

E-P HYREG® Series VY2

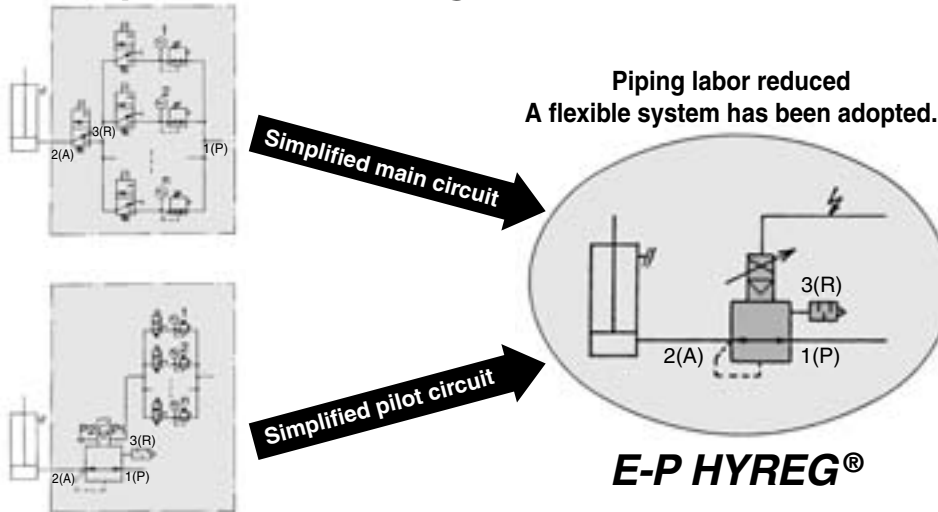
This hybrid regulator combines a regulator and a solenoid valve.

Stepless control through electric signals

Port sizes M5 to 2 inches can be covered by combining an ultra-compact electro-pneumatic pilot valve and a 3 port high-capacity exhaust main regulator.



Simple circuit configuration



Long service life and low wattage type as standard

VY2

- Maximum operating pressure: 0.7 MPa
- Power consumption: 0.8 W
- Operating time (Estimated service life): 7000 Hr [Ultra dries air (Dew point -40°C or equivalent)]
- Made to Order VY1
- Maximum operating pressure: 0.9 MPa
- Power consumption: 1.8 W
- Operating time (Estimated service life): 3000 Hr [Ultra dries air (Dew point -40°C or equivalent)]

Ease of handling

Having the amplifier built into the electro-pneumatic pilot valve, only an external power supply and signal (voltage, current) need to be connected.

Manifold capable

Using the VVEXB/2/4 series, a maximum 10 station manifold is possible.

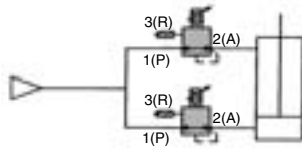
Application example

Capable of performing multistage pressure control and stepless pressure control by varying the electrical

Drive and Thrust Control

Cylinder behavior and pressurization control for peening and stamping

Example
Welding pressure control of spot welding gun cylinder
Loading cylinder control

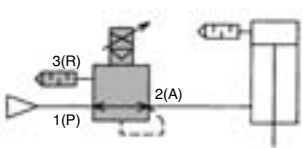


Cylinder Thrust Control

Tension control balancer

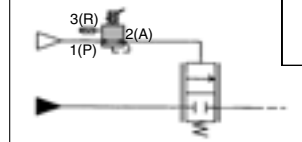
Example

Auto balancer



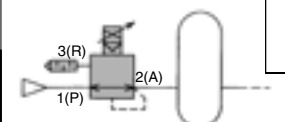
Flow Control of Various Fluids

For remote control of another air operated valve



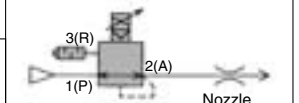
Pressure Control of Tank

Automatic adjustments



Air Flow Control of Nozzle ^{Note)}

Air blowing
Air cooling



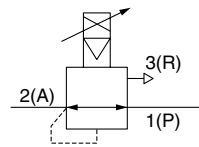
Note) Use for the sonic flow.

Series VY2

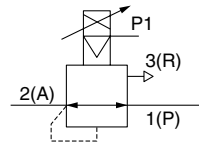


JIS Symbol

Internal pilot



External pilot



How to Order

E-P HYREG®
Maximum operating pressure: 0.7MPa

Pilot type

0	Internal pilot
1	External pilot ^{Note)}

Note) Except body size D

VY2 1 0 0 - 01 -

Power source/Command signal

Symbol	Power source voltage DC	Command signal DC	Input impedance
Nil	24 V	1 to 4 V	67 kΩ
1		0 to 7.5 V	10 kΩ
2		4 to 16 mA	120 Ω
3		0 to 15 mA	
5	12 V	1 to 4 V	67 kΩ
6		0 to 7.5 V	10 kΩ
7		4 to 16 mA	120 Ω
8		0 to 15 mA	

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

Body size **Port size Rc** **Option**

Mounting	Symbol	Symbol	Port 1(P), 2(A) / Port 3(R)	B (Bracket)	F (Foot)	G (Pressure gauge)	N (Silencer)	Applicable pilot valve ²⁾				
Base mounted	D	00	Without sub-plate	—	—	—	—	VY2D00-□00 ³⁾				
		M5	M5	—	—	—	●					
	B	00	Without sub-plate	—	—	—	●		—			
		M5	M5	—	—	—	—					
	2	01	1/8	—	—	—	●		—			
		02	1/4	—	—	—	●					
		4	00	Without sub-plate	—	—	—			—		
			02	1/4	—	—	—			●		
	4	03	3/8	—	—	—	—		—			
		04	1/2	—	—	—	—					
		Body ported	A	M5	M5	● ¹⁾	● ¹⁾			—	—	VY2B00-□00 ³⁾
			1	01	1/8	● ¹⁾	● ¹⁾			●	●	
02	1/4			—	—	●	●					
3	02		1/4	—	—	—	●	●				
	03	3/8	—	—	—	●	●					
5	04	1/2	—	—	—	—	—					
	04	1/2	—	—	—	●	●					
7	06	3/4	—	—	—	●	●					
	10	1	—	—	—	—	—					
9	10	1	1 1/4	●	—	●	●					
	12	1 1/4										
	14	1 1/2										
	20	2										

Note 1) Only bracket or foot may be mounted.

Note 2) When replacing the pilot valve, it may not satisfy characteristics such as accuracy, etc. Confirm the product works under the operating conditions before using. If SMC is requested to repair the product, SMC confirms whether characteristics are satisfied.

Note 3) □ in the applicable pilot valve part number is designated for the power source/command signal.



Made to Order

(Refer to pages 730 to 735 for details.)

Maximum operating pressure: 0.9 MPa (VY1)

Specifications

Model		VY2D00	VY2A0 ⁰	VY2B0 ⁰	VY210 ⁰	VY220 ⁰	VY230 ⁰	VY240 ⁰	VY250 ⁰	VY270 ⁰	VY290 ⁰										
Port size	Port	M5	M5	M5	01	02	01	02	02	03	04	02	03	04	04	06	10	10	12	14	20
	1(P)																	1	1 1/4	1 1/2	2
	2(A)	M5	M5	M5	1/8	1/8	1/4	1/8	1/4	1/4	3/8	1/2	1/4	3/8	1/2	1/2	3/4	1	1 1/4	1 1/2	2
	3(R)																	1 1/4	1 1/2	2	
Mass (kg) ⁽¹⁾		0.11	0.16	0.19	0.25	0.35	0.55	0.75	1.5	2	4										
Hysteresis ⁽²⁾		0.009 MPa	0.023 MPa				0.027 MPa				0.045 MPa										
Sensitivity ⁽²⁾		0.005 MPa	0.009 MPa				0.014 MPa				0.018 MPa										
Repeatability ⁽²⁾		± 0.005 MPa	± 0.009 MPa				± 0.009 MPa				± 0.018 MPa										
Response time ⁽²⁾		10 ms	30 ms																		
Fluid		Air																			
Ambient and fluid temperature		0 to 50°C (No condensation)																			
Maximum operating pressure		0.7 MPa ^{(3), (8)}																			
Regulating pressure range		0.05 to 0.66 MPa (Supply pressure 0.7 MPa) ⁽⁴⁾																			
External pilot pressure		-(Direct operated)	Set pressure +0.04 MPa to 0.7 MPa (VY2□01)																		
Command signal ⁽⁵⁾		1 to 4 VDC, 0 to 7.5 VDC, 4 to 16 mA DC, 0 to 15 mA DC																			
Power supply		12 VDC ± 10%, 24 VDC ± 10%, 0.8 W or less																			
Electrical entry		DIN terminal																			
Applicable cable		Cable O.D. ø4 to 6.5																			
Bleed air flow (Port P2)		When not operating: Zero, When operating: 7 l/min (ANR) (Supply pressure 0.7 MPa)																			
Installation		Universal																			
Lubrication		Not required ^{(6), (7)}																			

- Note 1) The mass of the base mounting type (D/B/2/4 size) with sub-plate is indicated.
 Note 2) All property values indicate maximum values.
 Note 3) Supply pressure must be 0.7 MPa or less.
 When the supply pressure exceeds 0.7 MPa, it may cause abnormal leakage from the pilot valve or abnormal set pressure.
 Note 4) The command signal should not fall in the area A (broken line section) in Signal – Outlet Pressure Characteristics on page 716.
 When setting a pressure with a command signal, it must be (supply air –0.04 MPa) or less. If the pressure falls in the area A or set pressure exceeds (supply air –0.04 MPa), the pilot valve will be ON (open). Note that if the supply pressure changes under this circumstance, the set pressure also changes.
 Note 5) Cut off the command signal when the pressure control on the outlet side is not required, such as when the line is temporarily halted, etc. Refer to Specific Product Precautions on page 736.
 Note 6) To lubricate the outlet side of “VY”, use “VY” as an external pilot. Avoid lubrication to the pilot air.
 Note 7) The non-lubricated specification is not applicable to these models.
 Note 8) The maximum operating pressure of 0.9 MPa is available as a made-to-order specification. Refer to pages 730 to 735 for details.

Option

Description		Part no.									
		VY2D00	VY2A0 ⁰	VY2B0 ⁰	VY210 ⁰	VY220 ⁰	VY230 ⁰	VY240 ⁰	VY250 ⁰	VY270 ⁰	VY290 ⁰
Bracket (With bolt, washer)	B	—	VEXA-18-2A	—	VEX1-18-1A	—	VEX3-32A	—	VEX5-32A	VEX7-32A	VEX9-32A
	F	—	VEXA-18-3A	—	VEX1-18-2A	—	—	—	—	—	—
Pressure gauge	G	—	—	G27-10-R1-X207	G27-10-01	G36-10-01	—	—	—	G46-10-01	—
Pilot EXH port silencer	N	AN120-M5	—	—	AN120-M5	AN101-01	AN120-M5	—	—	AN210-02	—

Sub-plate and Base Gasket Part No.

Valve size	D	B																
Sub-plate	VEXD-5 (Port size: M5)	VEXB-2-2 □ □ P <div style="display: flex; justify-content: space-around;"> <div> <p>Port size</p> <table border="1"> <tr><th>Symbol</th><th>Port size</th></tr> <tr><td>A</td><td>M5</td></tr> <tr><td>B</td><td>1/8</td></tr> </table> </div> <div> <p>Thread type</p> <table border="1"> <tr><th>Symbol</th><th>Thread type</th></tr> <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> </table> </div> </div>	Symbol	Port size	A	M5	B	1/8	Symbol	Thread type	Nil	Rc	F	G	N	NPT	T	NPTF
Symbol	Port size																	
A	M5																	
B	1/8																	
Symbol	Thread type																	
Nil	Rc																	
F	G																	
N	NPT																	
T	NPTF																	
Base gasket	VEXD-7	VEXB-4-1																

Valve size	2	4																																		
Sub-plate	VEX1-9-1 □ □ P <div style="display: flex; justify-content: space-around;"> <div> <p>Port size</p> <table border="1"> <tr><th>Symbol</th><th>Port size</th></tr> <tr><td>A</td><td>1/8</td></tr> <tr><td>B</td><td>1/4</td></tr> </table> </div> <div> <p>Thread type</p> <table border="1"> <tr><th>Symbol</th><th>Thread type</th></tr> <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> </table> </div> </div>	Symbol	Port size	A	1/8	B	1/4	Symbol	Thread type	Nil	Rc	F	G	N	NPT	T	NPTF	VEX4-2A- □ □ P <div style="display: flex; justify-content: space-around;"> <div> <p>Port size</p> <table border="1"> <tr><th>Symbol</th><th>Port size</th></tr> <tr><td>A</td><td>1/4</td></tr> <tr><td>B</td><td>3/8</td></tr> <tr><td>C</td><td>1/2</td></tr> </table> </div> <div> <p>Thread type</p> <table border="1"> <tr><th>Symbol</th><th>Thread type</th></tr> <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> </table> </div> </div>	Symbol	Port size	A	1/4	B	3/8	C	1/2	Symbol	Thread type	Nil	Rc	F	G	N	NPT	T	NPTF
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Symbol	Thread type																																			
Nil	Rc																																			
F	G																																			
N	NPT																																			
T	NPTF																																			
Base gasket	VEX1-11-2	VEX4-4																																		

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

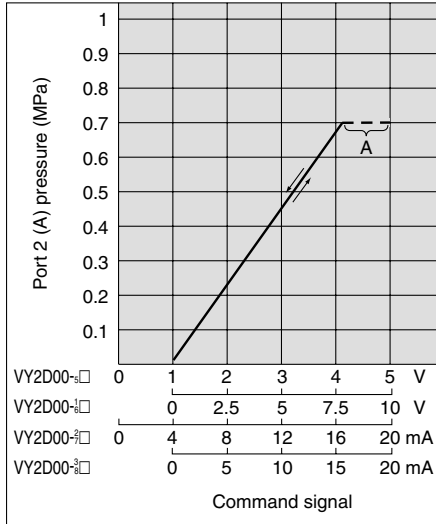
AP100

Series VY2

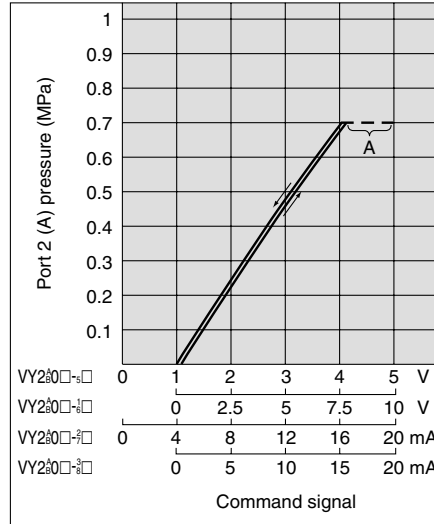
Characteristics

Command Signal — Outlet Pressure Characteristics (Characteristics of pressure setting) Port 1 (P) pressure 0.7 MPa

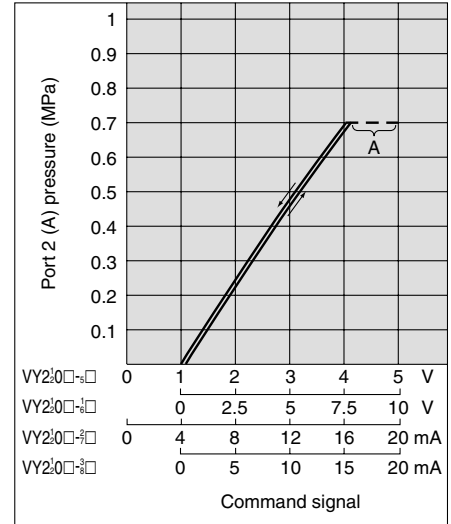
VY2D00



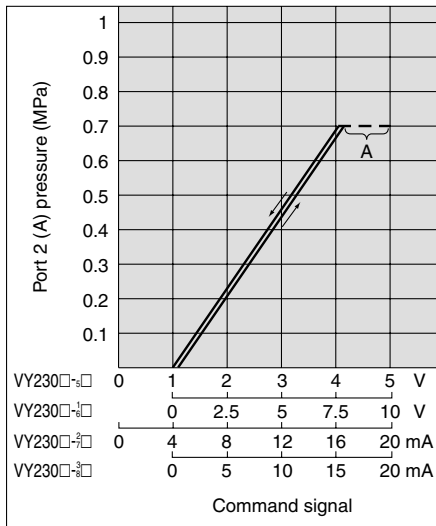
VY2A0₁⁰/VY2B0₁⁰



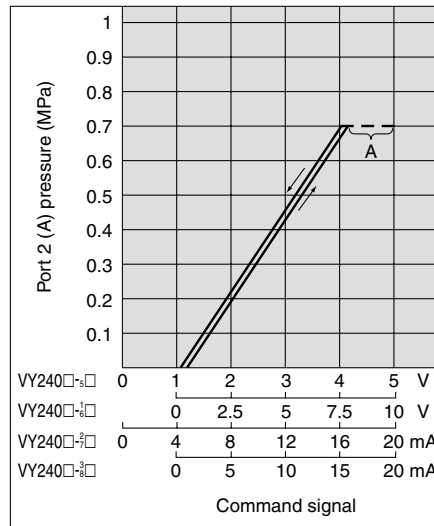
VY210₁⁰/VY220₁⁰



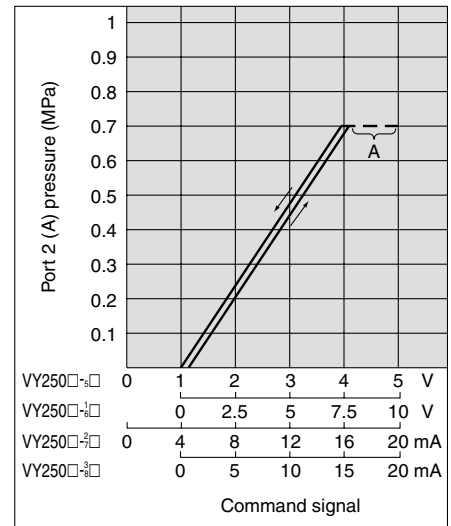
VY230₁⁰



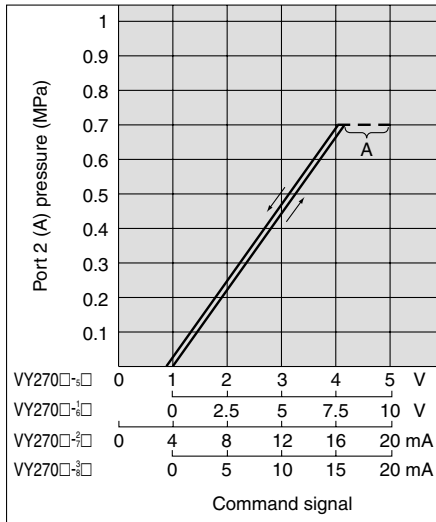
VY240₁⁰



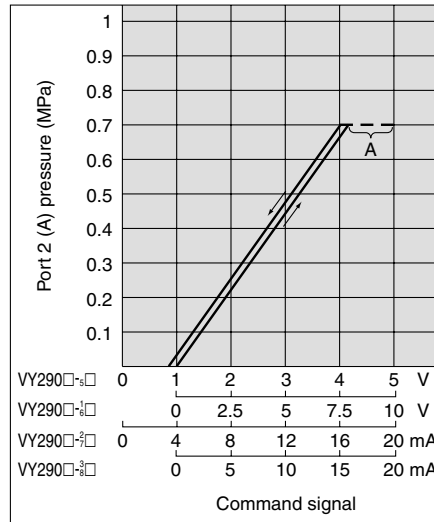
VY250₁⁰



VY270₁⁰



VY290₁⁰



When setting a pressure with a command

- Note 1) Supply pressure must be 0.7 MPa or less.
When the supply pressure exceeds 0.7 MPa, it may cause abnormal leakage from the pilot valve or abnormal set pressure.
- Note 2) The command signal should not fall in the area A (broken line section) in Signal - Outlet Pressure Characteristics. When setting a pressure with a command signal, it must be (supply air - 0.04 MPa) or less. If the pressure falls in the area A or set pressure exceeds (supply air - 0.04 MPa), the pilot valve will be ON (open). Note that if the supply pressure changes under this circumstance, the set pressure also changes.

Command signal voltage (current) for starting the operation of a pilot valve VY2D0* (direct operated)

(There is dispersion in the following range.)

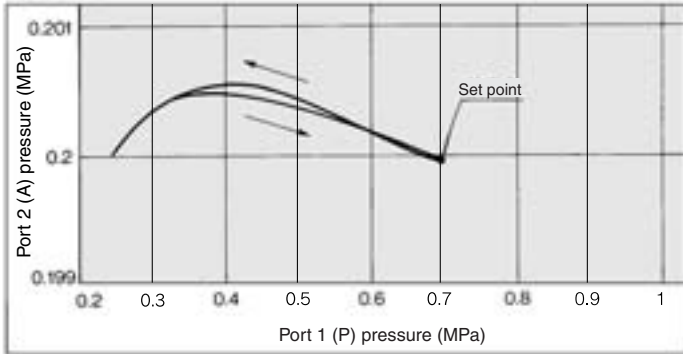
Symbol ⁽¹⁾	Command Signal	Operation start range
Nil, 5	1 to 4 V DC	0.93 to 1.07 V DC
1, 6	0 to 7.5 V DC	0.01 to 0.1 V DC
2, 7	4 to 16 mA DC	3.7 to 4.3 mA DC
3, 8	0 to 15 mA DC	0.02 to 0.2 mA DC

Note 1) Enter symbols above □ in VY2D0*-□**, □ indicates power supply and a command signal.

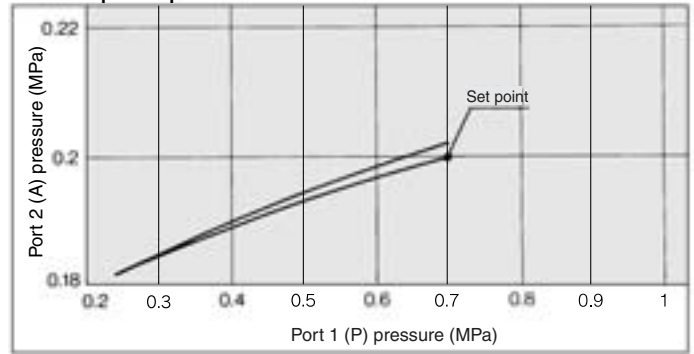
Note 2) Other body sizes add the dispersion on the above data when the main valve activates.

Pressure Characteristics

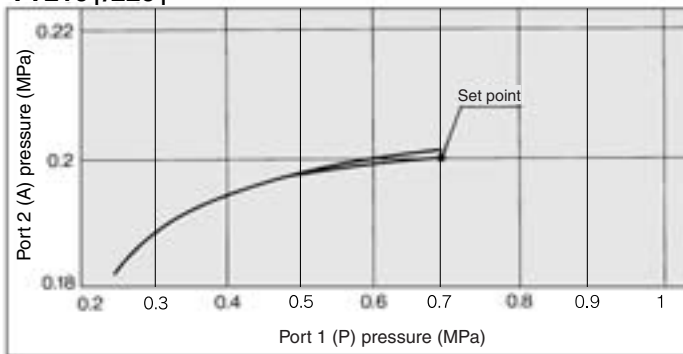
VY2D00



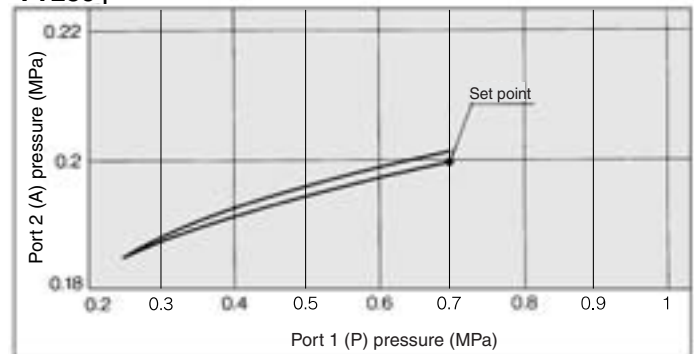
VY2A0⁰/2B0⁰



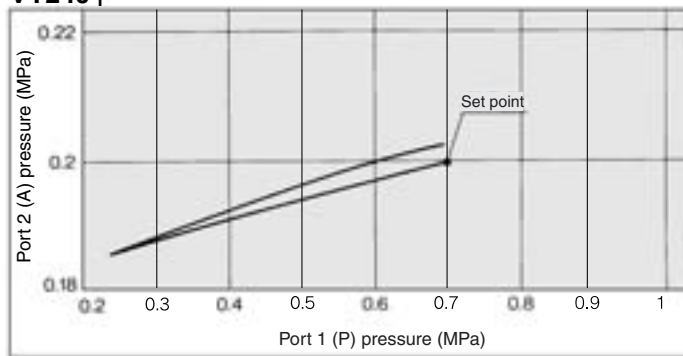
VY210⁰/220⁰



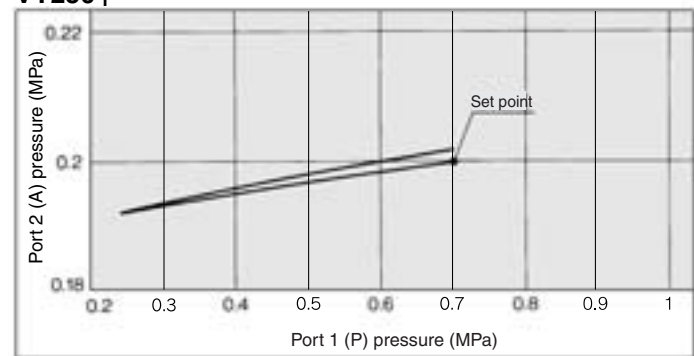
VY230⁰



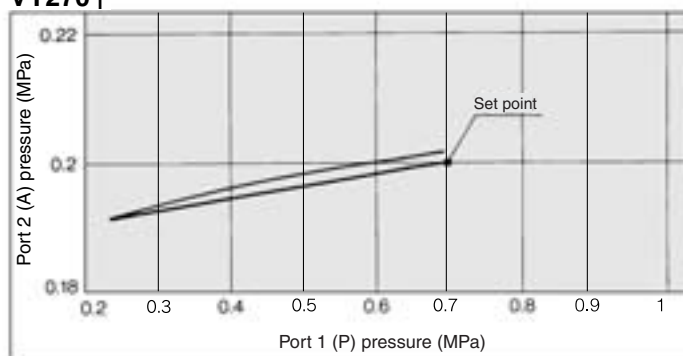
VY240⁰



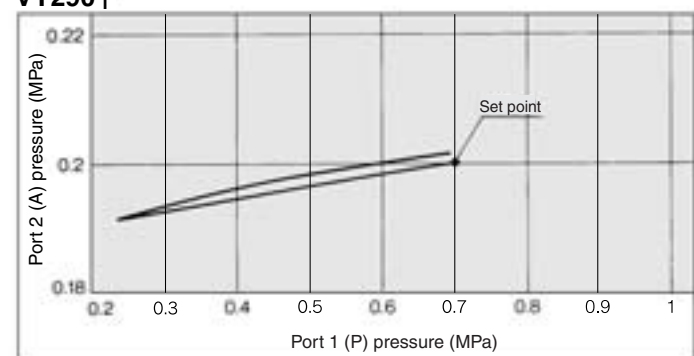
VY250⁰



VY270⁰



VY290⁰



ARJ

AR425
to 935

AMR

ARM

ARP

IR

IRV

VEX1□

SRH

SRP

SRF

ARX20

VCHR

ITV

IC

PVQ

VEF
VEP

VER

VEA

VY2

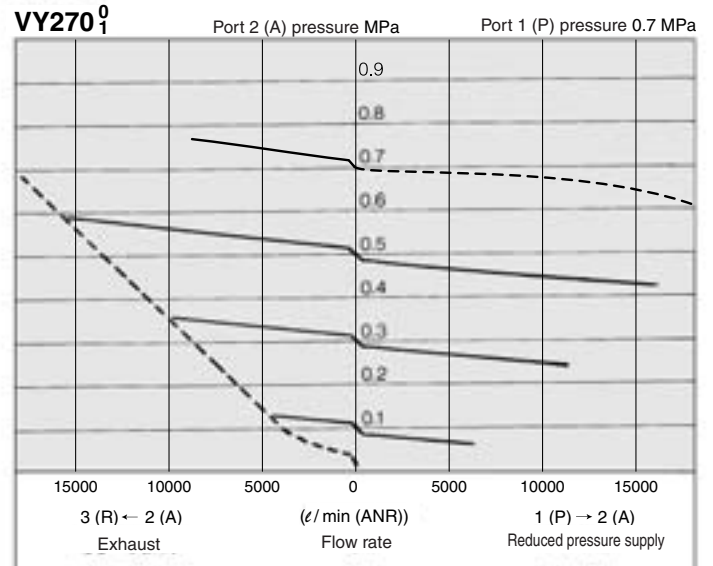
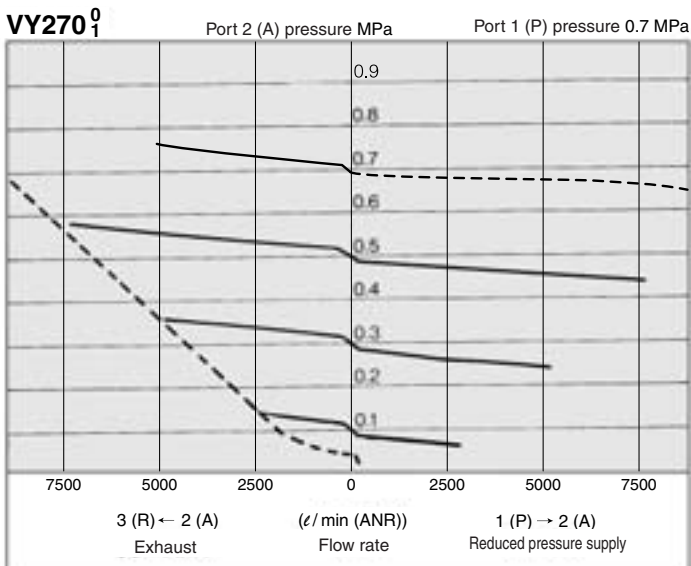
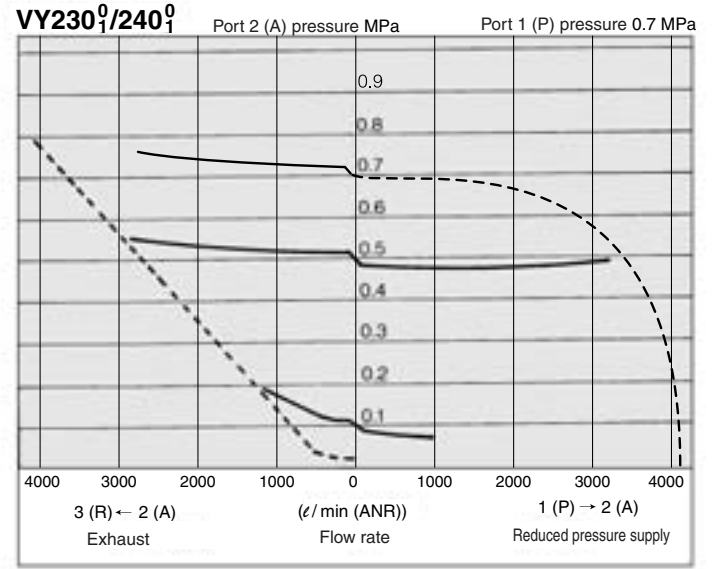
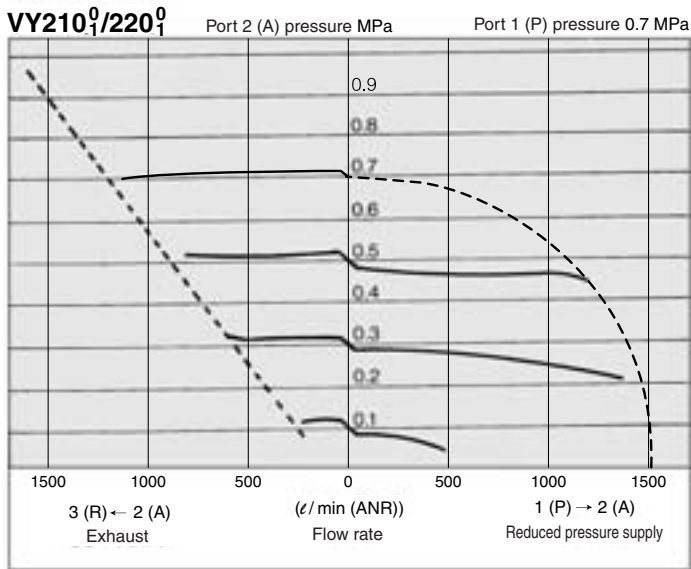
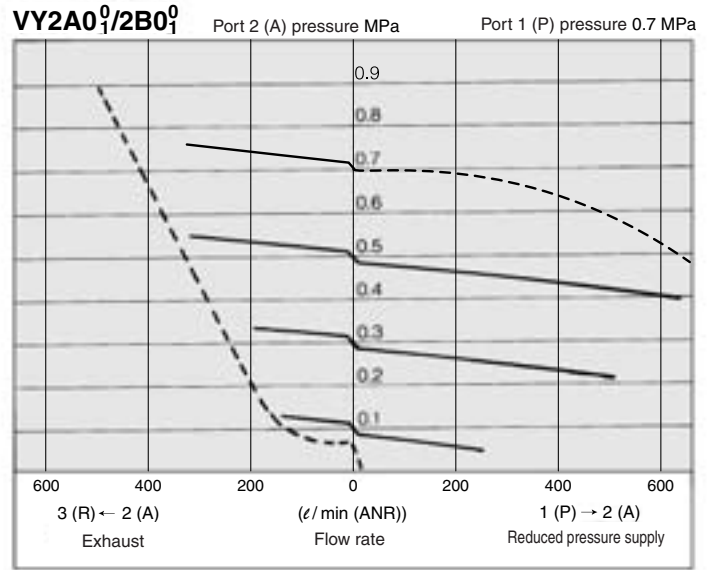
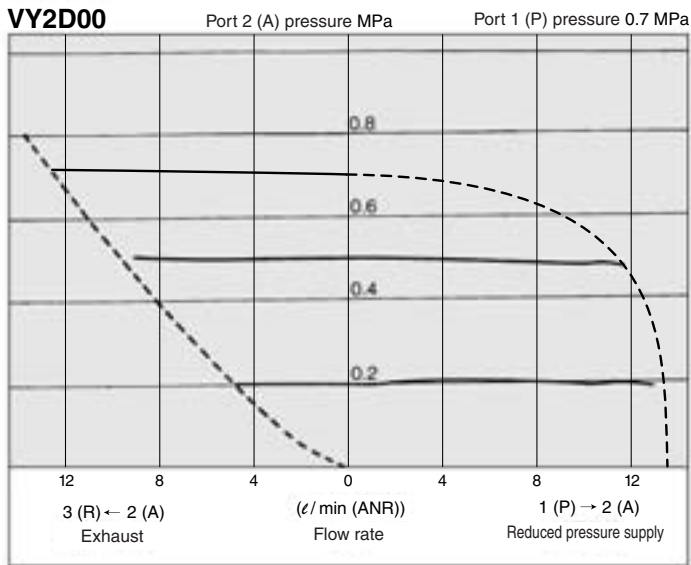
VBA
VBAT

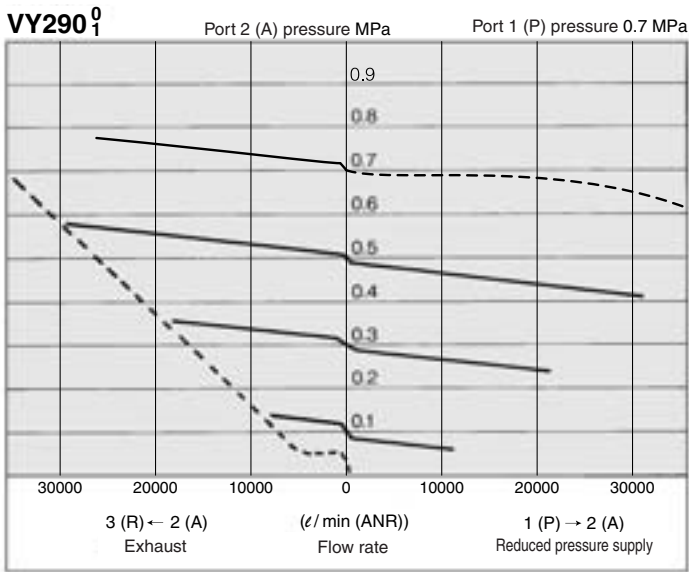
AP100

Series VY2

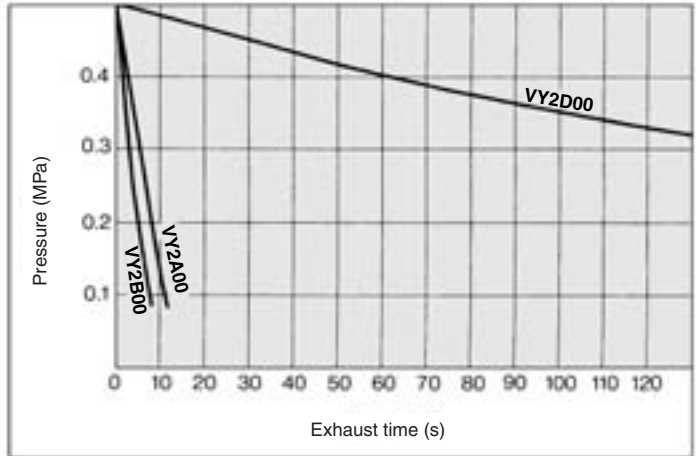
Characteristics

Flow Characteristics

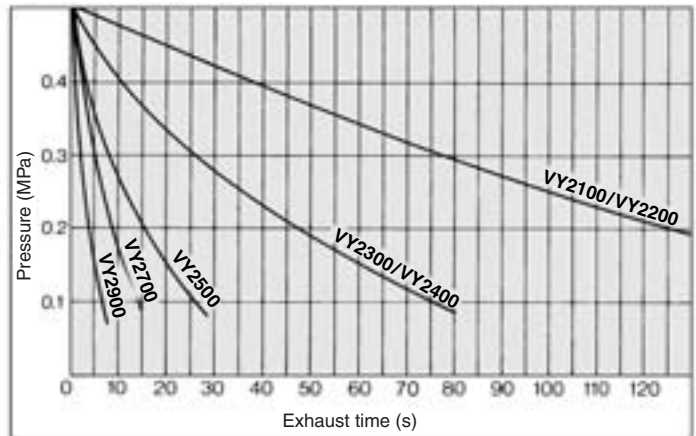




② Exhaust Time from 10ℓ Tank

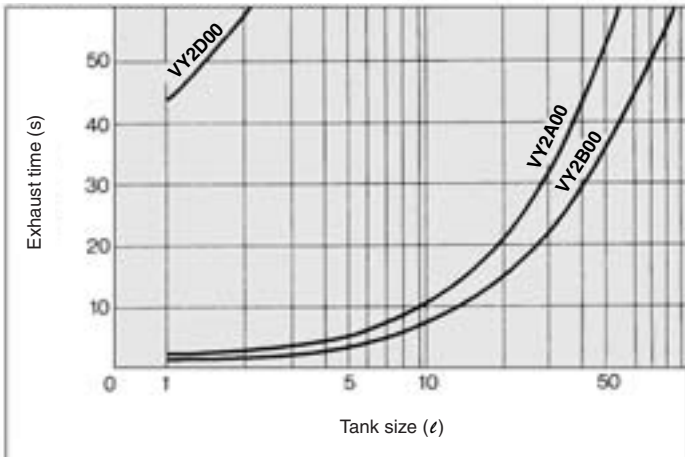


Exhaust Time from 1000ℓ Tank

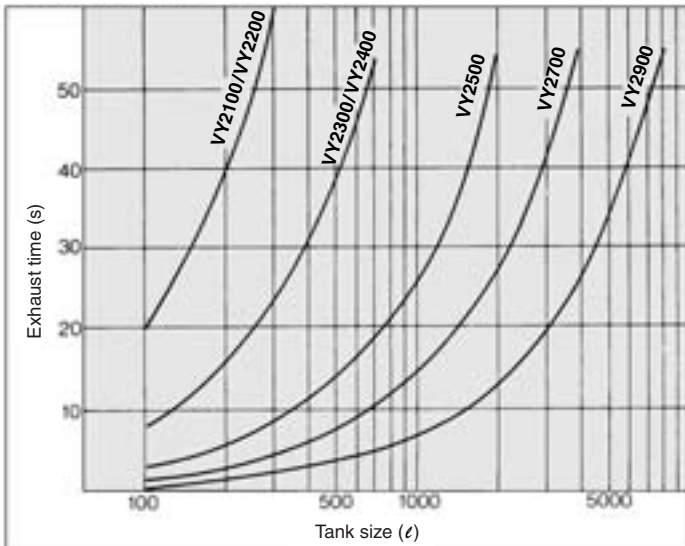


Exhaust Time

① Exhaust Time from 0.5 MPa to 0.1 MPa

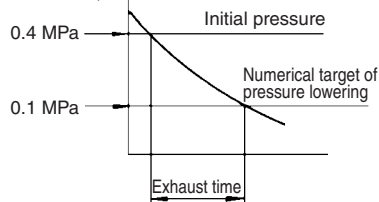


Exhaust Time from 0.5 MPa to 0.1 MPa



③ Exhaust time from optional pressure point

Ex.] Using VY2500, lower the 500ℓ tank pressure from 0.4 to 0.1.
 a) If describing the above graph in _____ b) Then, to convert the time into one from a 500ℓ tank. accordance with graphs, the exhaust time is read; 27 - 3 = 24 s.



$$t = \frac{\text{Tank capacity}}{1000} \times [\text{Read exhaust time}]$$

$$= \frac{500}{1000} \times 24$$

$$\cong 12$$

Then, the result is 12 s.

ARJ

AR425 to 935

AMR

ARM

ARP

IR

IRV

VEX1□

SRH

SRP

SRF

ARX20

VCHR

ITV

IC

PVQ

VEF VEP

VER

VEA

VY2

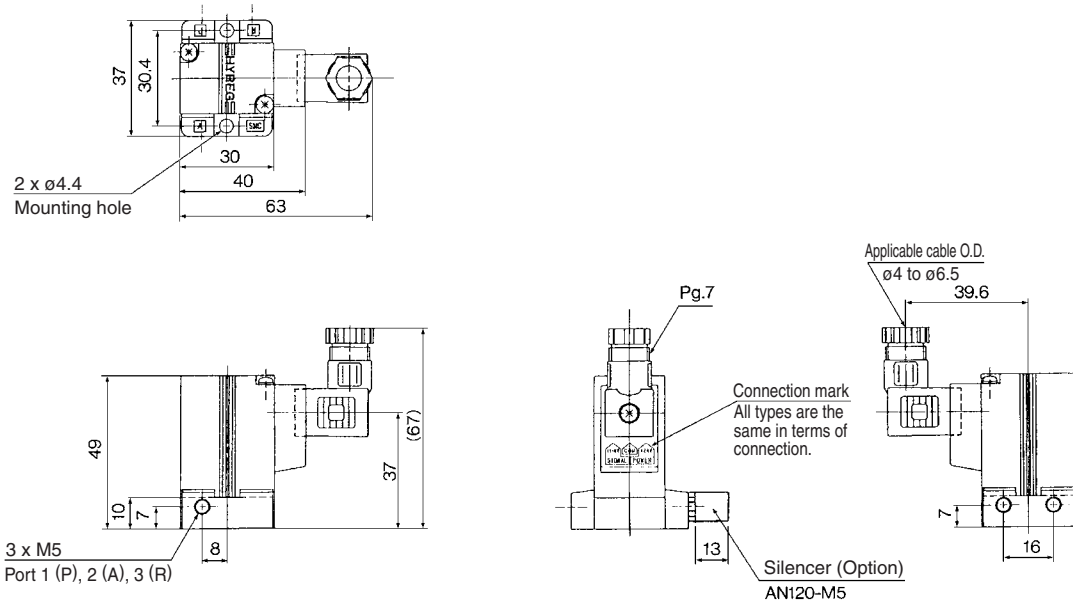
VBA VBAT

AP100

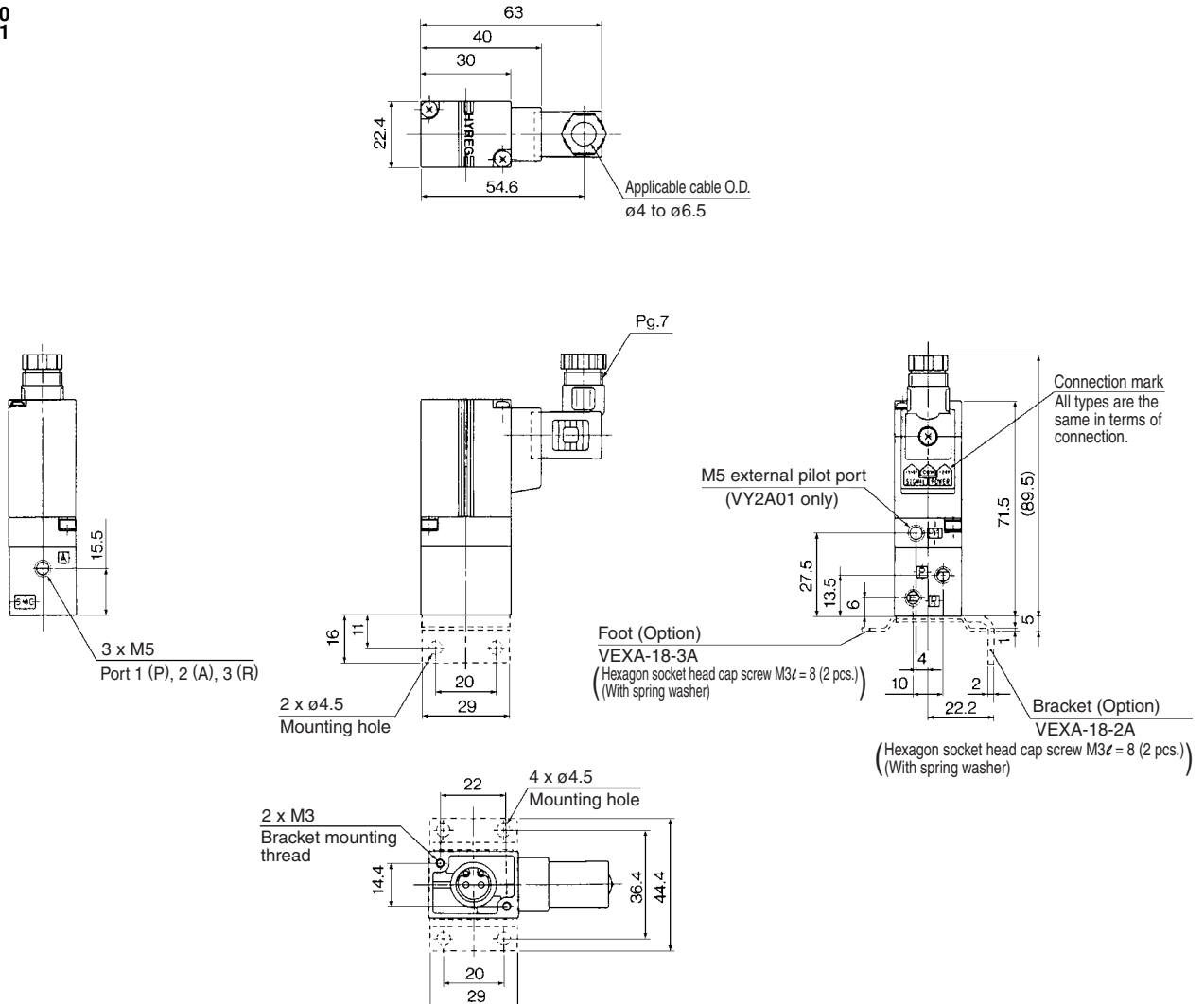
Series VY2

Dimensions

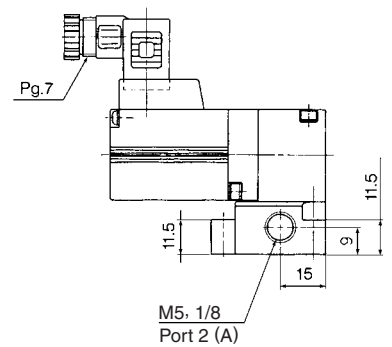
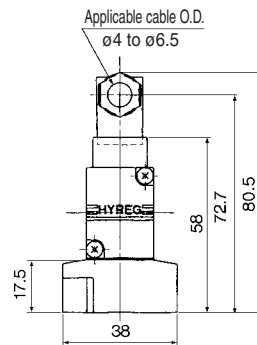
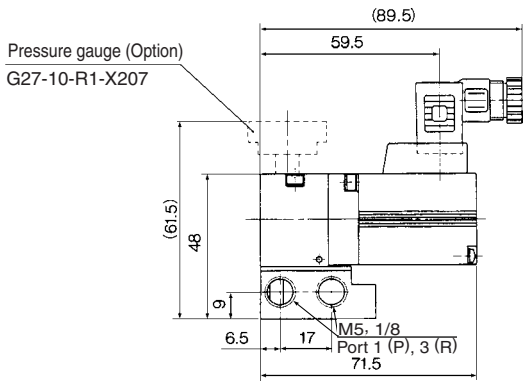
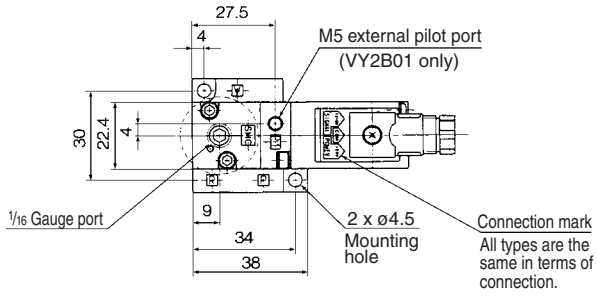
VY2D00



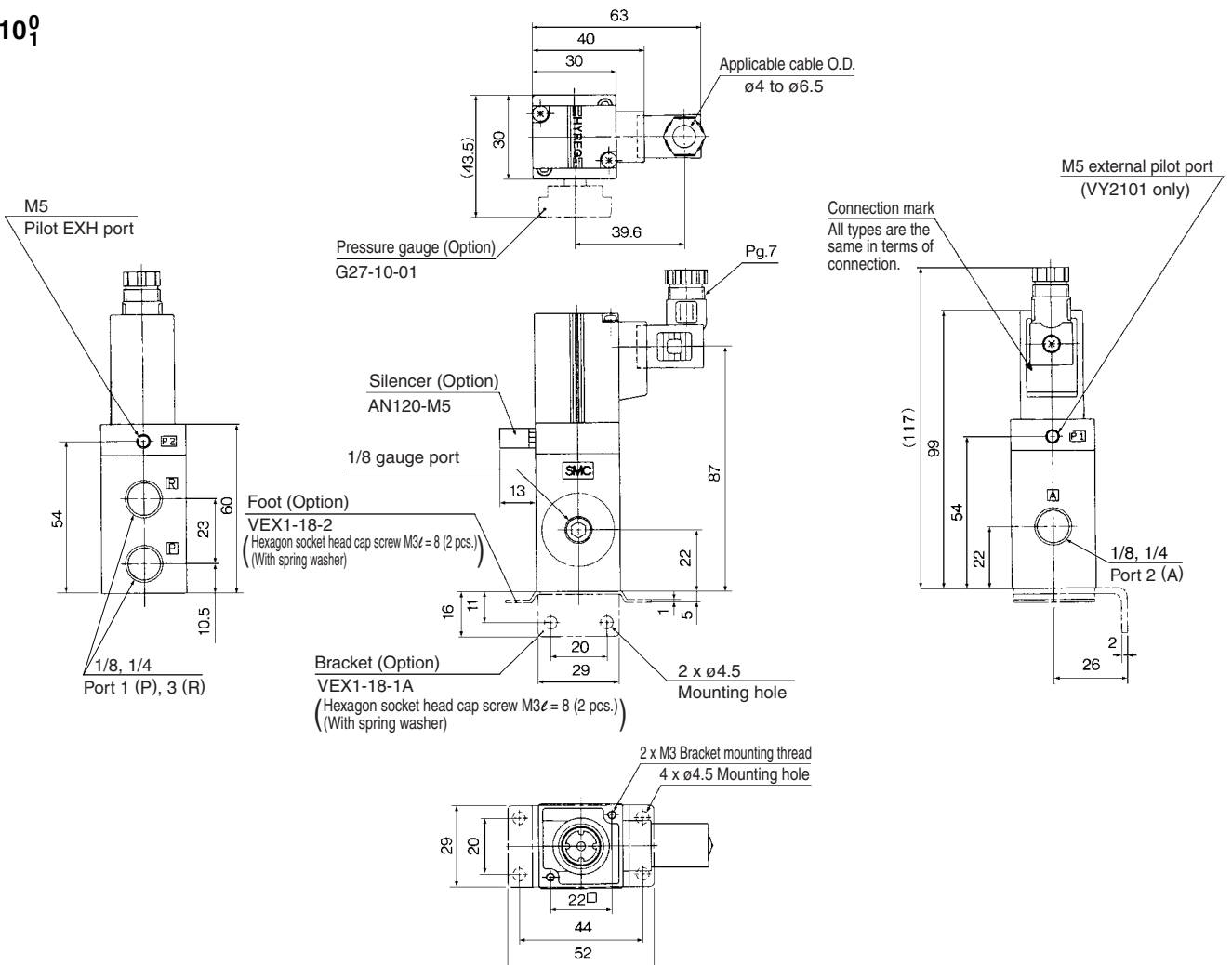
VY2A0⁰



VY2B0₁



VY210₁



ARJ

AR425 to 935

AMR

ARM

ARP

IR

IRV

VEX1□

SRH

SRP

SRF

ARX20

VCHR

ITV

IC

PVQ

VEF VEP

VER

VEA

VY2

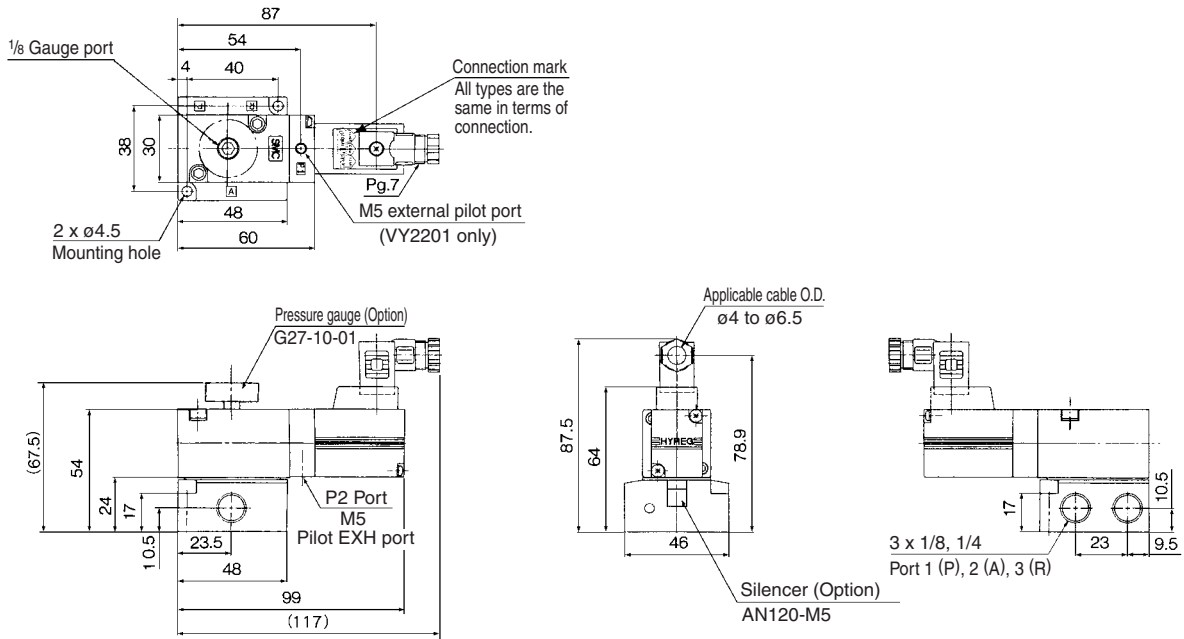
VBA VBAT

AP100

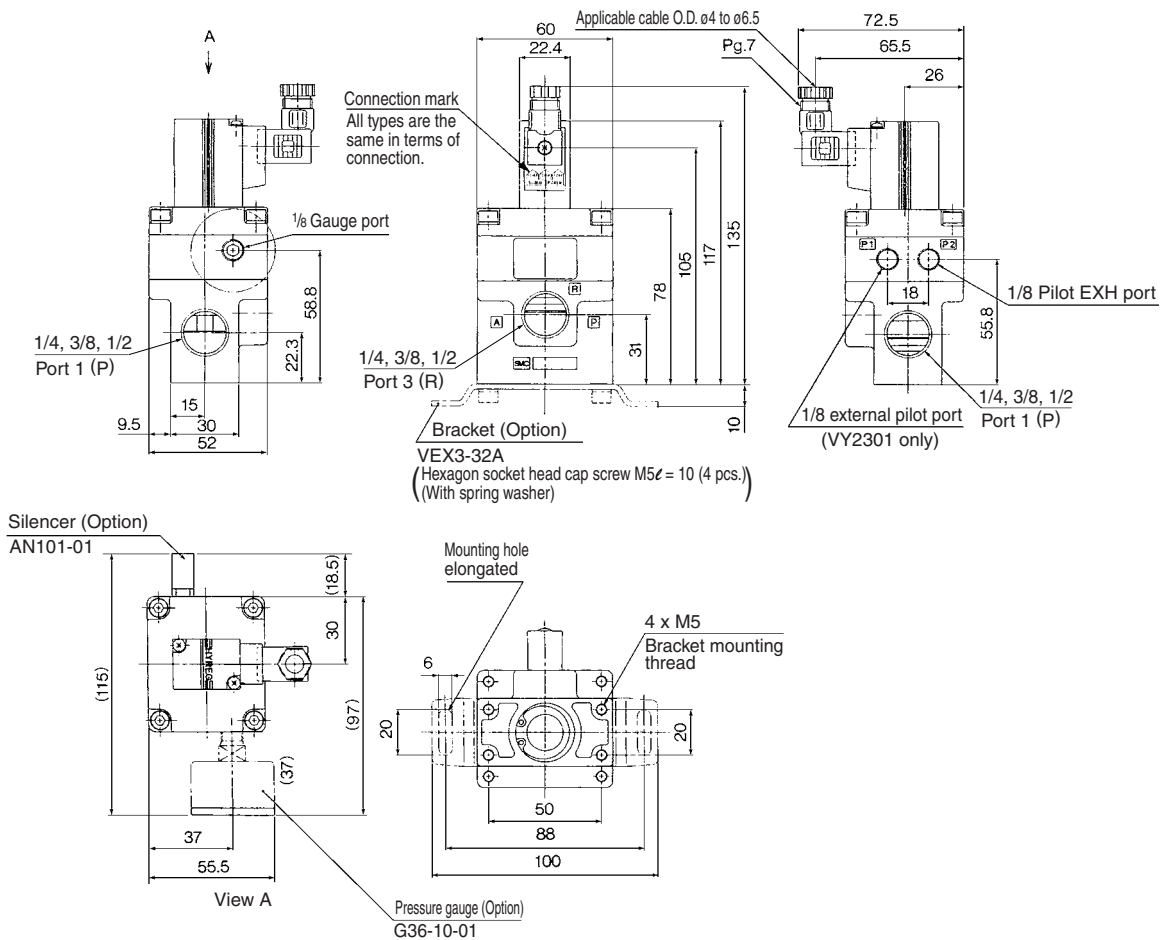
Series VY2

Dimensions

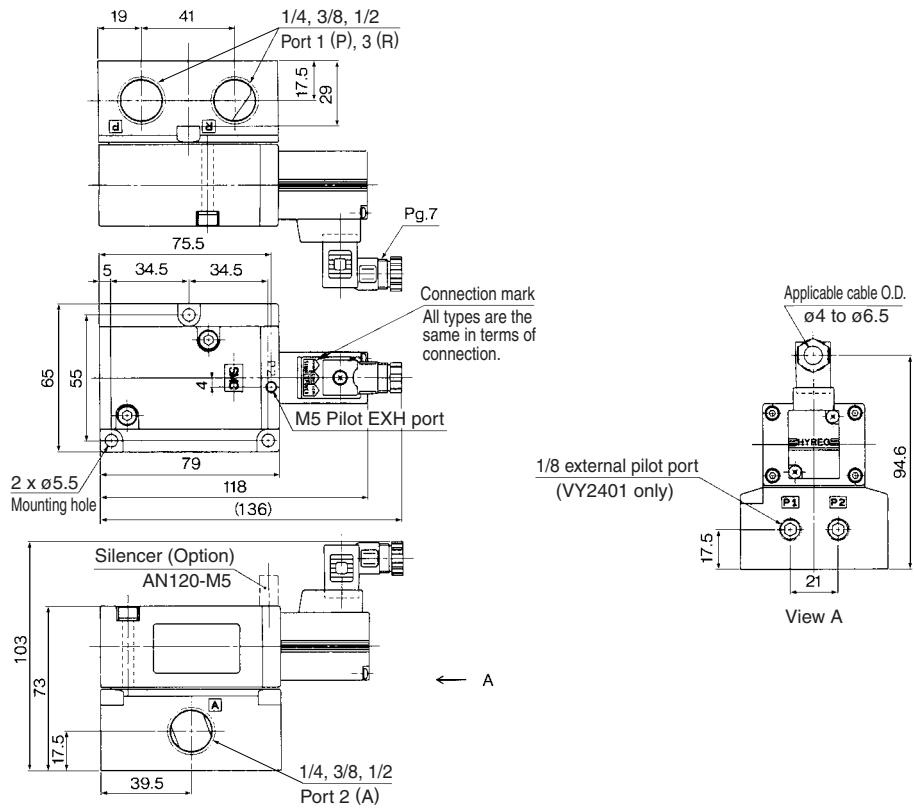
VY220⁰₁



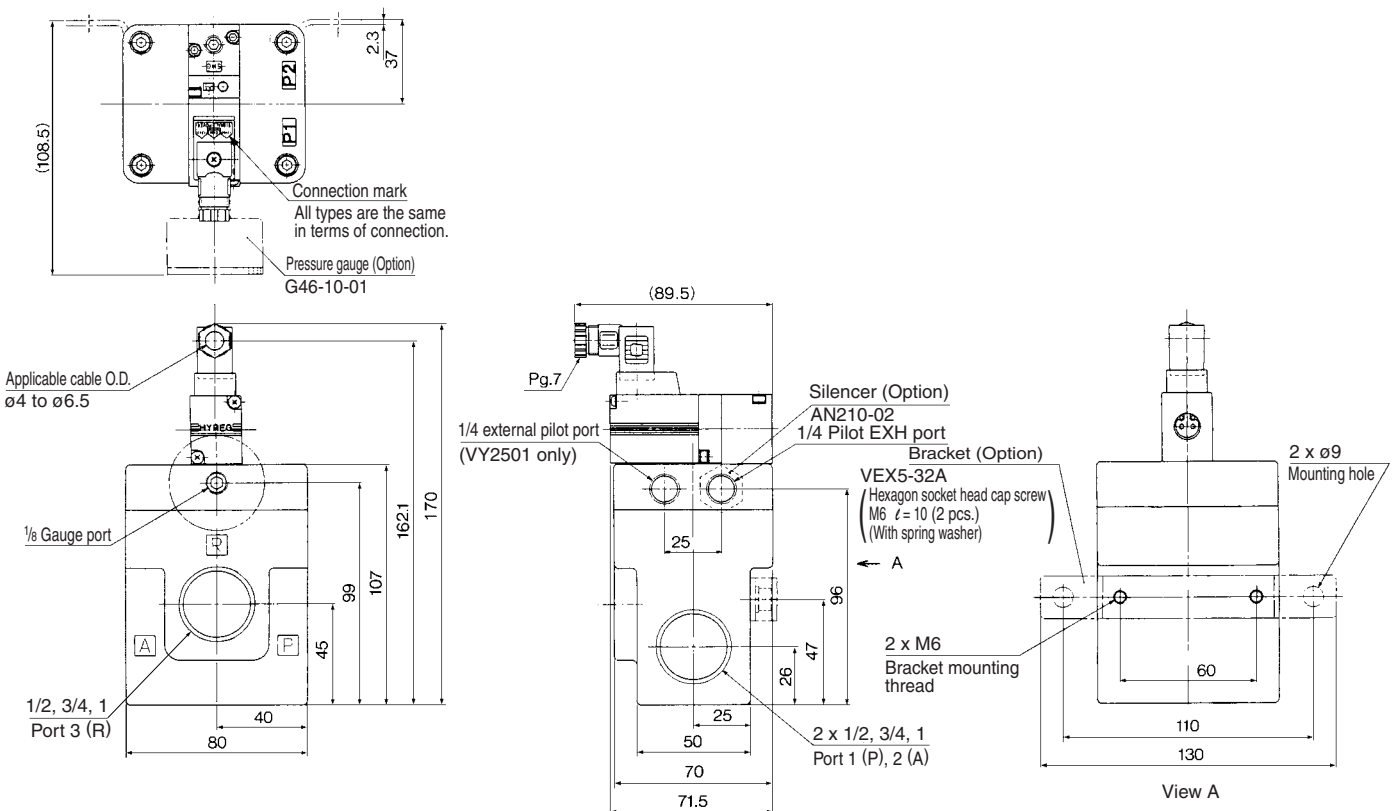
VY230⁰₁



VY240₁



VY250₁

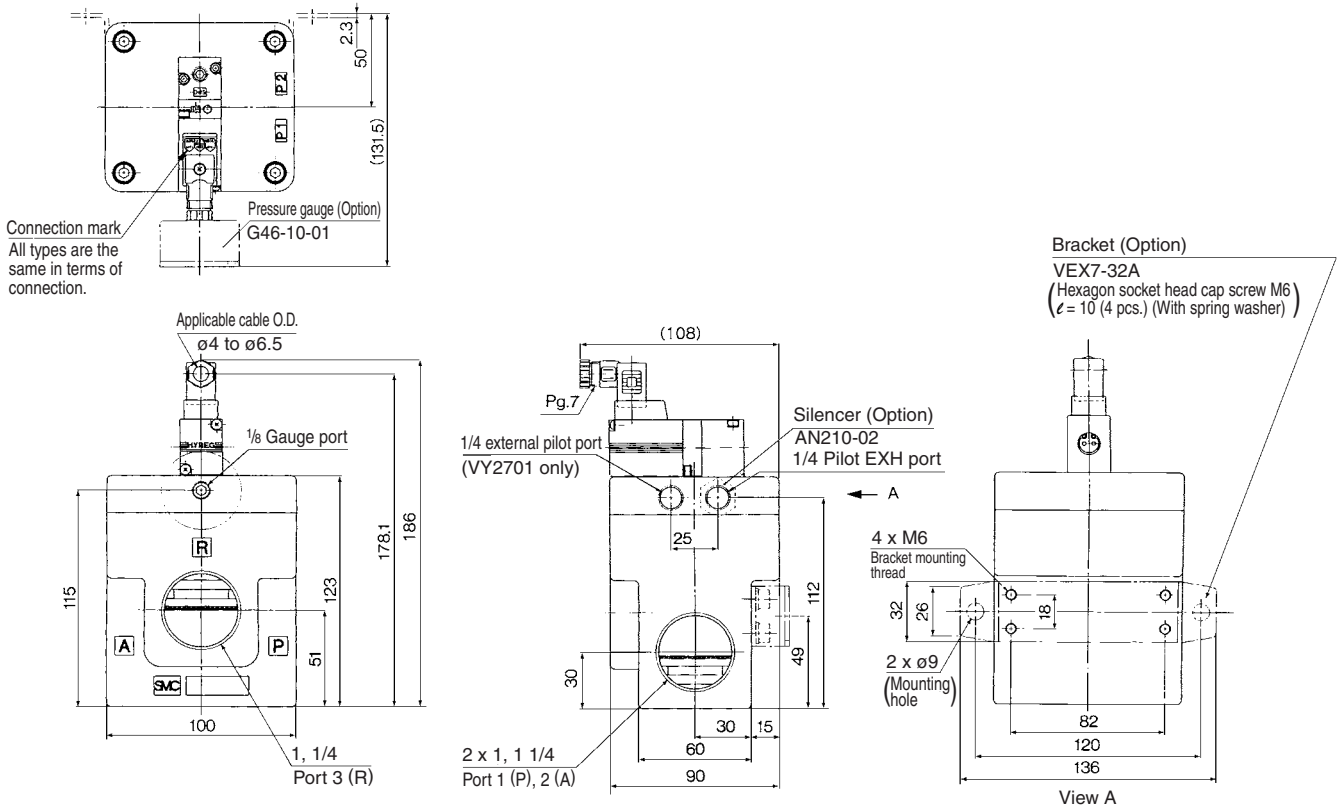


ARJ
AR425 to 935
AMR
ARM
ARP
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IRV
VEX1□
SRH
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SRF
ARX20
VCHR
ITV
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PVQ
VEF VEP
VER
VEA
VY2
VBA VBAT
AP100

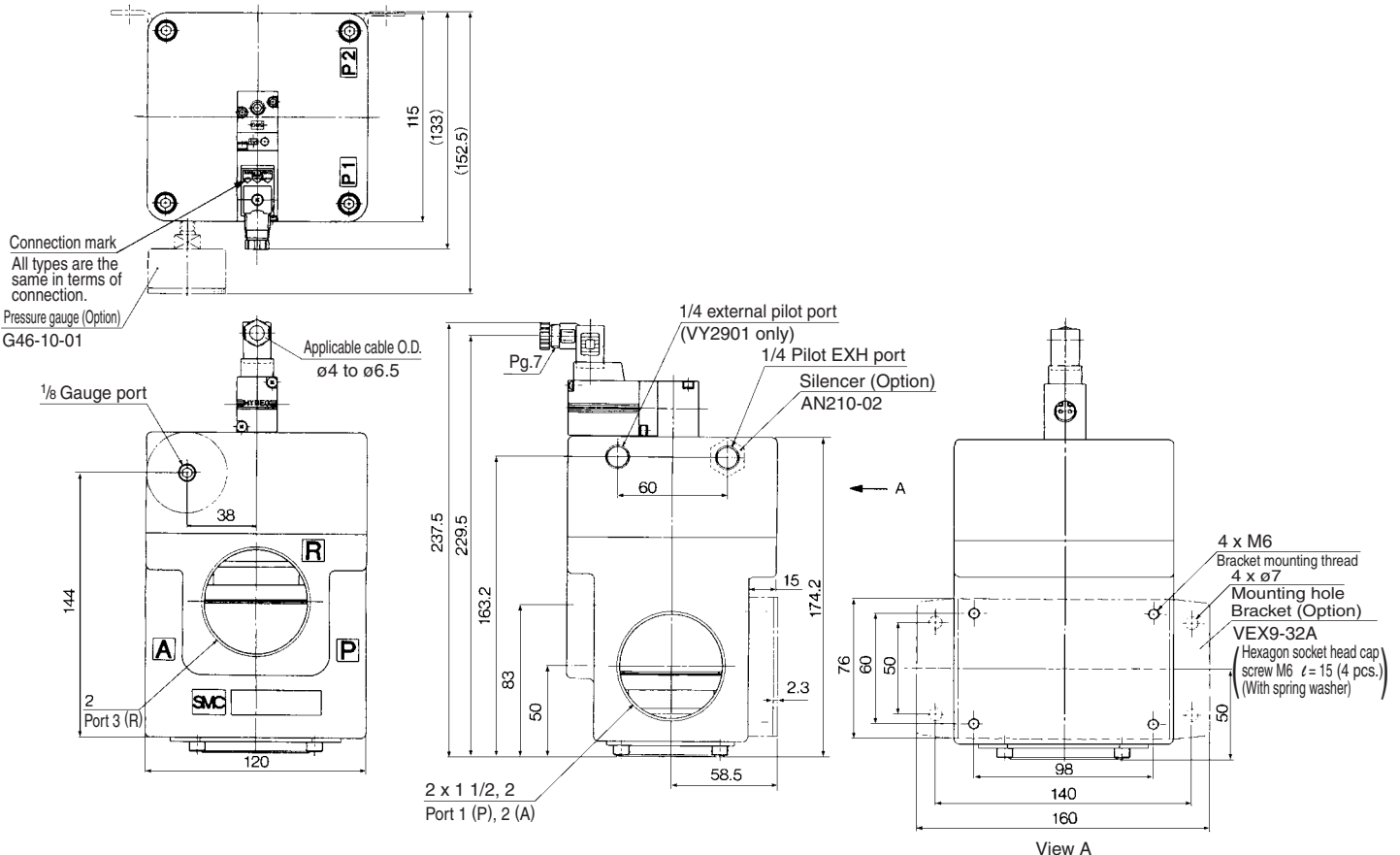
Series VY2

Dimensions

VY270₁



VY290₁



ARJ

AR425
to 935

AMR

ARM

ARP

IR

IRV

VEX1□

SRH

SRP

SRF

ARX20

VCHR

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VEF
VEP

VER

VEA

VY2

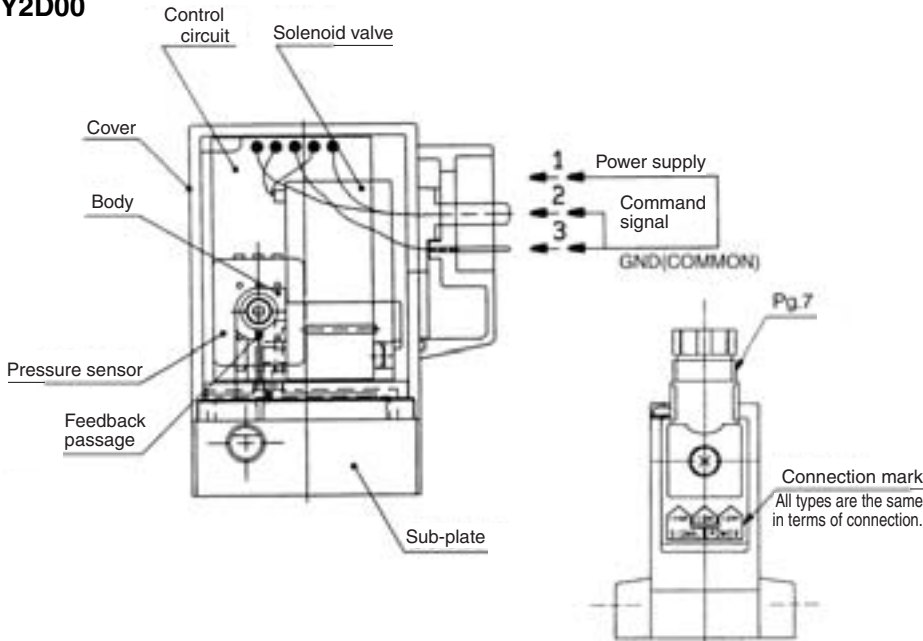
VBA
VBAT

AP100

Series VY2

Construction/Component Parts/Working Principle

VY2D00



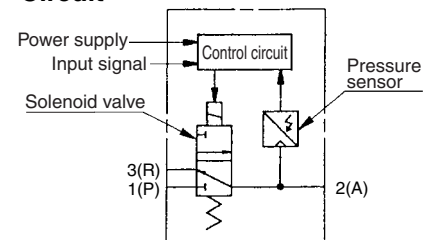
The VY2D00, which is the smallest direct drive, consists of a solenoid, pressure sensor, control circuit, body cover, and a sub plate. The type with sub-plate can be used alone, and the type without sub-plate can also be used as a pilot valve.

Working principle

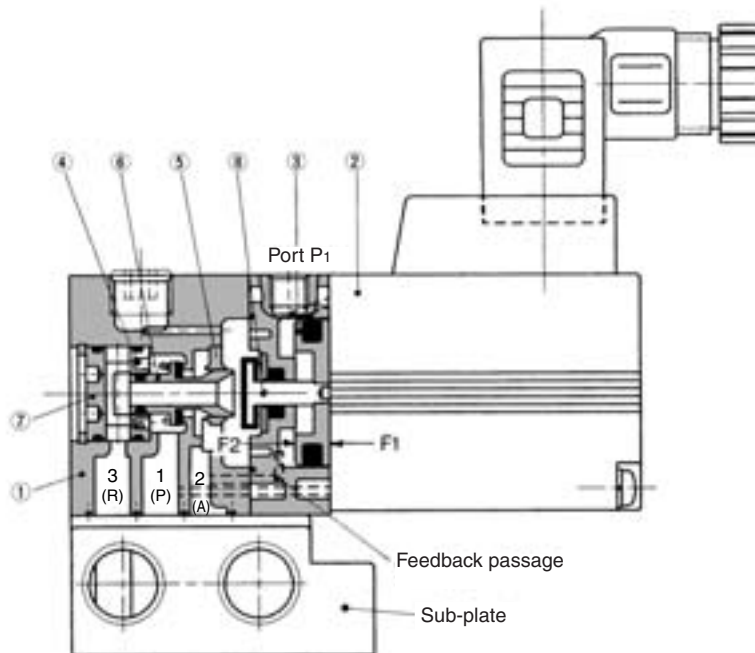
- When the command signal is below 1 VDC, (refer to page 716) the solenoid valve is inactive, and the port 2(A) pressure is zero.
- When a command signal between 1 and 5 VDC is provided, the solenoid is activated.
- The port 2(A) pressure is fed back to the control circuit by the pressure sensor.
- The control circuit compares the feedback signal with the size of the command signal that was provided, and:
 - 1) If the feedback signal is smaller, current is supplied to the solenoid valve to raise the port 2(A) pressure [from 1(P) to 2(A)].
 - 2) If the feedback signal is greater, current is not supplied to valve to reduce the port 2(A) pressure [from 2(A) to 3(R)].

The above processes 1) and 2) are repeated at high speeds to set the port 2(A) pressure.

Circuit



VY2A0_i, VY2B0_i (Pilot valve: VY2D00-□00)



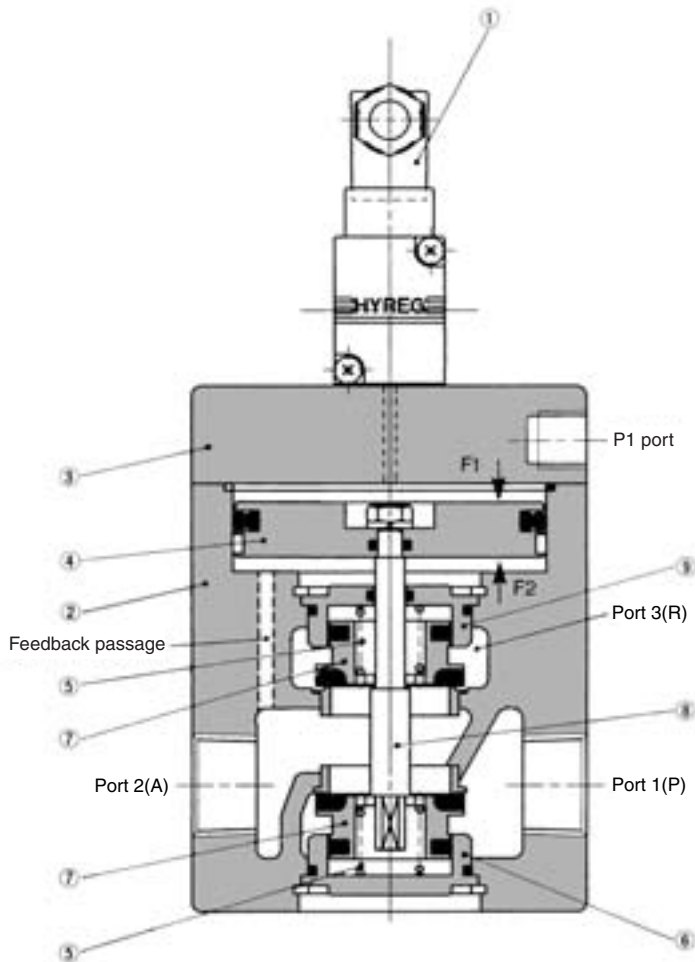
Working principle

- The supply [1(P) to 2(A)] valve of valve ⑥ and the exhaust [2(A) to 3(R)] valve close due to the balance between actuating forces F1 and F2. Actuating force F1 is applied to the right surface of pressure regulation piston ③ by the pilot pressure (pilot valve assembly ②: VY2D00-□00), and actuating force F2 is applied to the left surface of the pressure regulation piston by the port and pressure that passes through the feedback passage. Thus, the port 2(A) pressure that corresponds to the pilot pressure is established.
- When the port 2(A) pressure becomes higher than the pilot pressure, F2 becomes greater than F1. This causes only the pressure regulation piston to move to the right, and the exhaust valve seat to open, allowing the air to be discharged from port 2(A) to port 3(R). When the port 2(A) pressure drops to reach a balance, the regulator returns to the set state.
- Conversely, if the port 2(A) pressure is lower than the pilot pressure, F2 becomes lower than F1. This causes the pressure regulating piston to move the valve to the left, and the supply valve seat to open, allowing the air to be supplied from port 1(P) to port 2(A). When the port 2(A) pressure balances, the regulator returns to the set state.

Component Parts

	Description	Material
1	Body	Zinc alloy die-casted
2	Pilot valve assembly	—
3	Adjusting piston	Aluminum alloy
4	Spring	Stainless steel
5	Valve guide	Stainless steel
6	Valve	Aluminum alloy/Rubber
7	Retainer	Aluminum alloy
8	Rod	Stainless steel/Rubber

VY210⁰, VY220⁰, VY230⁰, VY240⁰ (Pilot valve: VY2D00-□00)
 VY250⁰, VY270⁰, VY290⁰ (Pilot valve: VY2B00-□00)



Working principle

- The pair of poppet valves (7) close due to the balance between actuating forces F1 and F2. Actuating force F1 is applied to the top surface of pressure regulation piston (4) by the pilot pressure (pilot valve assembly (1): VY2^B 00-00), and actuating force F2 is applied to the bottom surface of the piston by the port 2(A) pressure that passes through the feedback passage. Thus, the port 2(A) pressure that corresponds to the pilot pressure is established. The poppet valve, which maintains a pressure balance with the port 2(A) pressure, is backed up by spring (5) (refer to the diagram on the left).
- When the port 2(A) pressure becomes higher than the pilot pressure, F2 becomes higher than F1. This causes the pressure regulation piston to move upward, and the top poppet valve to open, allowing the air to be discharged from port 2(A) to port 3(R). When the port 2(A) pressure drops to reach a balance, the regulator returns to the state shown in the diagram to the left.
- Conversely, if the port 2(A) pressure is lower than the pilot pressure, F2 becomes less than F1. This causes the pressure regulation piston to move downward, and the lower poppet valve to open, allowing the air to be supplied from port 1(P) to port 2(A). When the port 2(A) pressure rises to reach a balance, the regulator returns to the state shown in the diagram to the left.

Component Parts

No.	Description	Material
1	Pilot valve assembly	—
2	Body	Aluminum alloy
3	Cover	Aluminum alloy
4	Adjusting piston	Aluminum alloy
5	Spring	Stainless steel
6	Valve guide	Aluminum alloy
7	Poppet valve	Aluminum alloy/Rubber
8	Shaft	Stainless steel
9	Valve guide	Aluminum alloy

ARJ

AR425
to 935

AMR

ARM

ARP

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IRV

VEX1□

SRH

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ARX20

VCHR

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VEA

VY2

VBA
VBAT

AP100

E-P HYREG[®] Manifold Specifications

Using the series VVEXB/2/4, a maximum of 10 stations manifold is possible.



Specifications

Applicable valve	VY2B0 ₁ ⁰	VY220 ₁ ⁰	VY240 ₁ ⁰
Valve stations ⁽¹⁾	2 to 10 stations	2 to 8 stations	2 to 6 stations
Passage	Common supply/exhaust		
Pilot type	Internal pilot, Common external pilot ⁽²⁾		
Pilot port size	M5		
Port size port 1(P), 2(A), 3(R)	1/8	1/4	1/4, 3/8, 1/2
Blanking plate assembly ⁽³⁾	VEXB-6	VEX1-17	VEX4-5

Note 1) VY2B0₁⁰ 6 stations or more, VY220₁⁰ 5 stations or more, VY240₁⁰ 4 stations or more supply pressure to the ports 1(P) on both sides of the manifold and exhaust pressure from the port 3(R) on the both sides.

Note 2) When used as a common external pilot, select the internal pilot specification as an applicable valve.

Note 3) Gasket and mounting bolts are equipped.

How to Order

VVEX **B** - **1** - **5** - **01**

Body size	Pilot type	Valve stations	Port size	
			1(P), 3(R)	2(A)
B For VY2B0 ₁ ⁰	1 Internal pilot	2 ^{Note1} 2 stations	01	1/8
	2 Common external pilot	2 ^{Note1} 10 stations		
2 For VY220 ₁ ⁰	1 Internal pilot	2 2 stations	02	1/4
	2 Common external pilot	8 8 stations		
4 For VY240 ₁ ⁰	1 Internal pilot	2 2 stations	A	3/8 1/4
	2 Common external pilot	6 6 stations	B	3/8
			C	1/2 3/8

Enter the valves and the blank plates to be placed on a manifold in order, starting at the left side of the manifold base (with port 2(A) facing you).

Ex.) VVEX2-2-5-02
 • VY2200-00-G - 4 pcs.
 • VEX1-17 - 1 pc.

Piping thread type

Nil	Rc
F	G
N	NPT
T	NPTF

Note) In the case of VVEXB, the "2" in the first digit of the valve station number is a dummy part number.

VY manifold pilot type

Pilot type	Manifold base part no.	Applicable valve part no.
Internal pilot manifold	VVEX□-1-□-□□	VY2□00
Common external pilot manifold	VVEX□-2-□-□□	
Individual external pilot manifold	VVEX□-□-□-□□	VY2□01

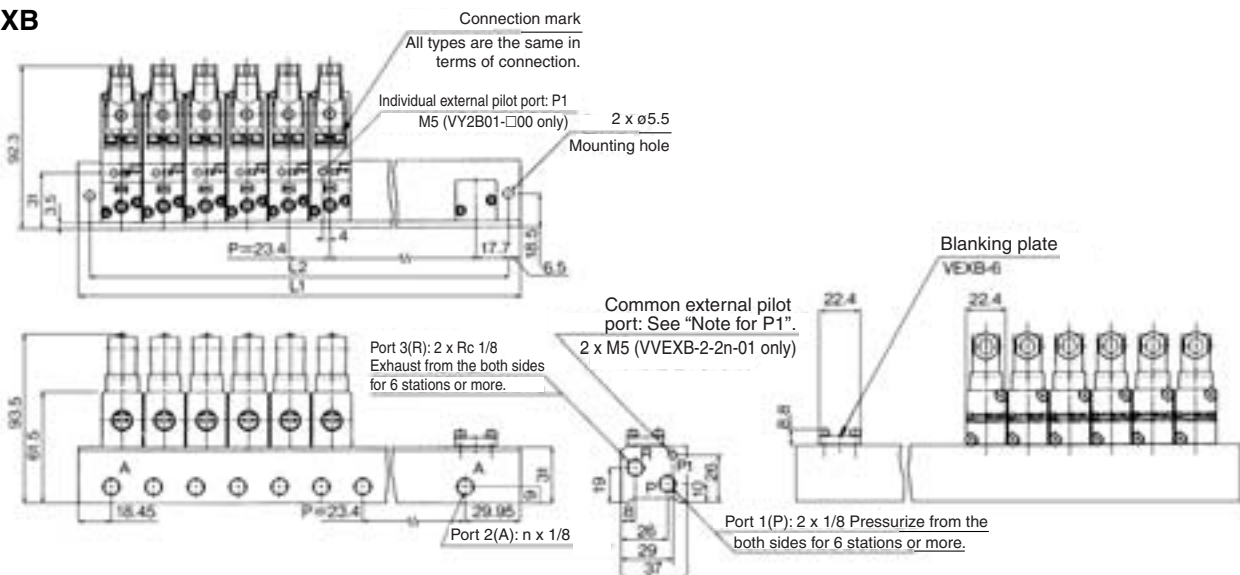
Note) It is recommended to use a common type when the external pilot type is used.

Body size 4

Pilot type	Manifold base part no.	Applicable valve part no.
Internal pilot manifold	VVEX4-1-□-□□	VY2400
Common external pilot manifold	VVEX4-2-□-□□	VY2401

Dimensions

VVEXB



Note for P1

Confirm internal pilot or common external pilot by checking whether P1 has a M5 screw or not.

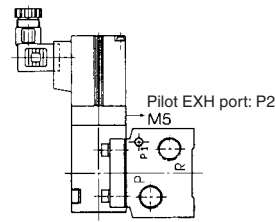
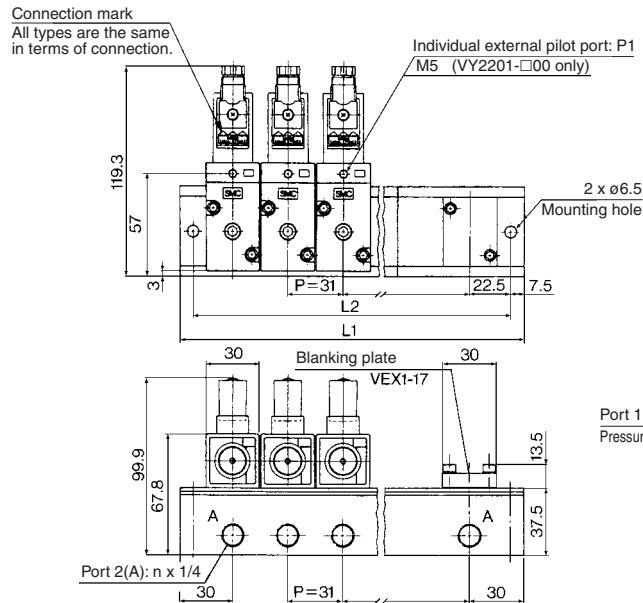
Internal pilot..... P1 has no M5 screw.

Common external pilot..... P1 has an M5 screw.

Dimension	Stations	2	3	4	5	6	7	8	9	10
L1		71.8	95.2	118.6	142	165.4	188.8	212.2	235.6	259
L2		58.8	82.2	105.6	129	152.4	175.8	199.2	222.6	246

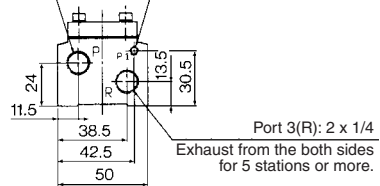
Dimensions

VVEX2



Port 1(P): 2 x 1/4
Pressurize from the both sides for 5 stations or more.

Common external pilot port:
See "Note for P1".
2 x M5 (VVEX2-2-n-02 only)



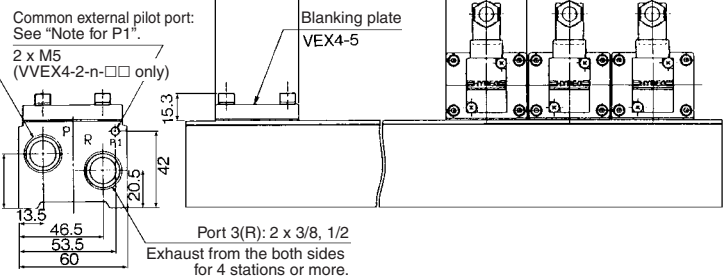
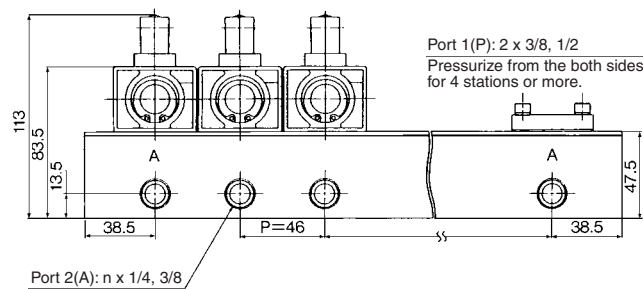
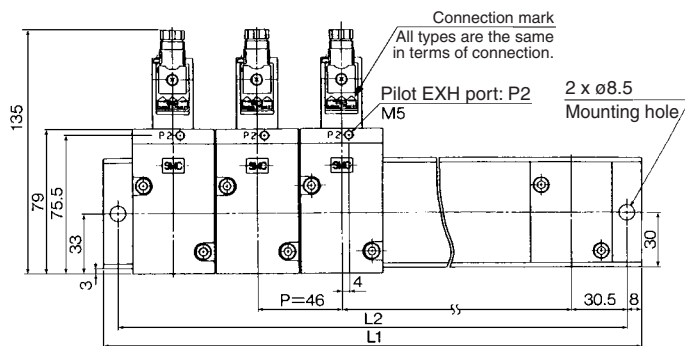
Dimension	Stations	2	3	4	5	6	7	8
L1		91	122	153	184	215	246	277
L2		76	107	138	169	200	231	262

Note for P1

Confirm internal pilot or common external pilot by checking whether P1 has a M5 screw or not.

Internal pilot..... P1 has no M5 screw.
Common external pilot..... P1 has an M5 screw.

VVEX4



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

Note for P1

Confirm internal pilot or common external pilot by checking whether P1 has a M5 screw or not.

Internal pilot..... P1 has no M5 screw.
Common external pilot..... P1 has an M5 screw.

ARJ

AR425
to 935

AMR

ARM

ARP

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VEX1□

SRH

SRP

SRF

ARX20

VCHR

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PVQ

VEF
VEP

VER

VEA

VY2

VBA
VBAT

AP100

Series VY1

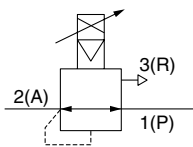
Made to Order Maximum operating pressure: 0.9 MPa (VY1)

How to Order

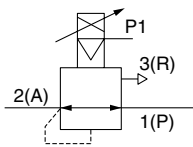


JIS Symbol

Internal pilot



External pilot



E-P HYREG Option

Maximum operating pressure: 0.9 MPa
Note) Use VY2 when the maximum operating pressure is 0.7 MPa or less.

Pilot type

0	Internal pilot
1	External pilot ^{Note)}

Note) Except body size D

VY1 1 0 0 - 01 -

Power source/Command signal

Symbol	Power source voltage DC	Command signal DC	Input impedance
Nil	24 V	1 to 5 V	67 kΩ
1		0 to 10V	10 kΩ
2		4 to 20 mA	120 Ω
3	0 to 20 mA		
5	12 V	1 to 5 V	67 kΩ
6		0 to 10 V	10 kΩ
7		4 to 20 mA	120 Ω
8		0 to 20 mA	

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

Body size

Port size Rc

Option

Mounting	Symbol	Symbol	Port 1(P), 2(A)	Port 3(R)	B (Bracket)	F (Foot)	G (Pressure gauge)	N (Silencer)	Applicable pilot valve ²⁾	
Base mounted	D	00	Without sub-plate	—	—	—	—	—	VY1D00-□00 ³⁾	
		M5	M5	—	—	—	●	—		
	B	00	Without sub-plate	—	—	—	—	●		—
		M5	M5	—	—	—	—	●		—
	2	01	1/8	—	—	—	—	●		●
			1/4	—	—	—	—	●		●
		02	1/8	—	—	—	—	●		●
			1/4	—	—	—	—	●		●
	4	00	Without sub-plate	—	—	—	—	—		●
			1/4	—	—	—	—	—		●
		03	3/8	—	—	—	—	—		●
			1/2	—	—	—	—	—		●
Body ported	A	M5	M5	● ⁽¹⁾	● ⁽¹⁾	—	—	—	VY1B00-□00 ³⁾	
		01	1/8	● ⁽¹⁾	● ⁽¹⁾	●	●	—		
	02		1/4	●	—	●	●	—		
		03	3/8	●	—	●	●	—		
	04		1/2	●	—	●	●	—		
		5	04	1/2	●	—	●	●		—
	06		3/4	●	—	●	●	—		
		10	1	—	—	—	—	—		—
	7		10	1	●	—	●	●		—
		12	1 1/4	1 1/4	●	—	●	●		—
	9		14	1 1/2	●	—	●	●		—
		20	2	2	●	—	●	●		—

Note 1) Only bracket or foot may be mounted.

Note 2) When replacing the pilot valve, it may not satisfy characteristics such as accuracy, etc. Confirm the product works under the operating conditions before using. If SMC is requested to repair the product, SMC confirms whether characteristics are satisfied.

Note 3) □ in the applicable pilot valve part number is designated for the power source/command signal.

Made to Order Maximum operating pressure: 0.9 MPa (VY1)

Standard Specifications

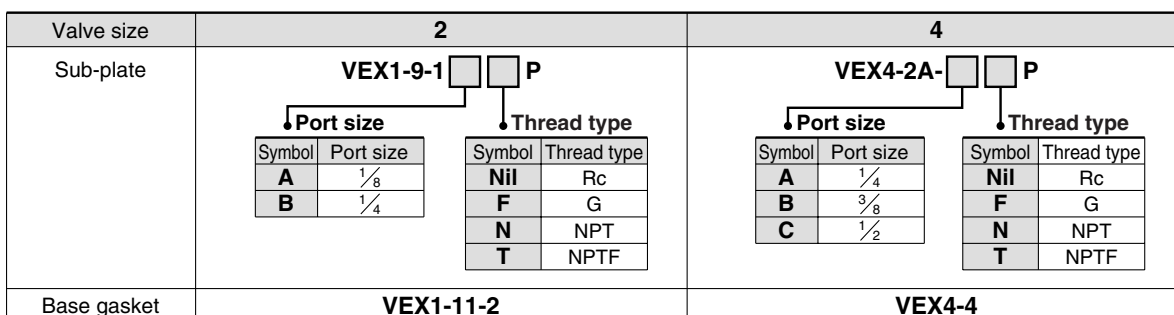
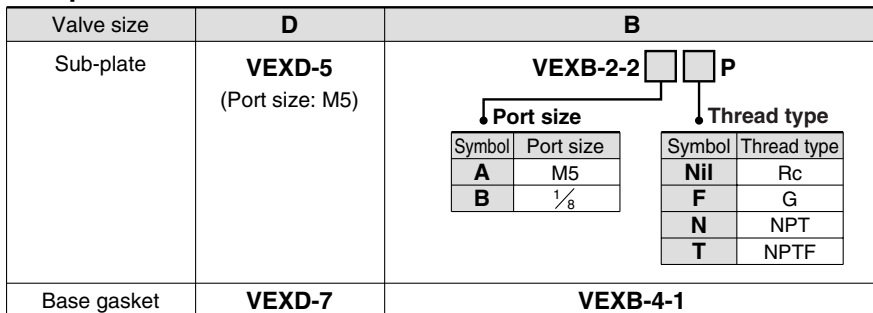
Model		VY1D00	VY1A0 ₁ ⁰	VY1B0 ₁ ⁰	VY110 ₁ ⁰	VY120 ₁ ⁰	VY130 ₁ ⁰	VY140 ₁ ⁰	VY150 ₁ ⁰	VY170 ₁ ⁰	VY190 ₁ ⁰											
Port size	Port	M5	M5	M5	01	02	01	02	02	03	04	02	03	04	04	06	10	10	12	14	20	
	1(P)	M5	M5	M5	1/8	1/8	1/4	1/8	1/4	1/4	3/8	1/2	1/4	3/8	1/2	1/2	3/4	1	1	1 1/4	1 1/2	2
	2(A)																					
	3(R)																					
Mass (kg) ⁽¹⁾	0.11	0.16	0.19	0.25	0.35	0.55	0.75	1.5	2	4												
Hysteresis ⁽²⁾	0.009 MPa	0.023 MPa						0.027 MPa			0.045 MPa											
Sensitivity ⁽²⁾	0.005 MPa	0.009 MPa						0.014 MPa			0.018 MPa											
Repeatability ⁽²⁾	± 0.005 MPa	± 0.009 MPa						± 0.009 MPa			± 0.018 MPa											
Response time ⁽²⁾	10 ms	30 ms																				
Fluid	Air																					
Ambient and fluid temperature	0 to 50°C (No condensation)																					
Maximum operating pressure	0.9 MPa ⁽³⁾																					
Regulating pressure range	0.05 to 0.84 MPa (Supply pressure 0.9 MPa)																					
External pilot pressure	— (Direct operated)	Set pressure + 0.04 to 0.9 MPa (VY1□01)																				
Command signal ⁽⁴⁾	1 to 5 VDC, 0 to 10 VDC, 4 to 20 mA DC, 0 to 20 mA DC																					
Power supply	12 VDC±10%, 24 VDC ±10%, 1.8 W or less																					
Electrical entry	DIN terminal																					
Applicable cable	Cable O.D. ø4 to 6.5																					
Bleed air flow (Port P2)	When not operating: Zero, When operating: 10 l/min (ANR) (Supply pressure 0.88 MPa)																					
Installation	Universal																					
Lubrication	Not required ⁽⁵⁾																					

- Note 1) The mass of the base mounting type (D/B/2/4 size) with sub-plate is indicated.
- Note 2) All property values indicate maximum values.
- Note 3) Use VY2 when the maximum operating pressure is 0.7 MPa or less.
- Note 4) Cut off the command signal when the pressure control on the outlet side is not required, such as when the line is temporarily halted, etc. Refer to Specific Product Precautions on page 736.
- Note 5) To lubricate the outlet side of "VY", use "VY" as an external pilot. Avoid lubrication to the pilot air.
- Note 6) The non-lubricated specification is not applicable to these models.
- Note 7) The service life is approximately 4000 to 5000 operating hours. (When using AF + AFM)
This may be approximately 3000 hours with ultra-dry air (dew point -40°C or equivalent).
- Note 8) Dimensions of VY1 are the same as VY2. (This is the same for manifolds.)
- Note 9) "How to order manifolds" is also the same as VY2.

Option

Description	Part no.										
	VY1D00	VY1A0 ₁ ⁰	VY1B0 ₁ ⁰	VY110 ₁ ⁰	VY120 ₁ ⁰	VY130 ₁ ⁰	VY140 ₁ ⁰	VY150 ₁ ⁰	VY170 ₁ ⁰	VY190 ₁ ⁰	
Bracket	B	—	VEXA-18-2A	—	VEX1-18-1A	—	VEX3-32A	—	VEX5-32A	VEX7-32A	VEX9-32A
(With bolt, washer)	F	—	VEXA-18-3A	—	VEX1-18-2A	—	—	—	—	—	—
Pressure gauge	G	—	—	G27-10-R1-X207	G27-10-01	G36-10-01	—	—	—	G46-10-01	—
Pilot EXH port silencer	N	AN120-M5	—	—	AN120-M5	AN101-01	AN120-M5	—	—	AN210-02	—

Sub-plate and Base Gasket Part No.



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

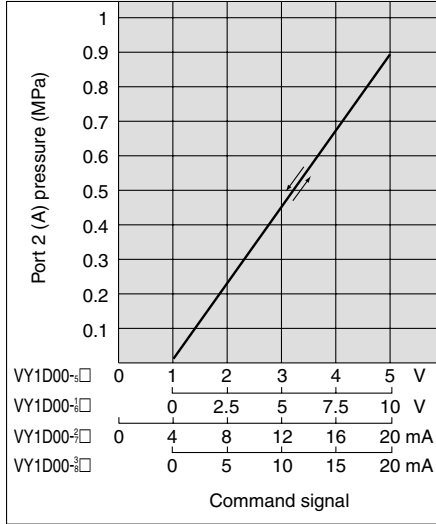
Made to Order Maximum operating pressure: 0.9 MPa (VY1)

Characteristics

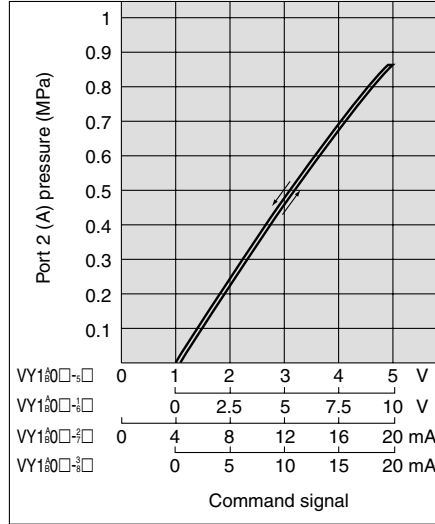
Command Signal — Outlet Pressure Characteristics (Characteristics of pressure setting)

Port 1(P) Pressure 0.9 MPa

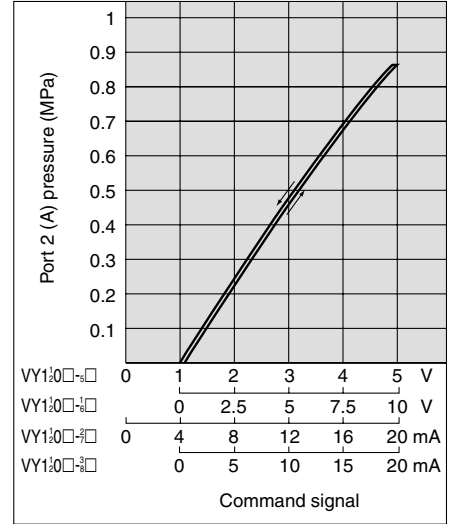
VY1D00



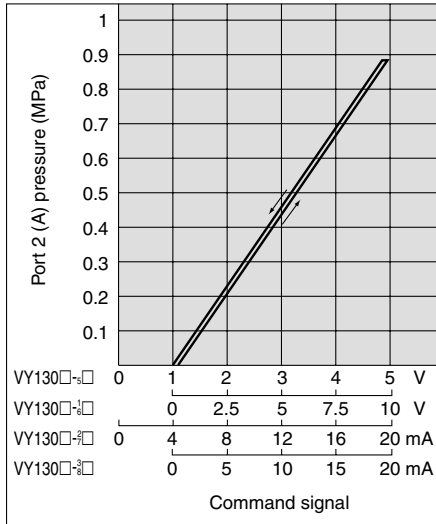
VY1A00/1A01, VY1B00/1B01



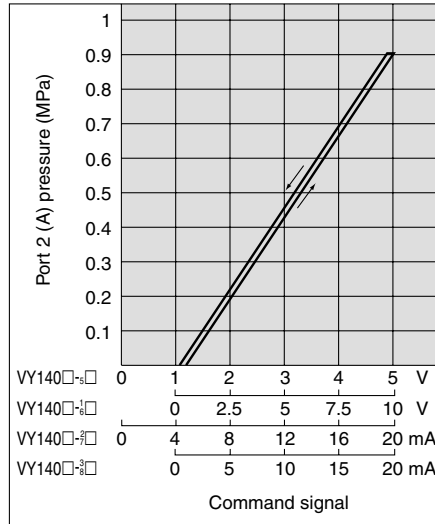
VY1100/1101, VY1200/1201



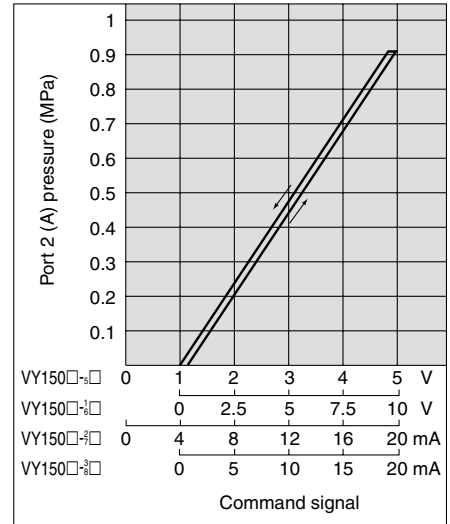
VY1300/1301



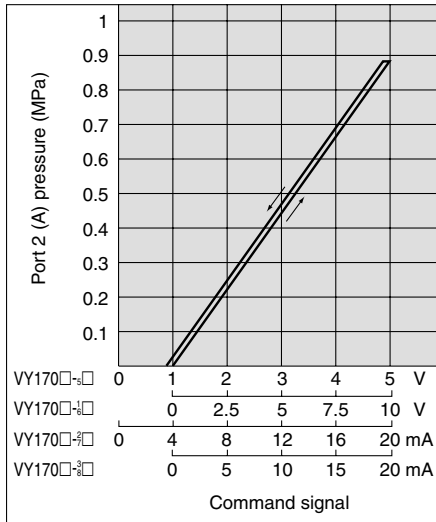
VY1400/1401



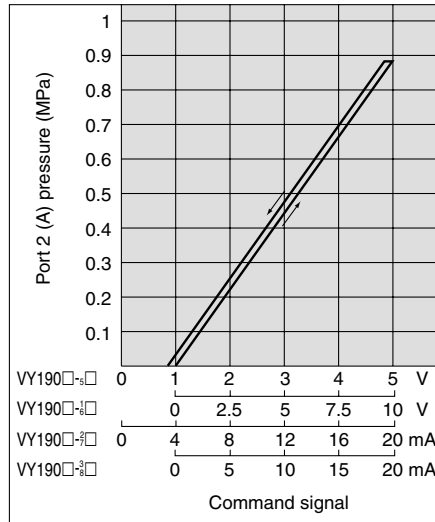
VY1500/1501



VY1700/1701



VY1900/1901



Command signal voltage (current) for starting the operation of a pilot valve VY1D0* (direct operated) (There is dispersion in the following range)

Symbol ⁽¹⁾	Input signal	Operation start range
Nil, 5	1 to 5 VDC	0.93 to 1.07 VDC
1, 6	0 to 10 VDC	0.01 to 0.1 VDC
2, 7	4 to 20 mA DC	3.7 to 4.3 mA DC
3, 8	0 to 20 mA DC	0.02 to 0.2 mA DC

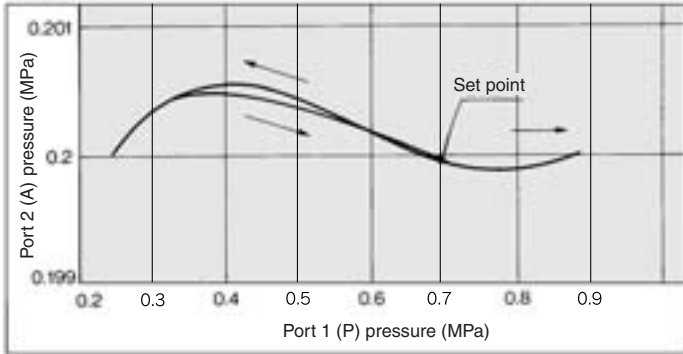
Note 1) Enter symbols above □ in VY1D0*-□□. □ indicates power supply and a command signal.

Note 2) Other body sizes add the dispersion on the above data when the main valve activates.

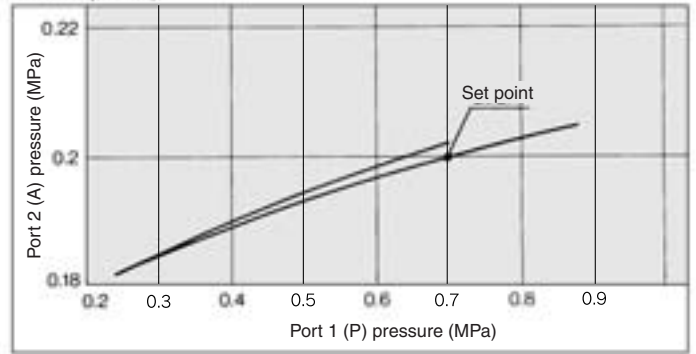
Made to Order Maximum operating pressure: 0.9 MPa (VY1)

Pressure Characteristics

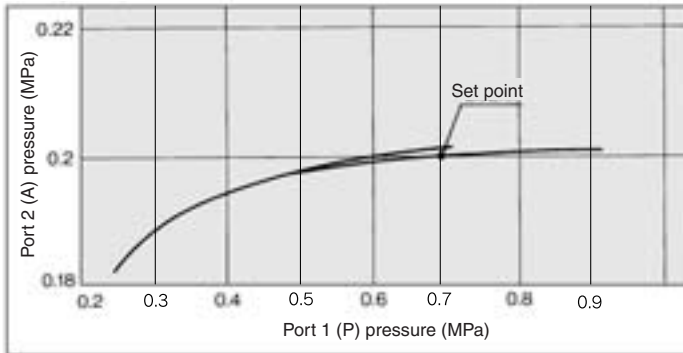
VY1D00



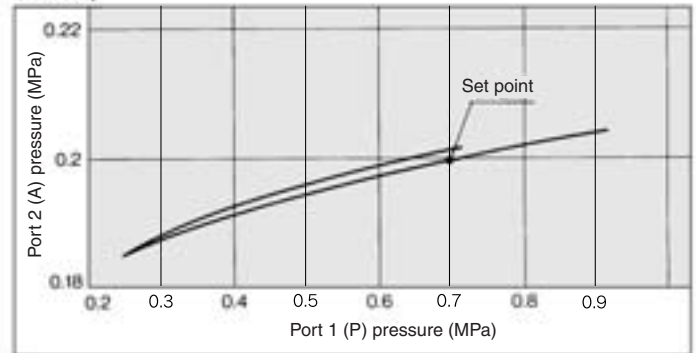
VY1A0 0/1B0 0



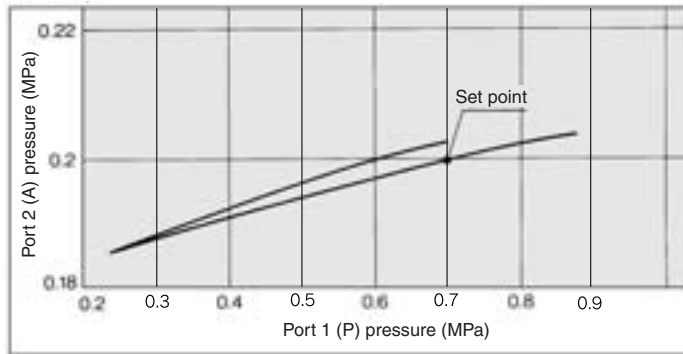
VY11 0/120 0



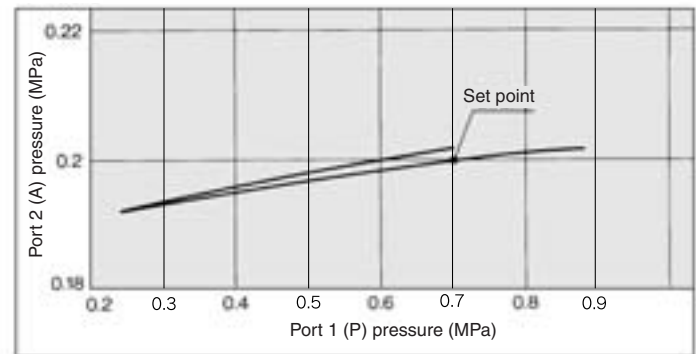
VY130 0



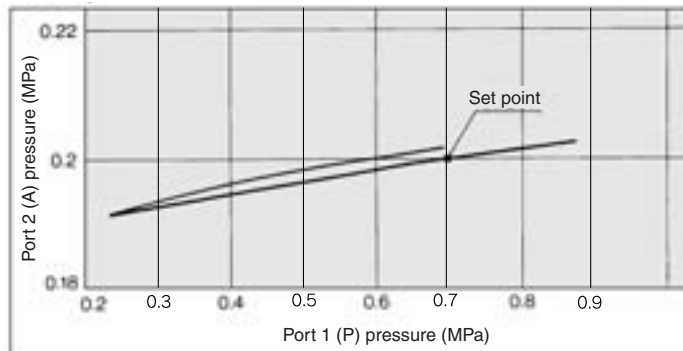
VY140 0



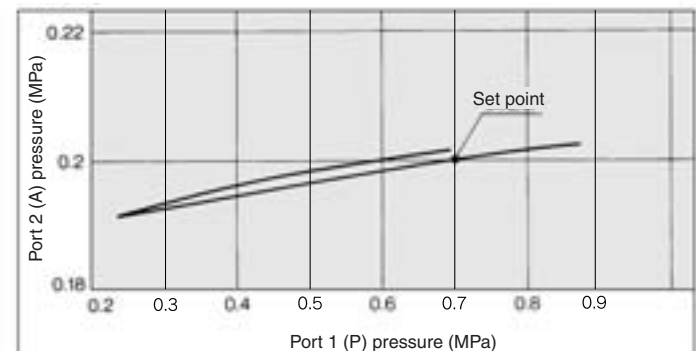
VY150 0



VY170 0



VY190 0



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

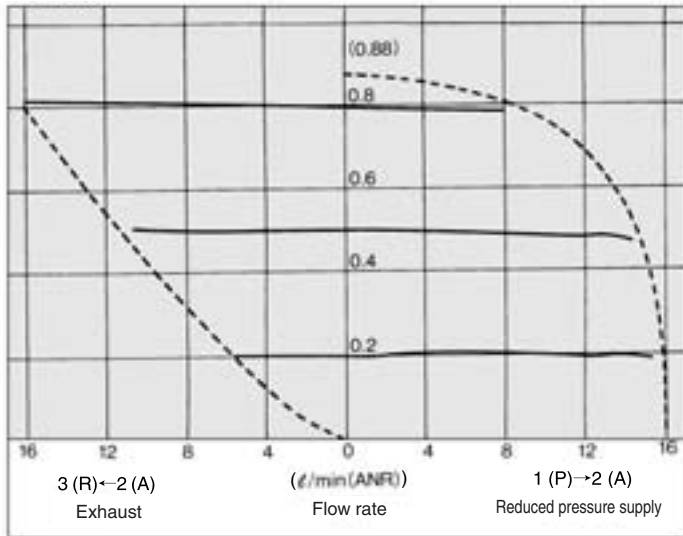
Series VY1

Made to Order Maximum operating pressure: 0.9 MPa (VY1)

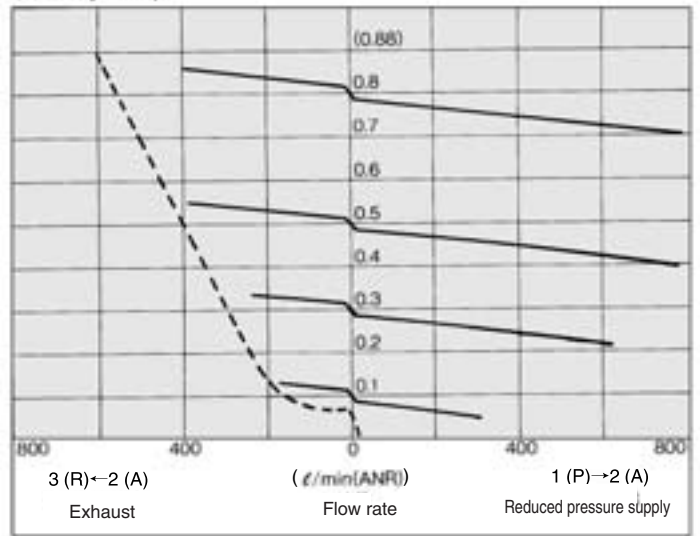
Characteristics

Flow Characteristics

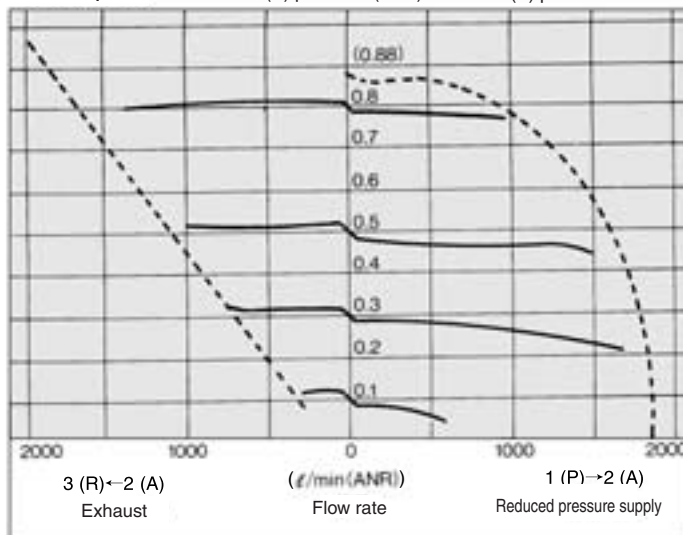
VY1D00 Port 2 (A) pressure (MPa) Port 1 (P) pressure 0.9 MPa



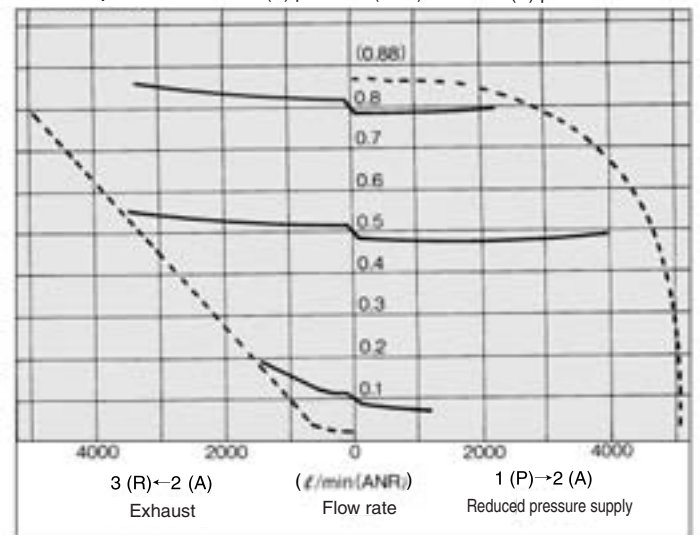
VY1A0 0/1B0 0 Port 2 (A) pressure (MPa) Port 1 (P) pressure 0.9 MPa



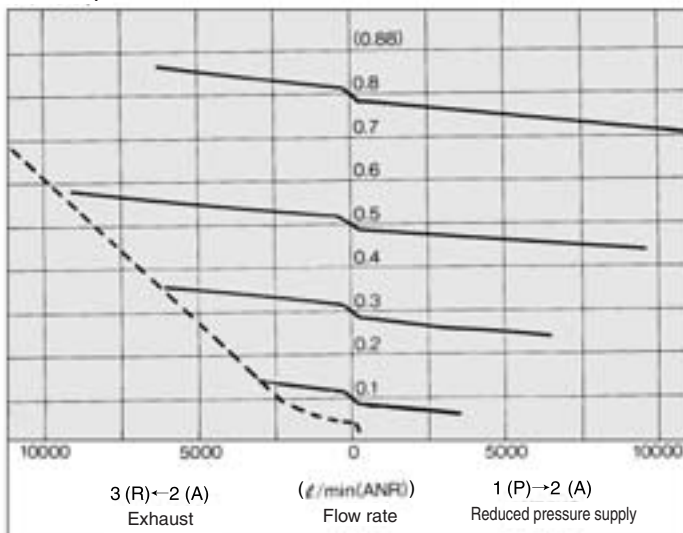
VY110 0/120 0 Port 2 (A) pressure (MPa) Port 1 (P) pressure 0.9 MPa



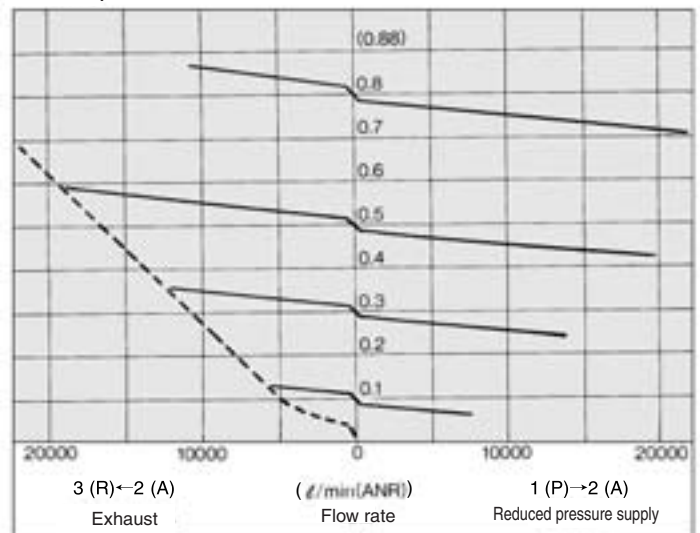
VY130 0/140 0 Port 2 (A) pressure (MPa) Port 1 (P) pressure 0.9 MPa



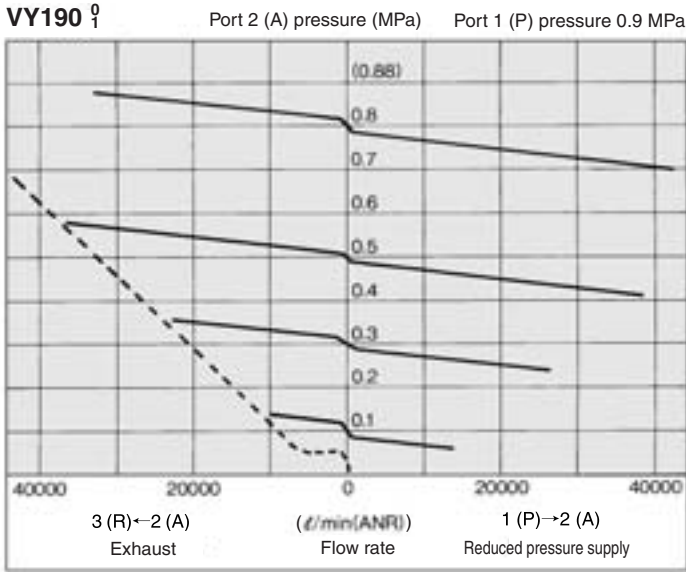
VY150 0 Port 2 (A) pressure (MPa) Port 1 (P) pressure 0.9 MPa



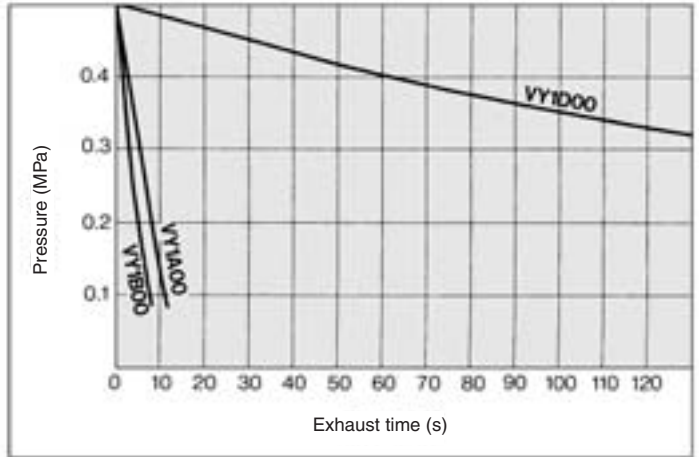
VY170 0 Port 2 (A) pressure (MPa) Port 1 (P) pressure 0.9 MPa



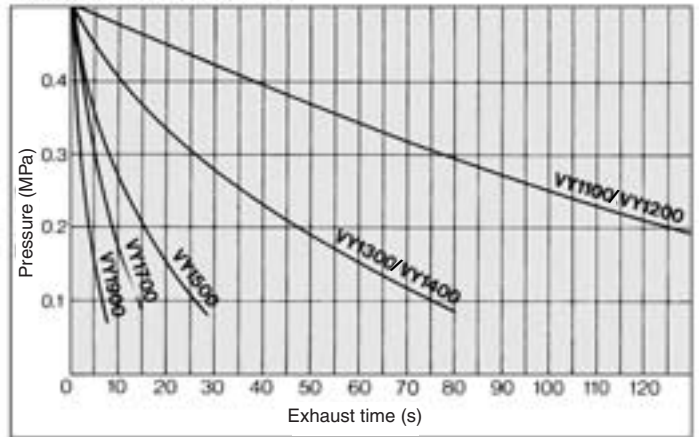
Made to Order Maximum operating pressure: 0.9 MPa (VY1)



2. Exhaust Time from 10 ℓ Tank

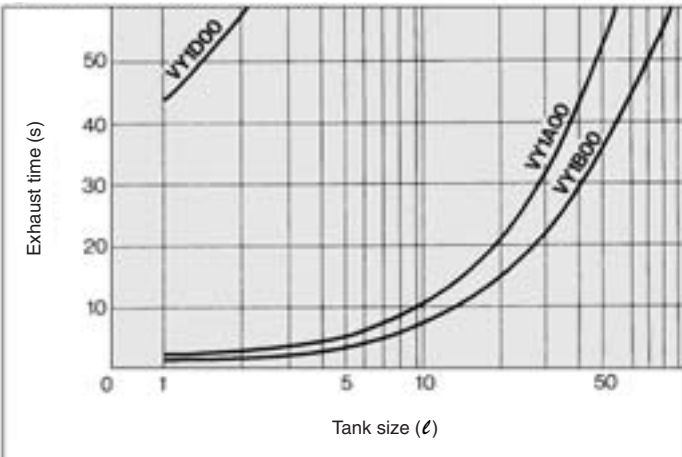


Exhaust Time from 1000 ℓ Tank

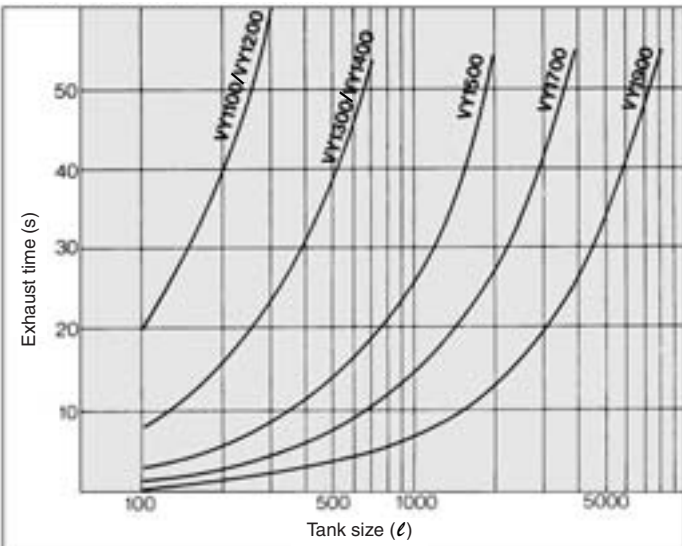


Exhaust Time

1. Exhaust Time from 0.5 MPa to 0.1 MPa



Exhaust Time from 0.5 MPa to 0.1 MPa



3. Exhaust time from optional pressure point

Ex.] Using VY1500, lower the 500 ℓ tank pressure from 0.4 to 0.1.

a) If describing the above graph in accordance with graphs, the exhaust time is read; $27 - 3 = 24$ s.

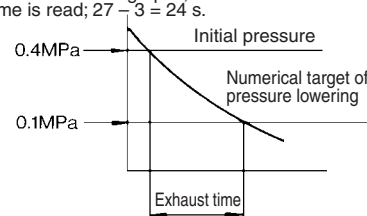
b) Then, to convert the time into one from a 500 ℓ tank.

$$t = \frac{\text{Tank capacity}}{1000} \times \left[\text{Read exhaust time} \right]$$

$$= \frac{500}{1000} \times 24$$

$$\cong 12$$

Then, the result is 12 s.



- 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 VY1

⚠ 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.

Piping

⚠ Caution

Tightening the fittings and their torque

When screwing fittings into the valves, 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	1.5 to 2 \pm 1/6 rotation
Rc 1/8	7 to 9
Rc 1/4	12 to 14
Rc 3/8	22 to 24
Rc 1/2	28 to 30
Rc 3/4	28 to 30
Rc1	36 to 38
Rc1 1/4	40 to 42
Rc1 1/2	48 to 50
Rc2	48 to 50

Air Supply

⚠ Caution

Poor quality air could enhance the spool's sliding resistance and may not achieve the specified properties. Use compressor oil with a minimal generation of oxidants and install a mist separator (SMC's Series AM/AFM). Refer to pages 2 and 3.

Pressure Gauge

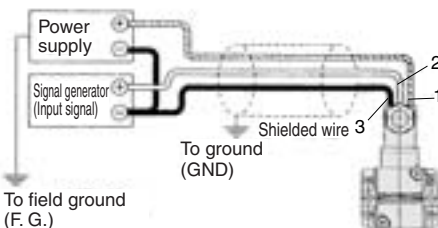
⚠ Caution

For products with pressure gauge, use caution about the durability of a pressure gauge, since it may be affected by the sudden pressure changes during operation.

Wires to be Used

⚠ Caution

Use 3 core shielded wires measuring 0.5 (mm²) for the power supply and signal lines according to the respective number of conductors. When connecting the shielded braided wire, connect it to the ground of the signal generator. As a rule, the electro-pneumatic hybrid regulator should be installed in a location that is free of noise or is shielded. If it must be installed in an environment with poor noise conditions, eliminate the power supply noise by using a line filter, Z-wrap, or a spark killer on the 100 V power supply or signal source line. The length of the power supply and signal lines must be kept as short as possible.



Terminal no.	Details of wire connection
1	Power supply
2	Command signal
3	GND (COMMON)

How to Use DIN Terminal

⚠ Caution

• Wiring procedures

- Loosen the retaining screw and pull the connector from the solenoid valve terminal block.
- Remove the retaining screw, insert a flat head screwdriver into the groove below the terminal block and pry it up to separate the terminal block from the housing.
- Loosen the terminal screws (slot head screws) on the terminal block.
Then, in accordance with the wiring procedure, insert the cord of the lead wires into the terminals and tighten the terminal screws to secure in place.
- Tighten the ground nut to secure the cord.

• Outlet changing procedure

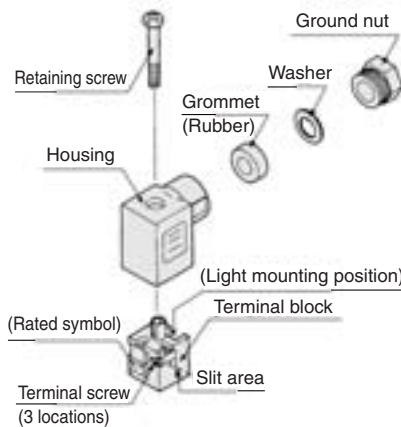
After the terminal block has been separated from its housing, reassemble the housing in the desired direction (in four 90° increments) to change the direction of the cord outlet.

• Precautions

Kindly insert the connector straight in without tilting it, and pull it out straight.

• Applicable wire

Cord external diameter: ϕ 4 to ϕ 6.5 c.f. 0.5 mm² 3 core wire (JIS C 3306 equivalent)



• Connector part no.: VK300-82-1

Input Signal

⚠ Caution

• Input signal when out of operation

There is dispersion in operation start voltage (current) for the input signal. (Refer to pages 716 and 732.)

If the command signal when out of operation exceeds the lower limit of the operation start voltage (current), the solenoid valve inside the pilot valve starts to activate and may be in the operation state. The service life of this product varies depending on the operating time of the solenoid valve inside the pilot valve. Be sure to cut off the command signal when the pressure control on the outlet side is not required, such as when the line is temporarily halted, etc. (Refer to "Service Life" below.)

Service Life

⚠ Caution

The service life of the VY2's pilot valve is approximately 7000 operating hours (with ultra-dry air (dew point -40°C or equivalent)). The made-to-order product VY1's pilot valve service life is approximately 4000 to 5000 operating hours. (When using AF + AFM) This may be approximately 3000 hours with ultra-dry air (dew point -40°C or equivalent).

Related Products:

Silencer (Series AN)

- Noise reducing effect: 30 dB or more.
- Large 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 collecting functions.
- Can also be used in a common piping system.



Model	Connection R	Effective area (mm ²)	Max. flow capacity (L/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 recovering efficiency 99.9%
- Noise reduction efficiency 35 dB or more
- For details, refer to Best Pneumatics No. 6.