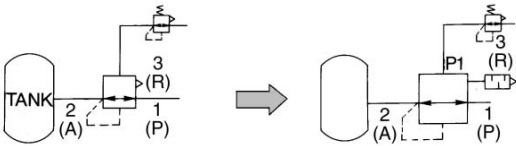
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Series VEX1

Application Example

1. Relief regulator (Rapid tank internal pressure setting)

(Relieving type regulator e.g. AR2000)

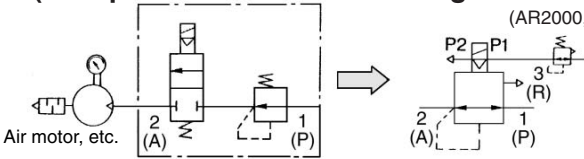


Relieving type diaphragm regulator

- Large exhaust capacity.
- Silencer is easy to connect.

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

(AR2000, etc.)

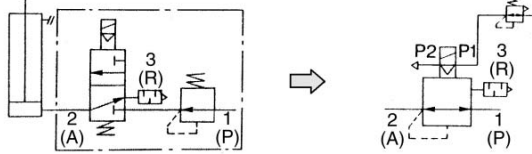


External pilot
2 port solenoid valve
(For on/off operation)

Diaphragm
regulator
(For pressure setting)

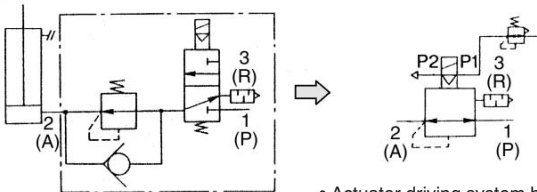
- Solenoid on/off operation controls the air flow.
- Setting can be changed by remote control. (Remote control)

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



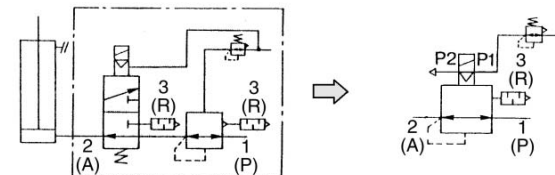
(Solenoid valve) (Regulator)

- Actuator's appropriate pressure control saves energy (Air).



- Actuator driving system becomes simple.

4. Balance and driving

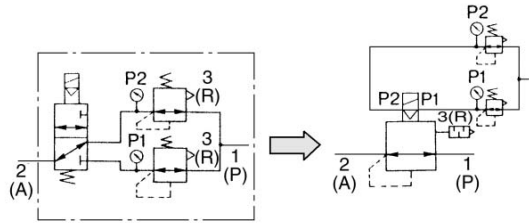


(External pilot
solenoid valve)

(Relieving type
regulator)

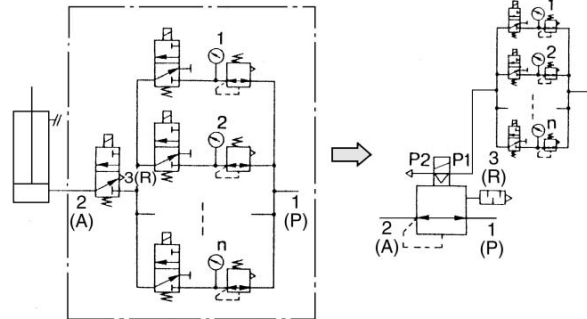
- The large capacity relief valve rapidly responds and sets the balance pressure.
- Solenoid on/off operation drives the cylinder.
- Common exhaust.

5. 2 steps directional control setting

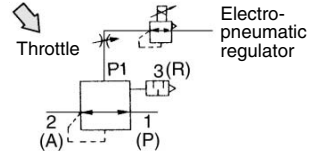


- 3 VALVES IN ONE – A simple main system is ensured.
- Remotely controlled by compact pilot system.

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

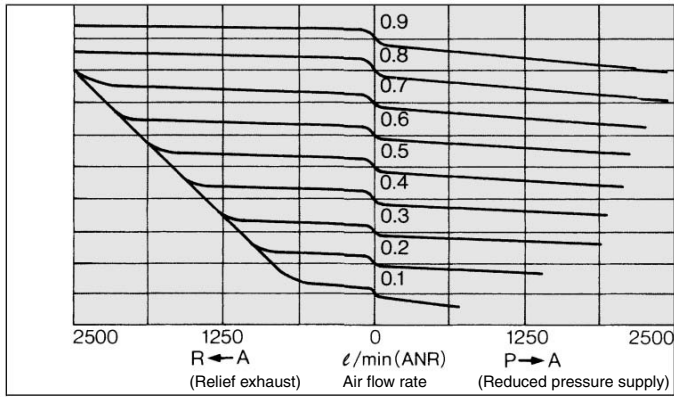
- When the VEX outlet side capacity is small, install a speed controller AS2000, in the pilot pipe to lower the pilot pressure for vibration prevention. (Meter-in)

⚠ Caution

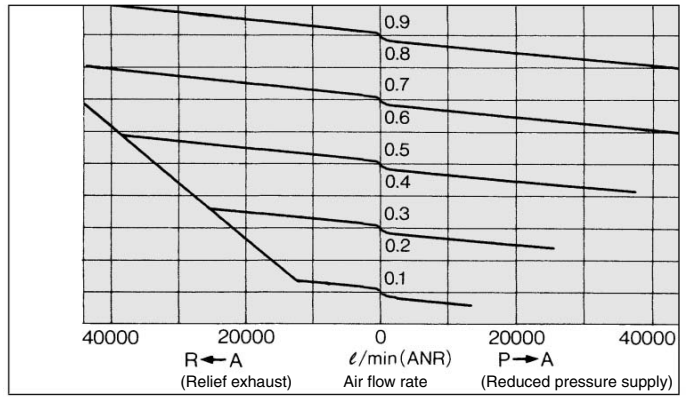
- Relieving type regulator such as AR2000, etc. should be used as pilot regulator in the application.
- A sensitive regulator such as the ARP3000, etc. should be used as a pilot regulator on the low pressure side, particularly with 5. 2 steps directional control setting.

Flow Characteristics

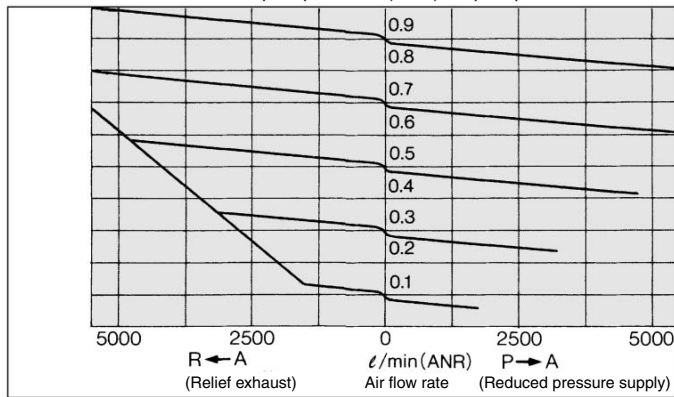
VEX110□/120□ A port pressure (MPa) P port pressure 1.0 MPa



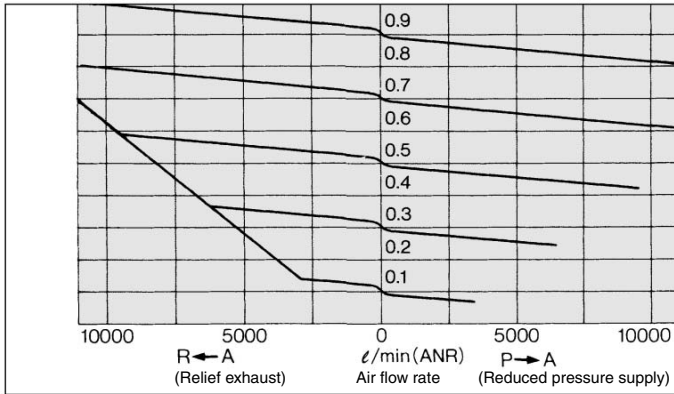
VEX190□ A port pressure (MPa) P port pressure 1.0 MPa



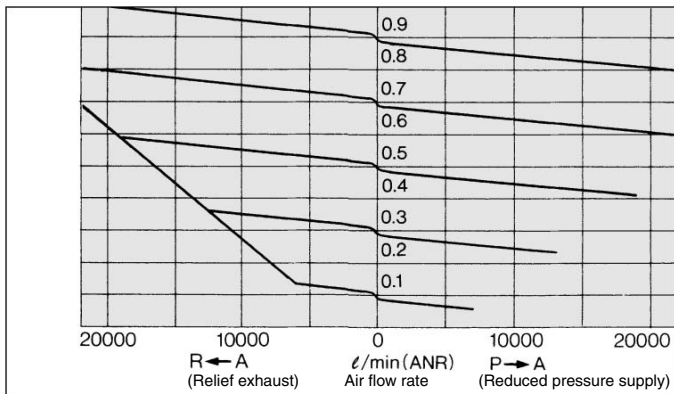
VEX130□ A port pressure (MPa) P port pressure 1.0 MPa



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

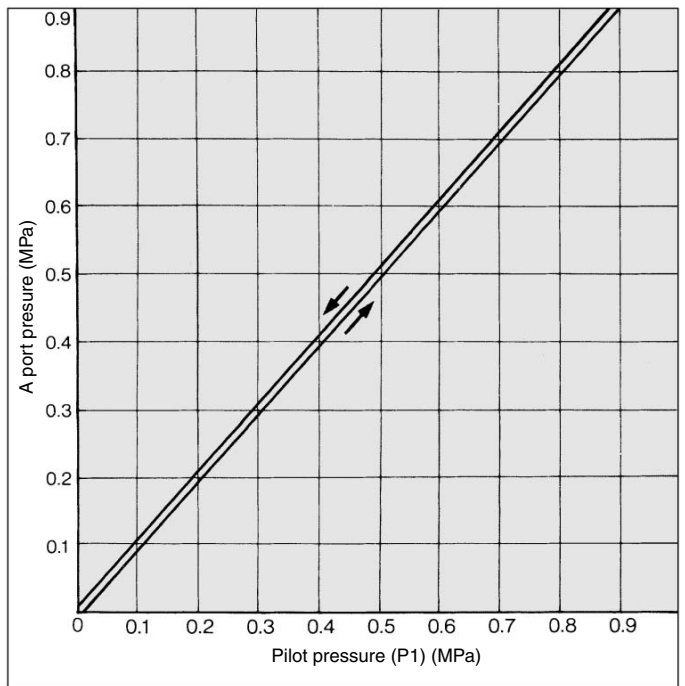


VEX170□ A port pressure (MPa) P port pressure 1.0 MPa



Setting Pressure Characteristics

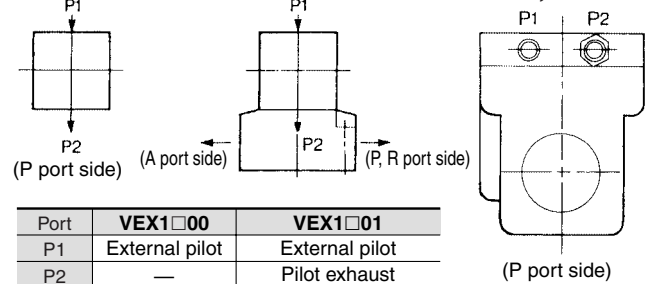
A port pressure is set according to pilot pressure.



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External Pilot Piping

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

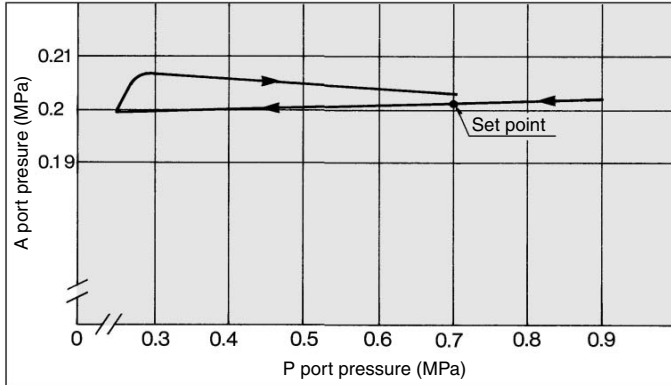


Series VEX1

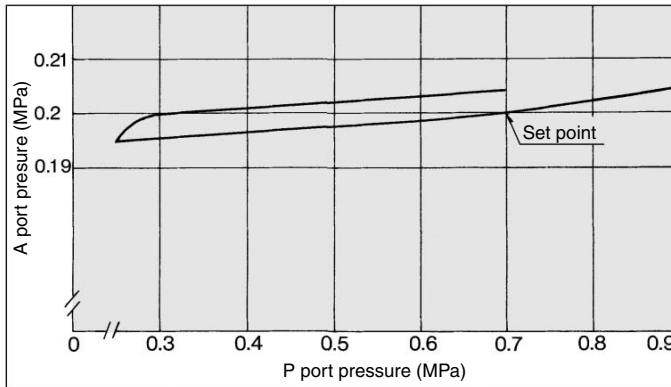
Pressure Characteristics

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

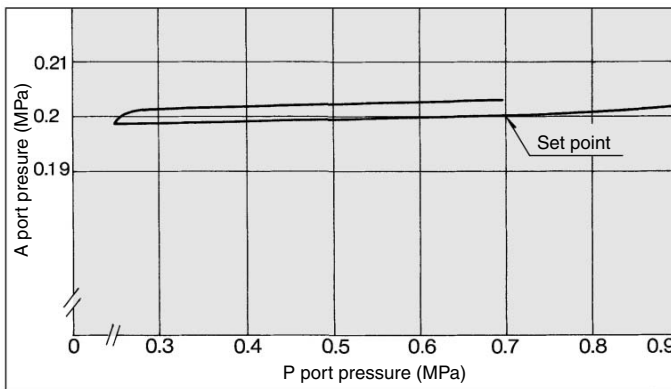
VEX110□/20□



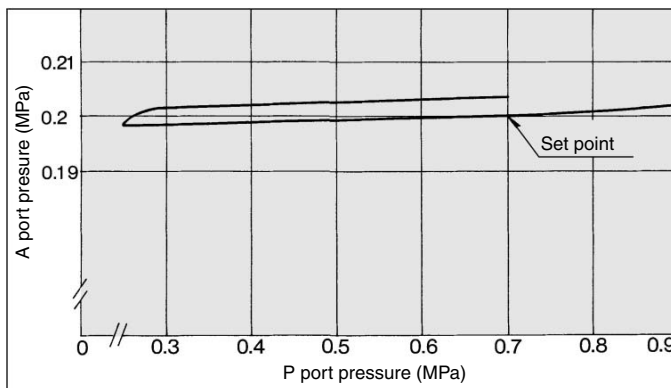
VEX130□



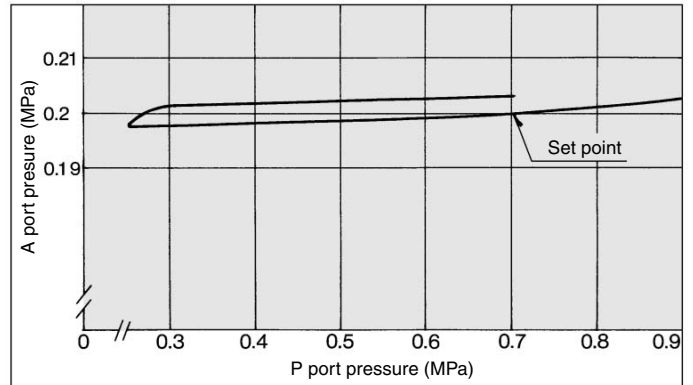
VEX150□



VEX170□

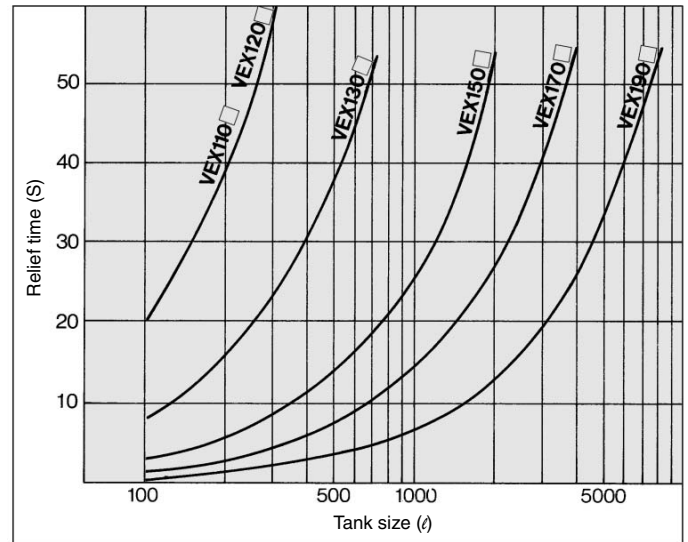


VEX190□

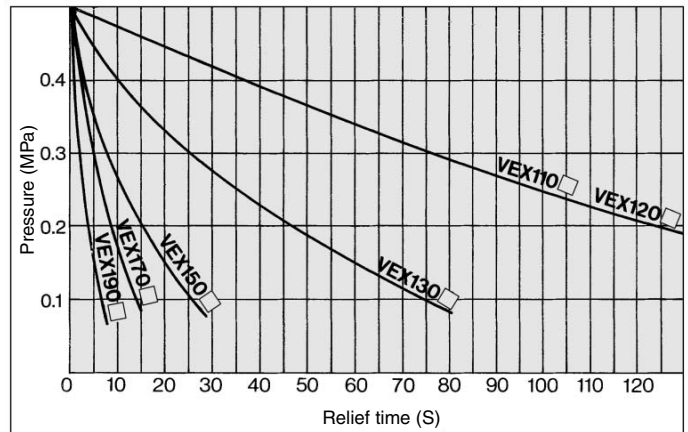


Relief Time

1. Relief time from 0.5 MPa to 1 MPa

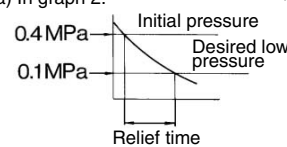


2. Relief time from 1000 ℓ tank



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.

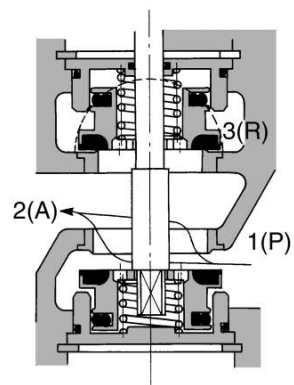
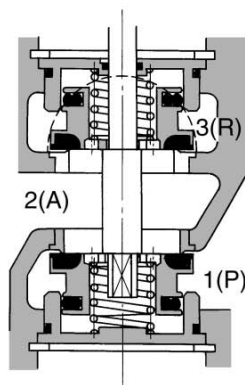
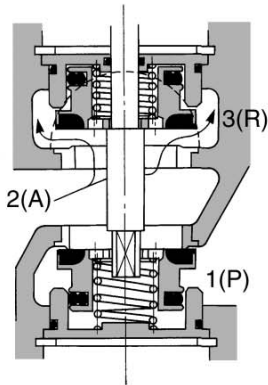
From above, the relief time is 26 - 3 = 23 s

Construction/Working Principle/Component Parts

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

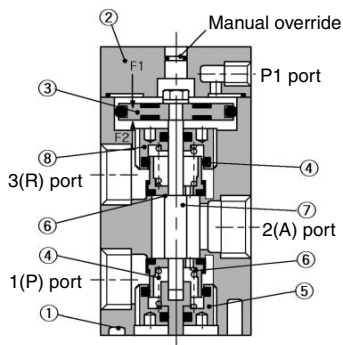
(2) Setting pressure condition

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

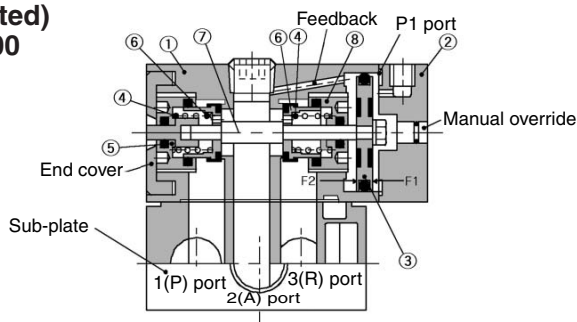


- The balance between the acting force F_1 of the pilot pressure (P1 port) over the upper surface of the pressure regulating piston ③ and the acting force F_2 of the pressure at A port leading to a space under the piston through the feed back flow root closes a couple of poppet valves ⑥ and sets A port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

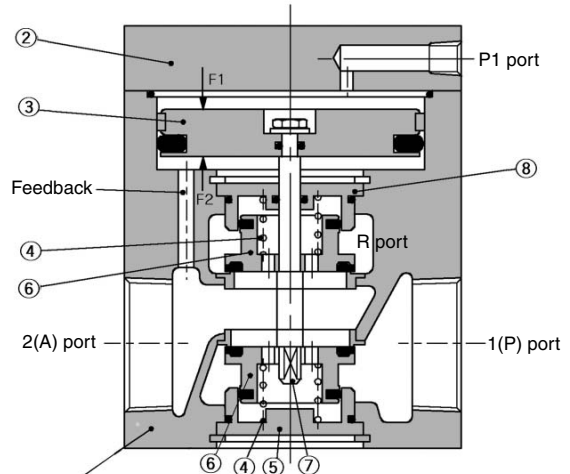
(Air operated)
VEX1100



(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

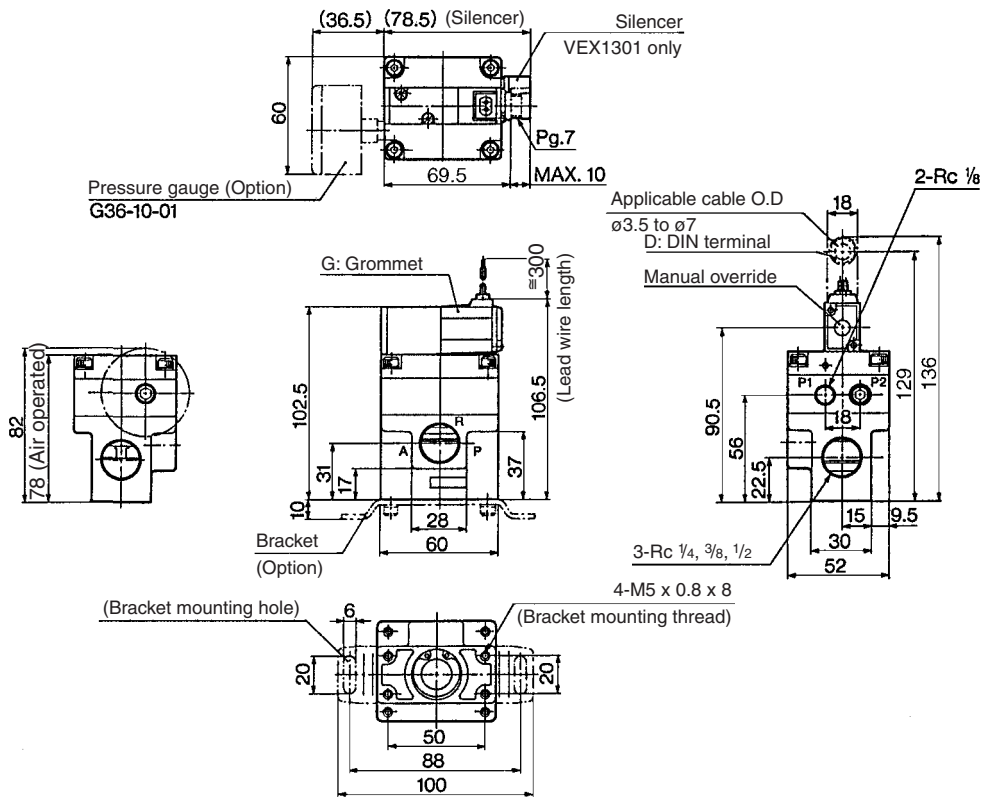
VEX

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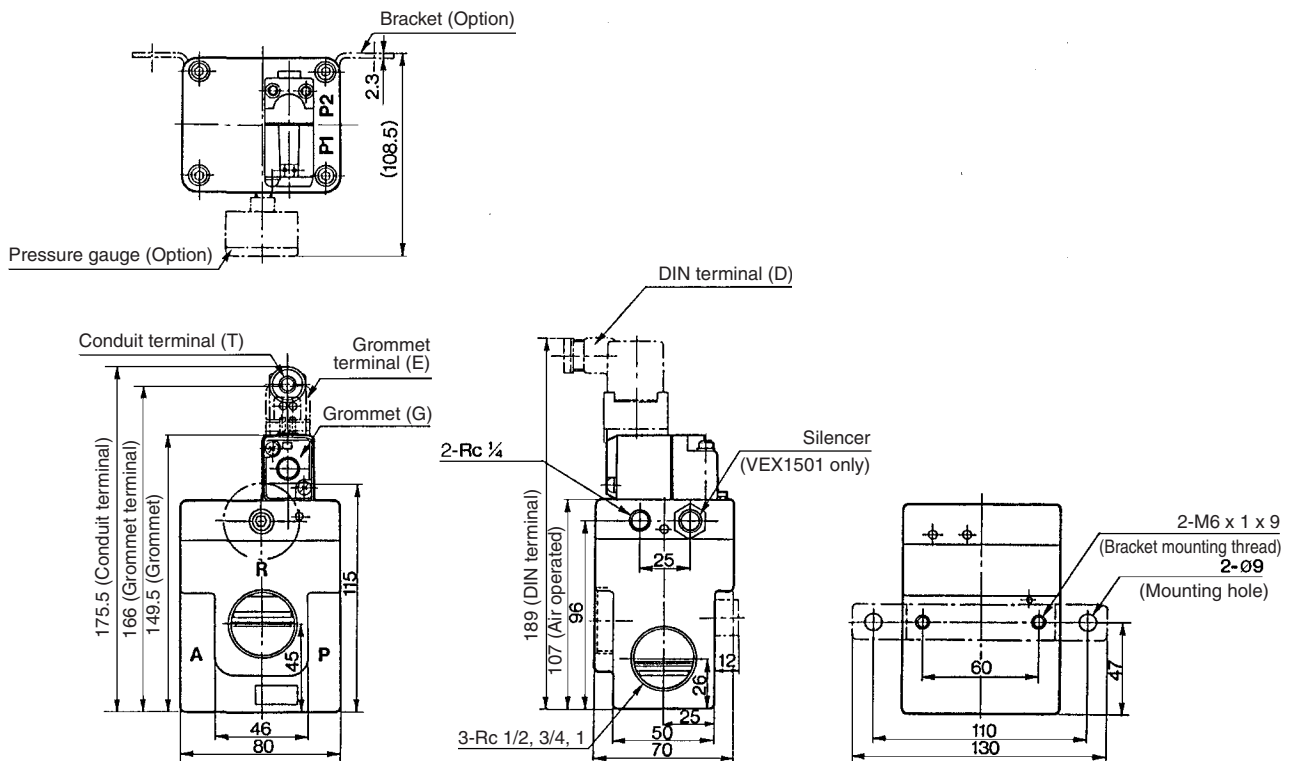
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Dimensions

Air operated: VEX1300
External pilot solenoid: VEX1301



Air operated: VEX1500
External pilot solenoid: VEX1501



VEX

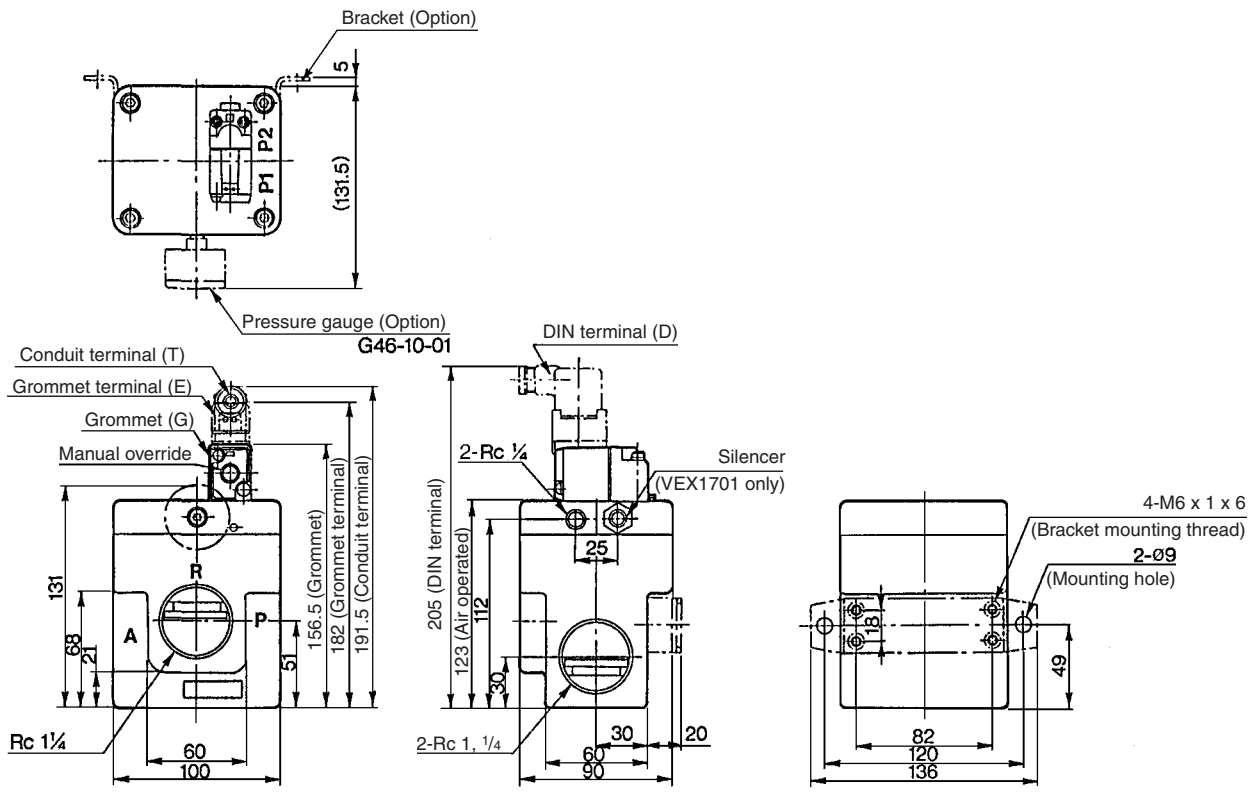
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Series VEX1

Dimensions

Air operated: VEX1700
External pilot solenoid: VEX1701



Air operated: VEX1900
External pilot solenoid: VEX1901

