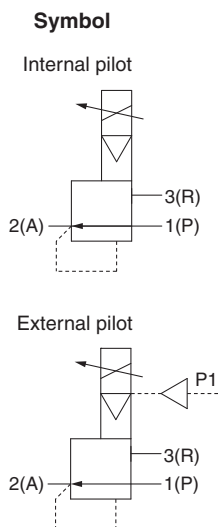
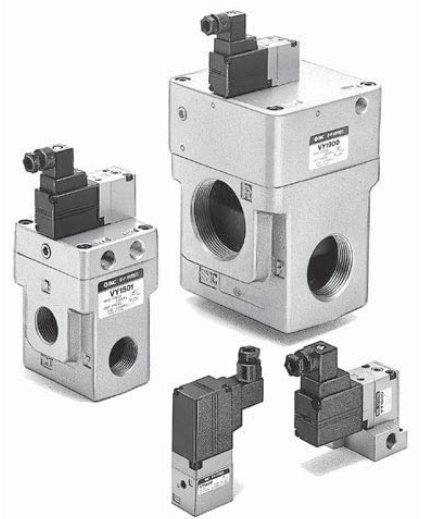
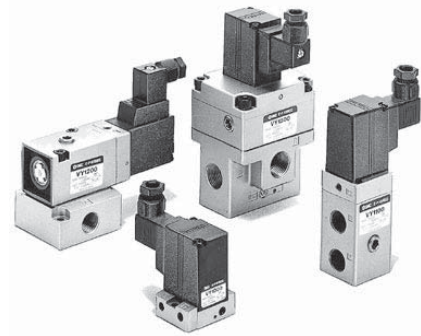


E-P HYREG® VY1 Series



How to Order

E-P HYREG
Maximum operating pressure: 0.9 MPa

Made to Order

X39 Low wattage specification P.1003

Pilot type

0	Internal pilot
1	External pilot ^{Note 1)}

Note 1) Except body size D

Thread type

Nil	Rc
F	G ⁽²⁾
N	NPT
T	NPTF

Note 2) Not conforming to ISO1179-1.

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	

Ordering Example: VY1 1 0 0 - 01 - - -

Mounting	Symbol	Symbol	Port 1(P), 2(A)	Port 3(R)	B (Bracket)	F (Foot)	G (Pressure gauge)	N (Silencer)	Applicable pilot valve ⁽⁶⁾
Base mounted	D	00	Without sub-plate		—	—	—	—	VY1D00- □00 ⁽⁵⁾
		M5	M5		—	—	—	●	
	B	00	Without sub-plate		—	—	●	—	
		M5	M5		—	—	—	—	
	01	1/8		—	—	—	—	—	
		1/4		—	—	—	—	—	
	2	00	Without sub-plate		—	—	●	●	
		01	1/8		—	—	—	—	
	02	1/4		—	—	—	—	—	
		3/8		—	—	—	—	—	
	4	00	Without sub-plate		—	—	—	●	
		02	1/4		—	—	—	—	
03	3/8		—	—	—	—	—		
	1/2		—	—	—	—	—		
Body ported	A	M5	M5		● ⁽³⁾	● ⁽³⁾	—	—	VY1B00- □00 ⁽⁵⁾
		1	01	1/8		● ⁽³⁾	● ⁽³⁾	●	
	02	1/4		—	—	—	—	—	
		3/8		—	—	—	—	—	
	3	03	3/8		●	—	●	●	
		04	1/2		●	—	●	●	
	5	04	1/2		●	—	●	●	
		06	3/4		●	—	●	●	
	10	1		—	—	—	—	—	
		1 1/4		—	—	—	—	—	
	7	10	1		●	—	●	●	
		12	1 1/4		●	—	●	●	
14	1 1/2		—	—	—	—	—		
	2		—	—	—	—	—		
9	14	1 1/2		●	—	●	●		
	20	2		●	—	●	●		

Note 3) Only bracket or foot may be mounted.

Note 4) 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 5) □ in the applicable pilot valve part number is designated for the power source/command signal.

Note 6) 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 1006.

Note 7) Face seal type One-touch fittings cannot be used.

Standard Specifications

Model	VY1D00	VY1A0 ⁰	VY1B0 ⁰	VY110 ⁰	VY120 ⁰	VY130 ⁰	VY140 ⁰	VY150 ⁰	VY170 ⁰	VY190 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	2	2	
Weight (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																				
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 ⁽³⁾	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 (Pilot EXH port)	When not operating: Zero, When operating: 10 L/min (ANR) (Supply pressure 0.9 MPa)																				
Installation	Universal																				
Lubrication	Not required ⁽⁴⁾																				

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) 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 1006.

Note 4) To lubricate the outlet side of "VY", use "VY" as an external pilot. Avoid lubrication to the pilot air.

Note 5) The non-lubricated specification is not applicable to these models.

Note 6) 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).

Option

Description	Symbol	Part no.									
		VY1D00	VY1A0 ⁰	VY1B0 ⁰	VY110 ⁰	VY120 ⁰	VY130 ⁰	VY140 ⁰	VY150 ⁰	VY170 ⁰	VY190 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)	<p>VEXB-2-2 □ □ P</p> <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> <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 ⁽⁷⁾</td></tr> <tr><td>N</td><td>NPT</td></tr> <tr><td>T</td><td>NPTF</td></tr> </table>	Symbol	Port size	A	M5	B	1/8	Symbol	Thread type	Nil	Rc	F	G ⁽⁷⁾	N	NPT	T	NPTF
Symbol	Port size																	
A	M5																	
B	1/8																	
Symbol	Thread type																	
Nil	Rc																	
F	G ⁽⁷⁾																	
N	NPT																	
T	NPTF																	
Base gasket	VYD-7	VEXB-4-1																

Valve size	2	4																																		
Sub-plate	<p>VEX1-9-1 □ □ P</p> <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> <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 ⁽⁷⁾</td></tr> <tr><td>N</td><td>NPT</td></tr> <tr><td>T</td><td>NPTF</td></tr> </table>	Symbol	Port size	A	1/8	B	1/4	Symbol	Thread type	Nil	Rc	F	G ⁽⁷⁾	N	NPT	T	NPTF	<p>VEX4-2A-1 □ □ P</p> <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> <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 ⁽⁷⁾</td></tr> <tr><td>N</td><td>NPT</td></tr> <tr><td>T</td><td>NPTF</td></tr> </table>	Symbol	Port size	A	1/4	B	3/8	C	1/2	Symbol	Thread type	Nil	Rc	F	G ⁽⁷⁾	N	NPT	T	NPTF
Symbol	Port size																																			
A	1/8																																			
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Nil	Rc																																			
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A	1/4																																			
B	3/8																																			
C	1/2																																			
Symbol	Thread type																																			
Nil	Rc																																			
F	G ⁽⁷⁾																																			
N	NPT																																			
T	NPTF																																			
Base gasket	VEX1-11-2	VEX4-4																																		

Note 7) Not conforming to ISO1179-1.

ARJ

AR425
to 935

ARX

AMR

ARM

ARP

IR□-A

IR

IRV

VEX

SRH

SRP

SRF

ITV

IC

ITVH

ITVX

PVQ

VY1

VBA
VBAT

AP100

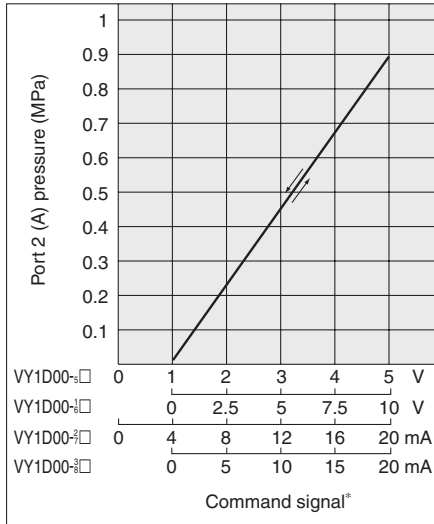
VY1 Series

Characteristics

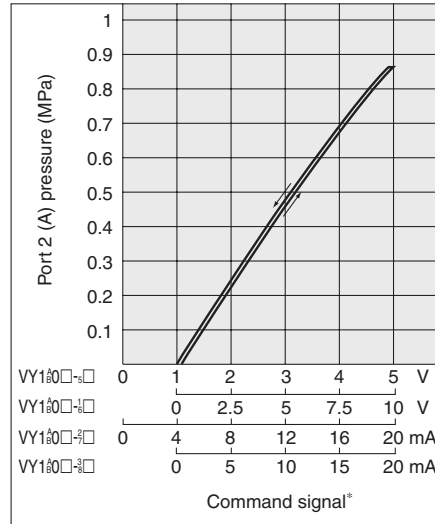
Command Signal — Outlet Pressure Characteristics (Characteristics of pressure setting)

Port 1(P) Pressure 0.9 MPa (-X39: 0.7 MPa)

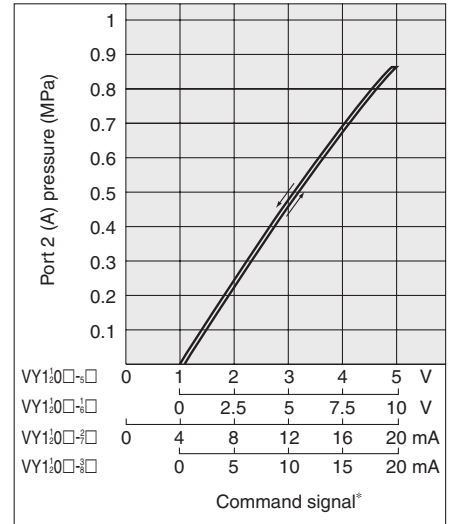
VY1D00



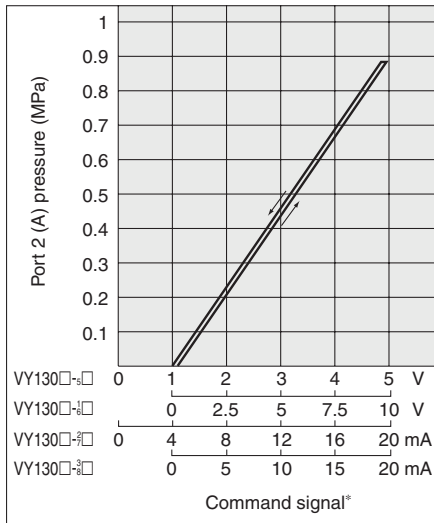
VY1A00/1A01, VY1B00/1B01



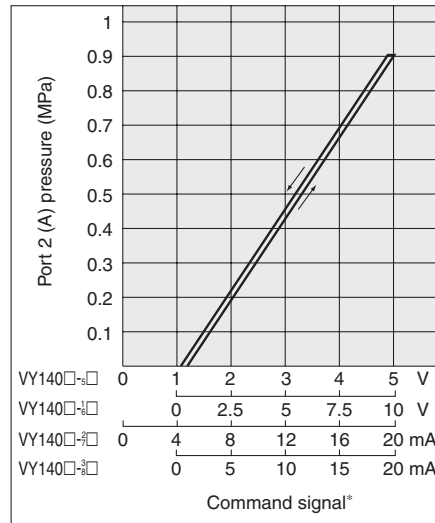
VY1100/1101, VY1200/1201



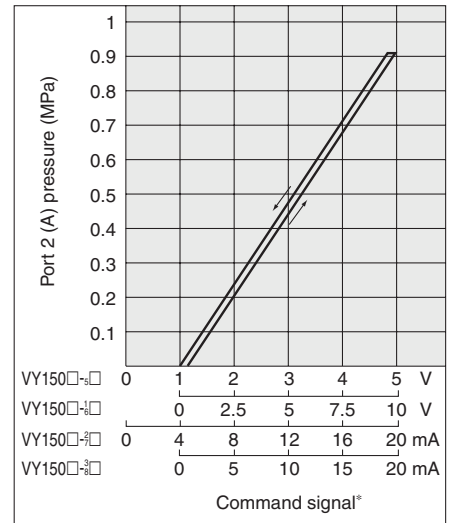
VY1300/1301



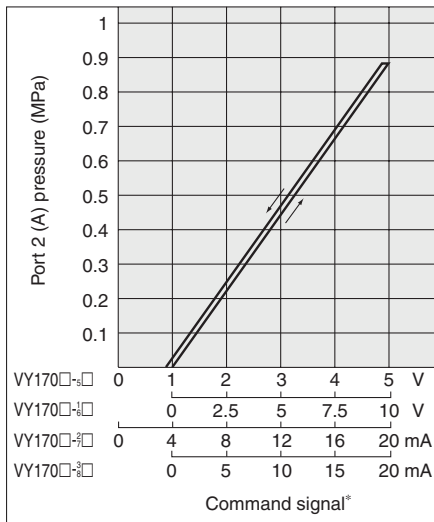
VY1400/1401



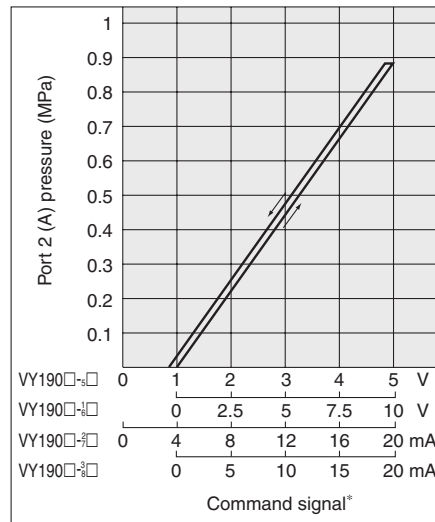
VY1500/1501



VY1700/1701



VY1900/1901



Command signal voltage (current) for starting the operation of a pilot valve VY1D00 (-X39) (direct operated) (There is dispersion in the following range)

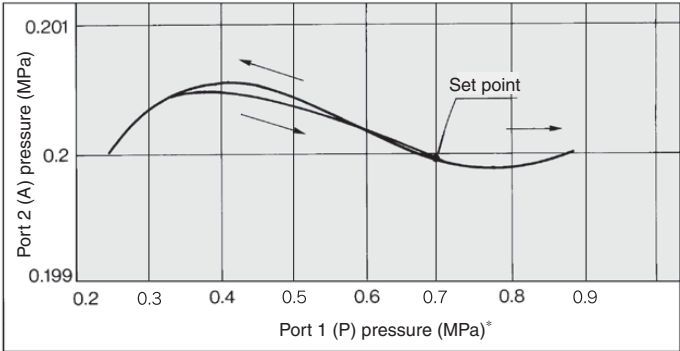
Symbol ⁽¹⁾	Input signal	Operation start range
Nil, 5	1 to 5 VDC	0.93 to 1.07 VDC
1, 6	0 to 10 VDC	0.01 to 0.1 VDC
2, 7	4 to 20 mA DC	3.7 to 4.3 mA DC
3, 8	0 to 20 mA DC	0.02 to 0.2 mA DC

Note 1) Enter symbols above □ in VY1D00-□**. □ indicates power supply and a command signal.
 Note 2) Other body sizes add the dispersion on the above data when the main valve activates.

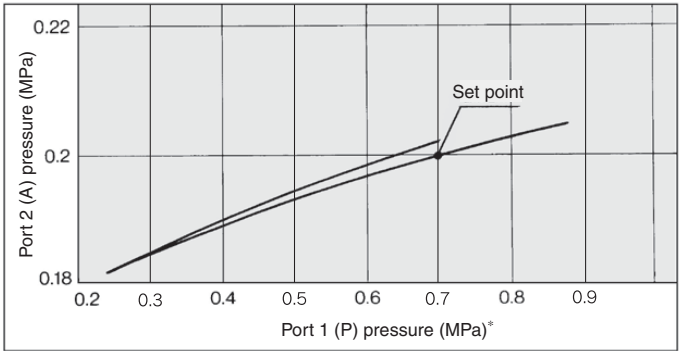
* For the command signal range of the low wattage specification (X39), refer to the specifications on page 1003.

Pressure Characteristics

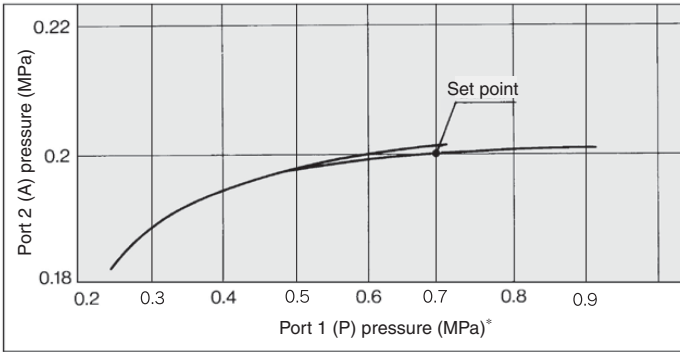
VY1D00



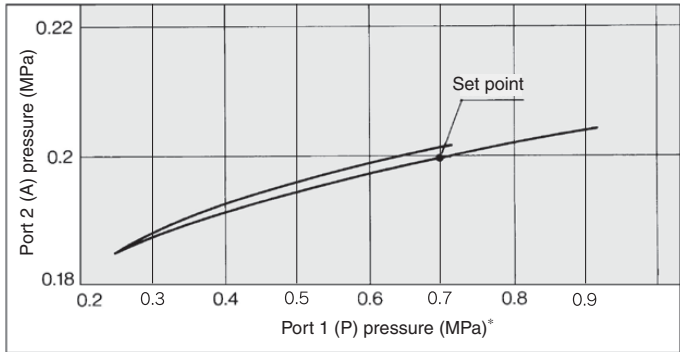
VY1A0 0/1B0 0



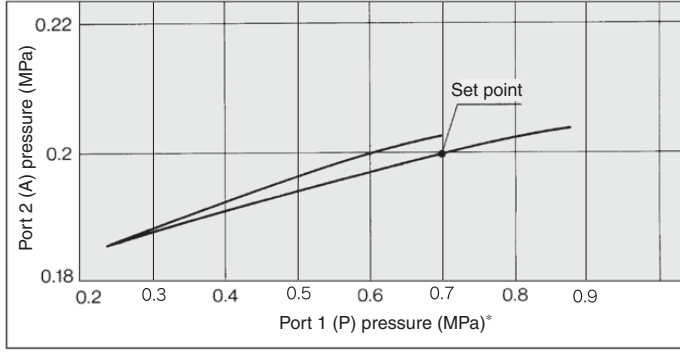
VY110 0/120 0



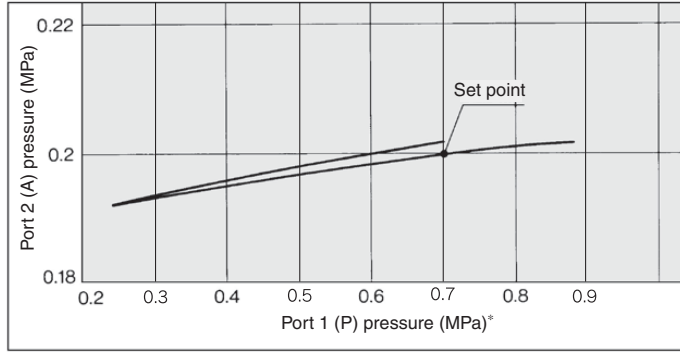
VY130 0



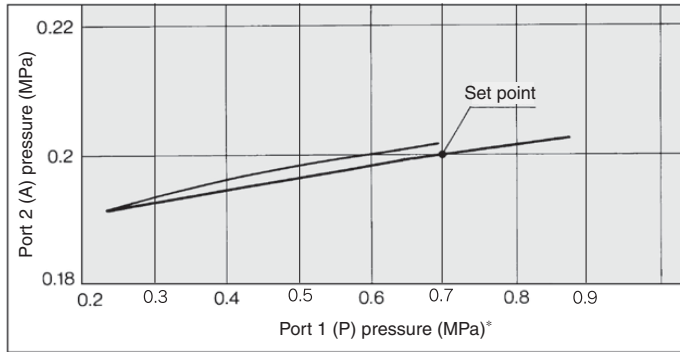
VY140 0



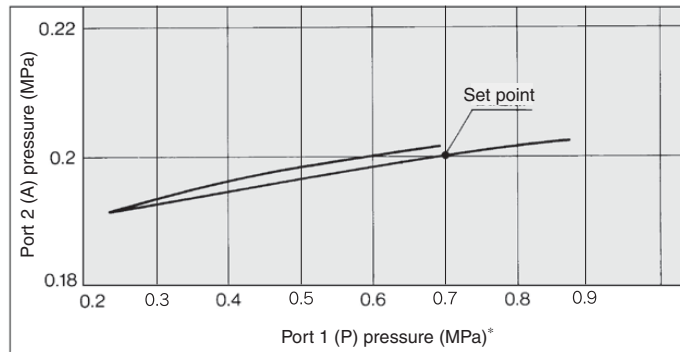
VY150 0



VY170 0



VY190 0



* For the low wattage specification (X39), the maximum pressure of port 1 (P) is 0.7 MPa.

ARJ

AR425
to 935

ARX

AMR

ARM

ARP

IR□-A

IR

IRV

VEX

SRH

SRP

SRF

ITV

IC

ITVH

ITVX

PVQ

VY1

VBA

VBAT

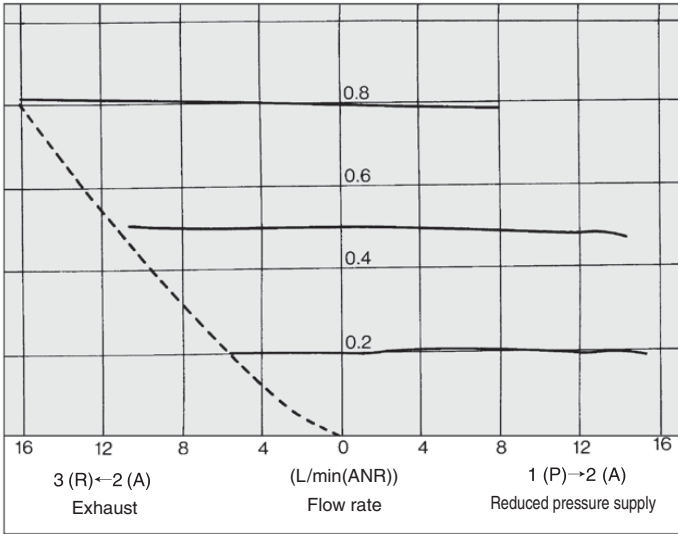
AP100

VY1 Series

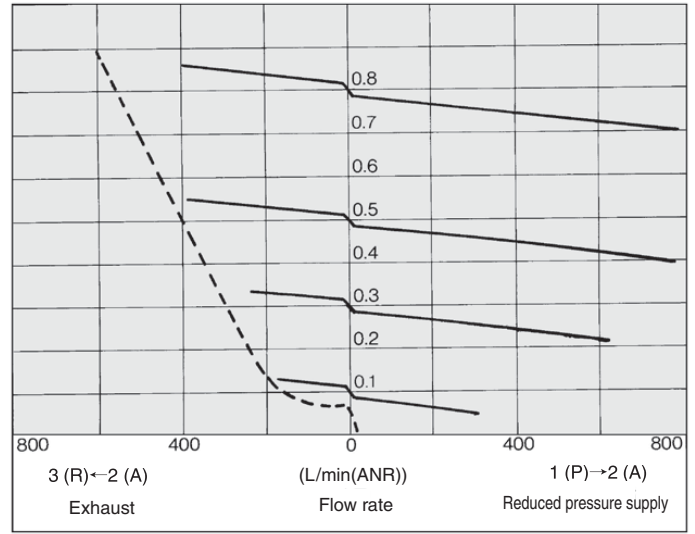
Characteristics

Flow Rate Characteristics

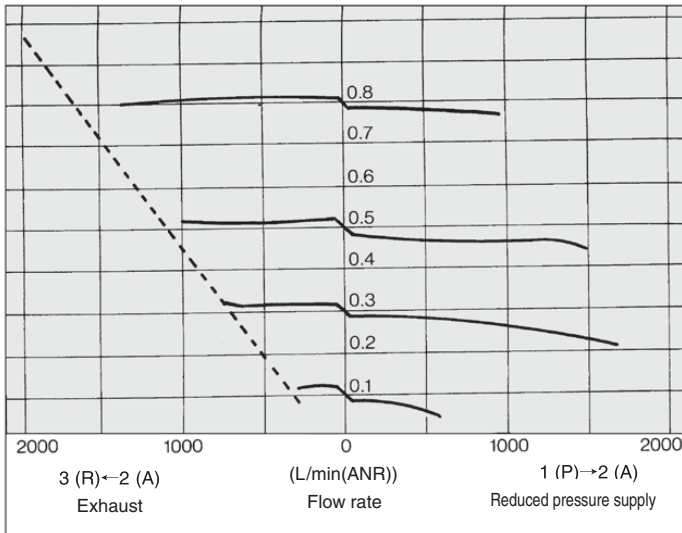
VY1D00 Port 2 (A) pressure (MPa) Port 1 (P) pressure 0.9 MPa



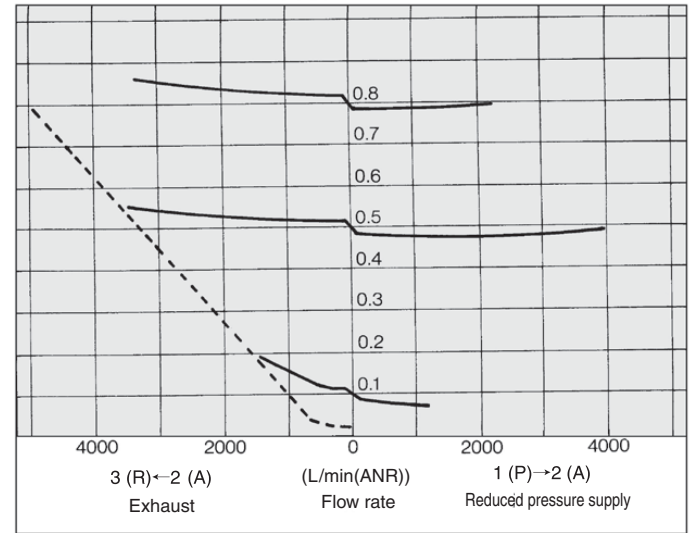
VY1A0 1/1B0 1 Port 2 (A) pressure (MPa) Port 1 (P) pressure 0.9 MPa



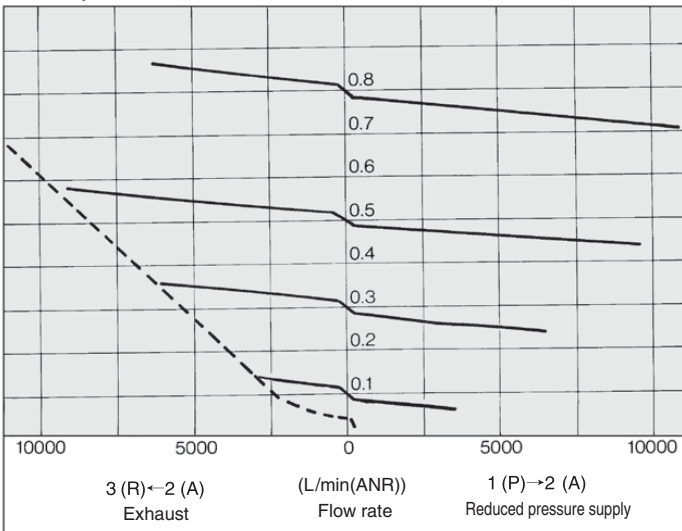
VY110 1/120 1 Port 2 (A) pressure (MPa) Port 1 (P) pressure 0.9 MPa



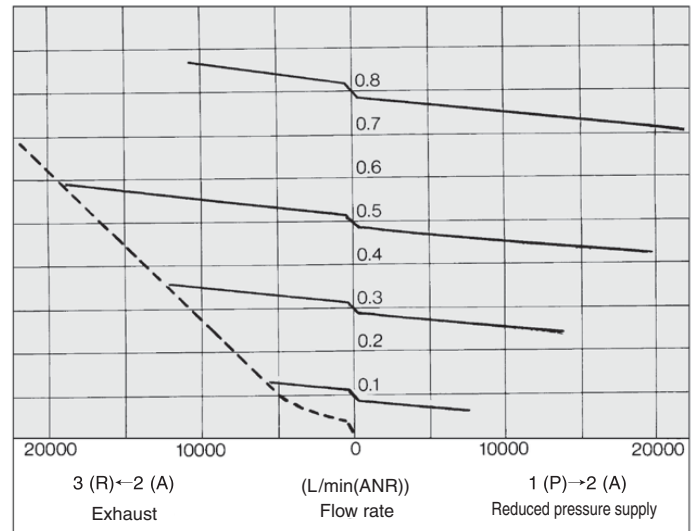
VY130 1/140 1 Port 2 (A) pressure (MPa) Port 1 (P) pressure 0.9 MPa



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

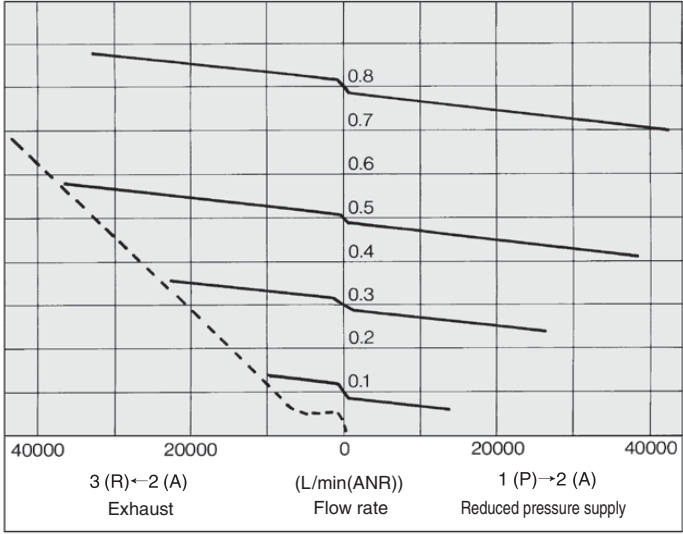


VY170 1 Port 2 (A) pressure (MPa) Port 1 (P) pressure 0.9 MPa

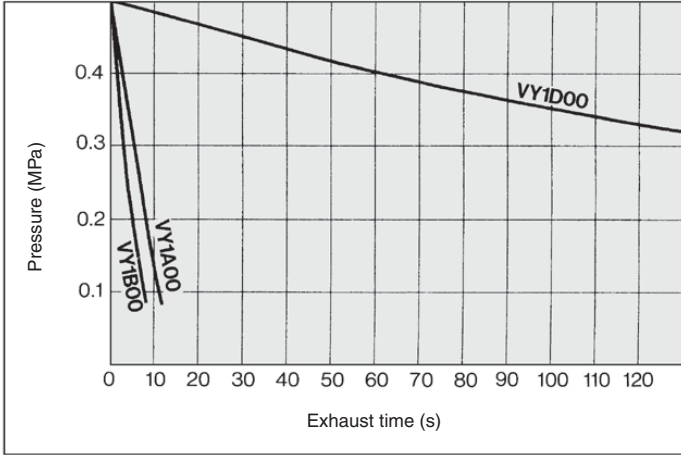


VY190

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

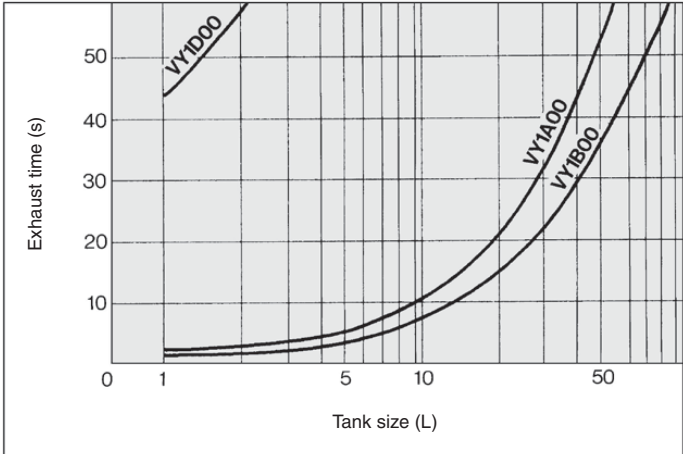


2. Exhaust Time from 10 L Tank

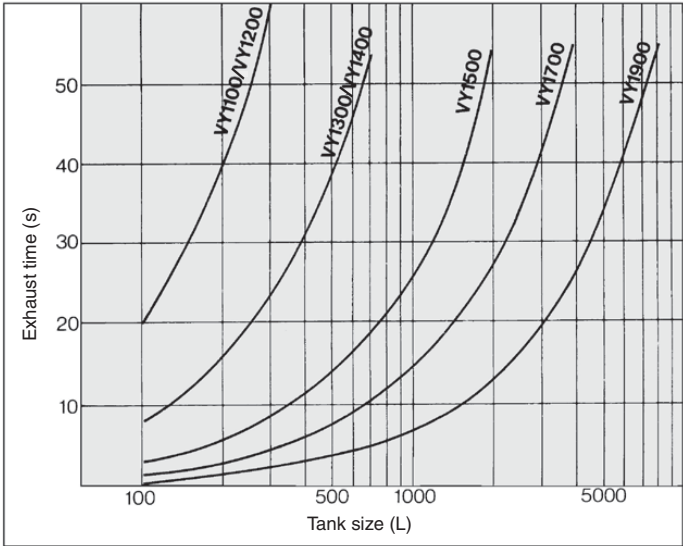


Exhaust Time

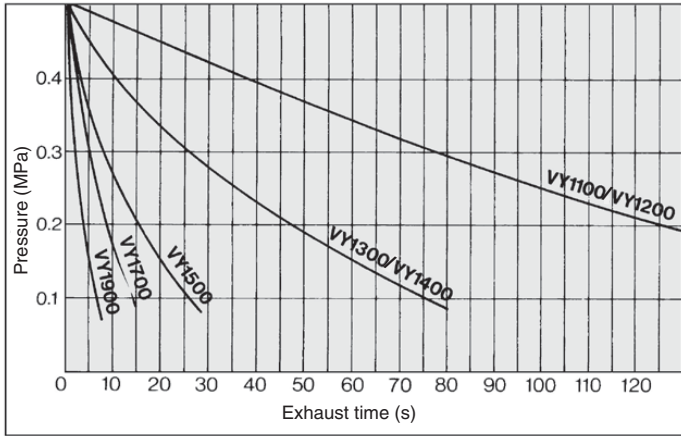
1. Exhaust Time from 0.5 MPa to 0.1 MPa



Exhaust Time from 0.5 MPa to 0.1 MPa



Exhaust Time from 1000 L Tank



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; $27 \div 3 = 24$ s.

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

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

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

$$\cong 12$$

Then, the result is 12 s.

ARJ

AR425 to 935

ARX

AMR

ARM

ARP

IR□-A

IR

IRV

VEX

SRH

SRP

SRF

ITV

IC

ITVH

ITVX

PVQ

VY1

VBA

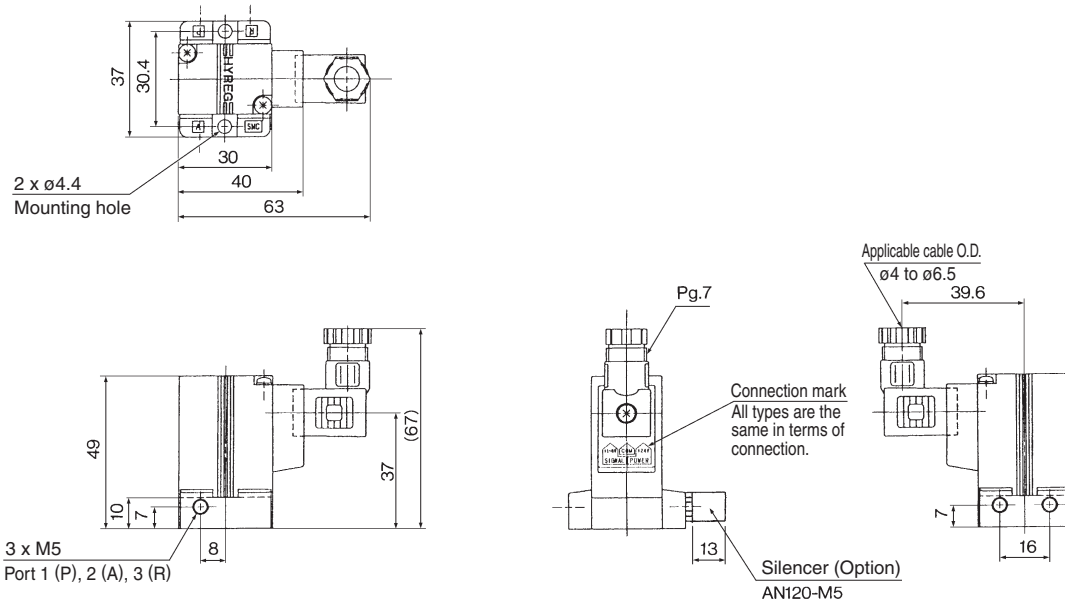
VBAT

AP100

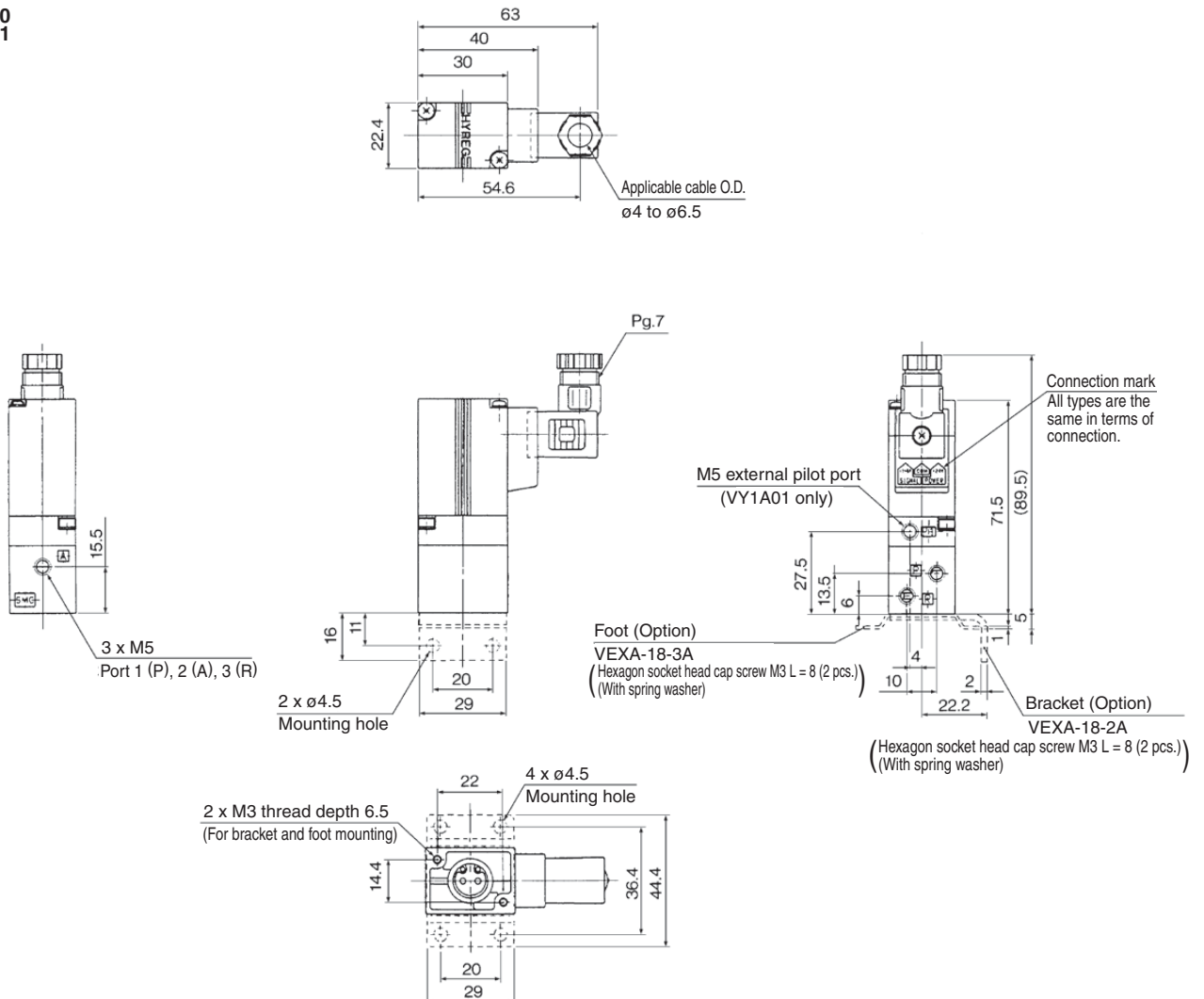
VY1 Series

Dimensions

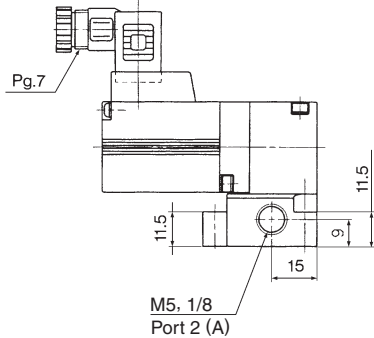
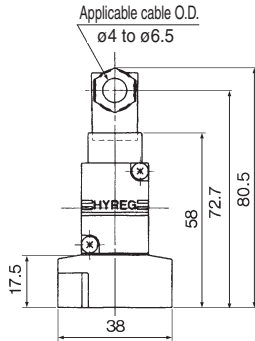
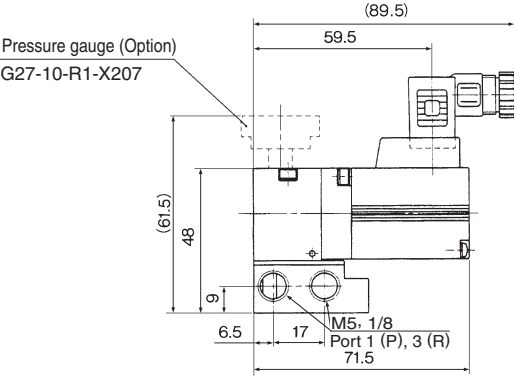
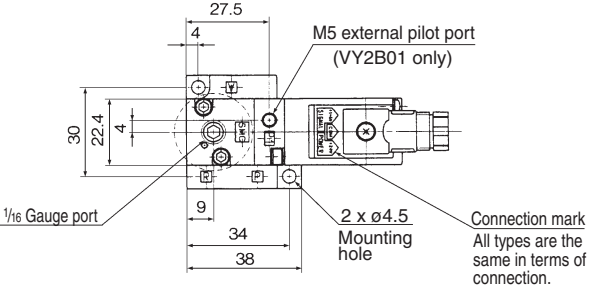
VY1D00



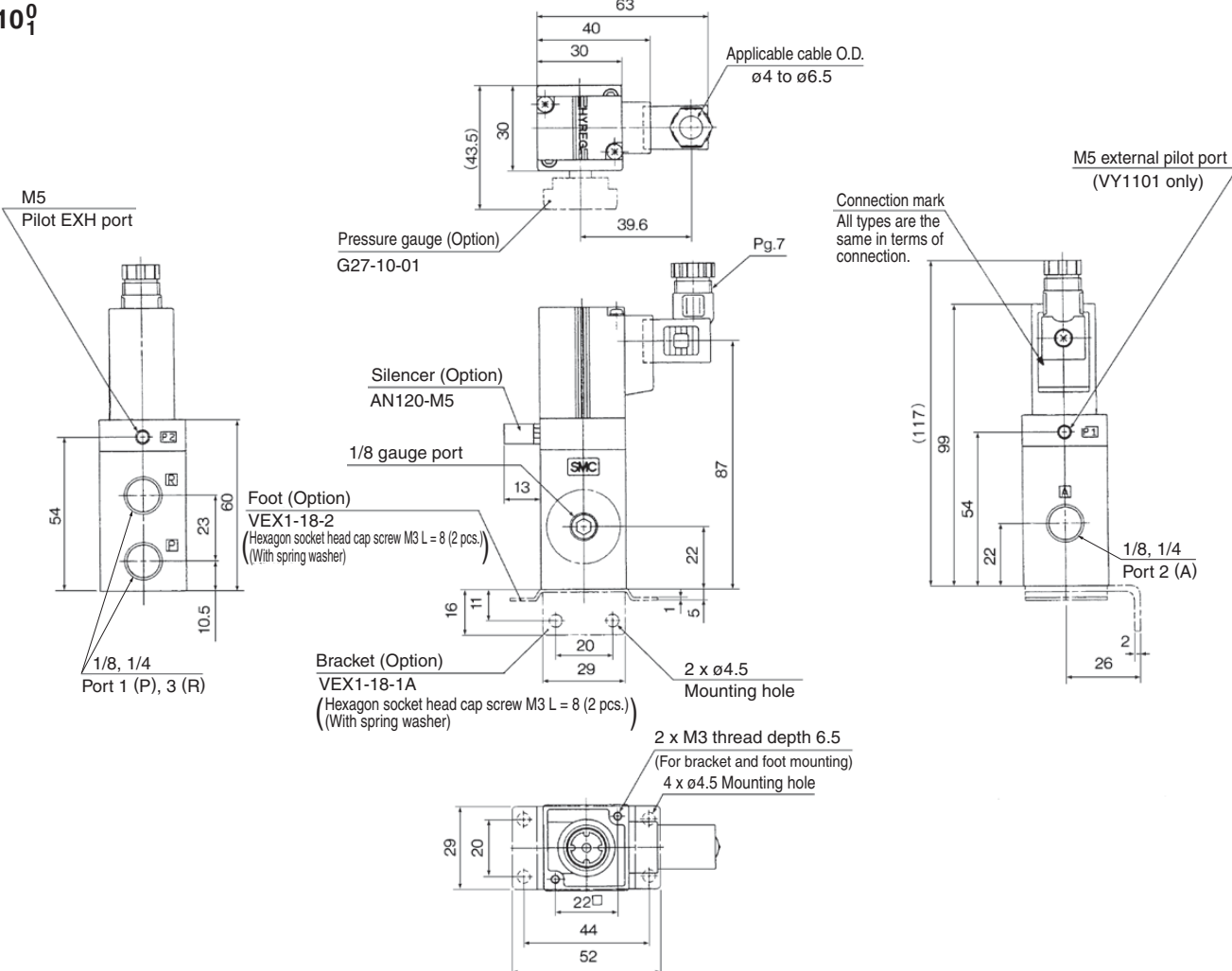
VY1A0₁



VY1B0₁



VY110₁

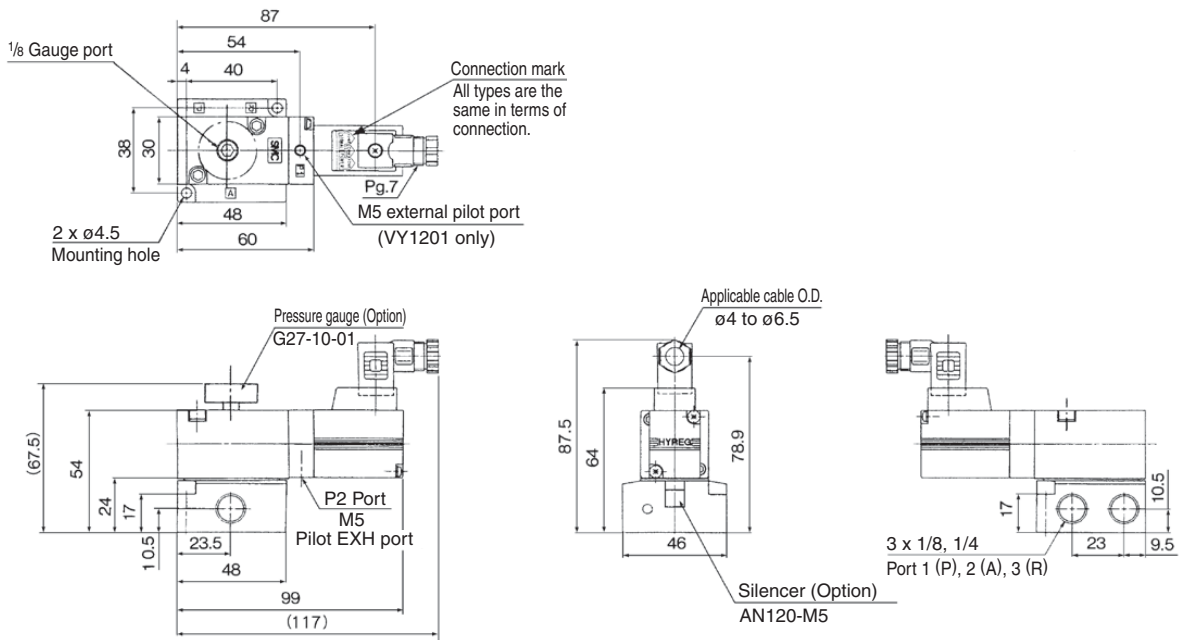


ARJ
AR425 to 935
ARX
AMR
ARM
ARP
IR□-A
IR
IRV
VEX
SRH
SRP
SRF
ITV
IC
ITVH
ITVX
PVQ
VY1
VBA
VBAT
AP100

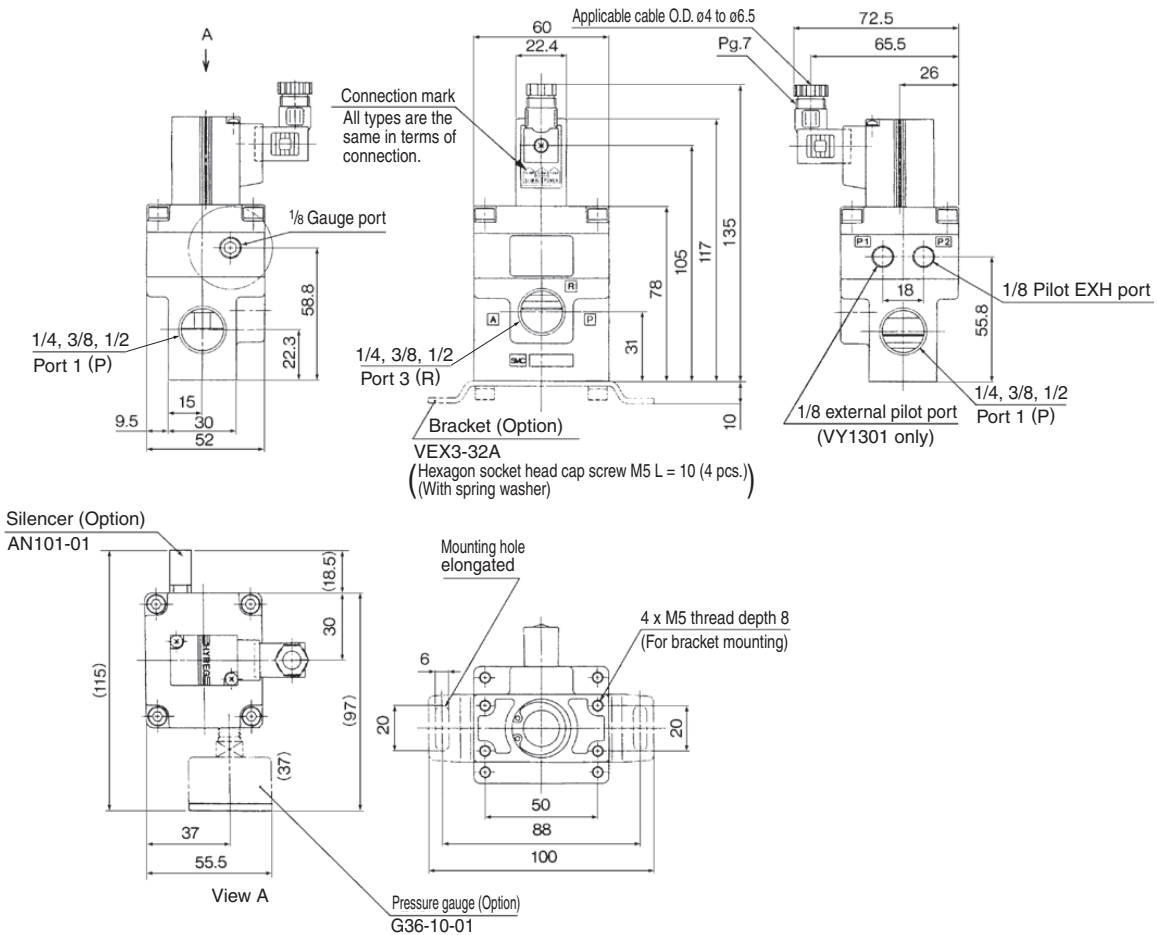
VY1 Series

Dimensions

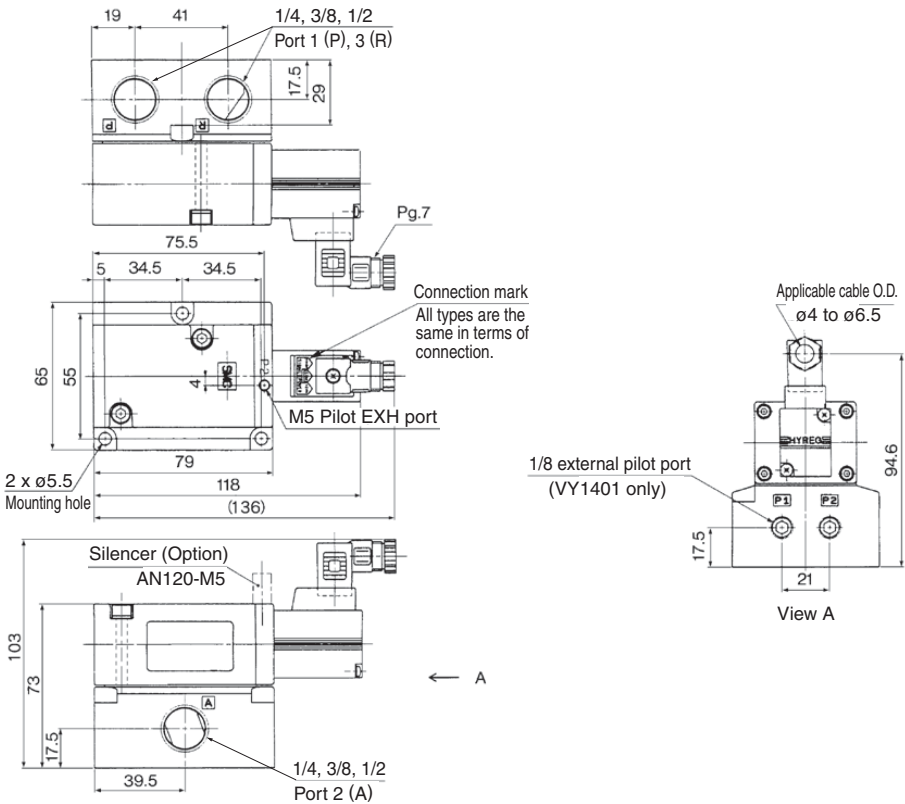
VY120₁



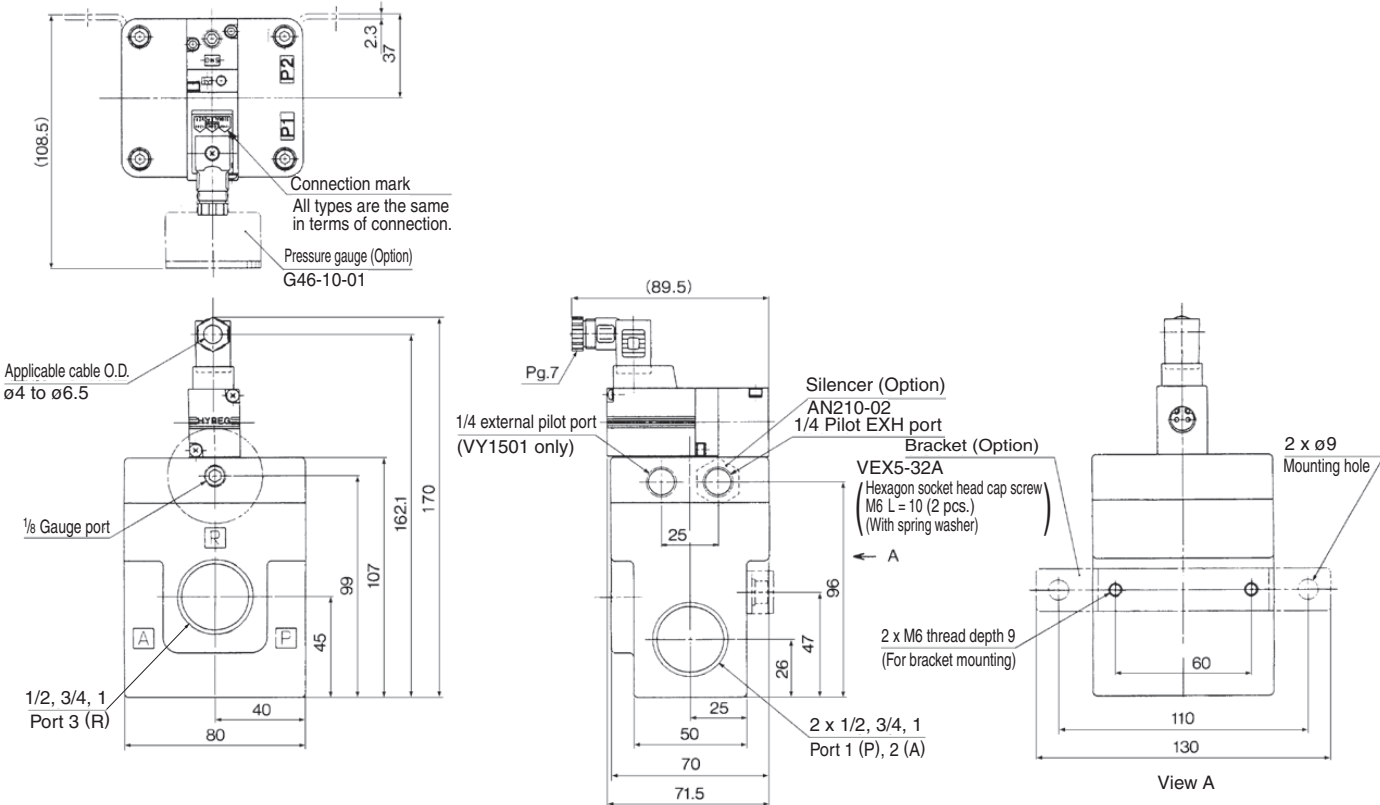
VY130₁



VY140₁



VY150₁

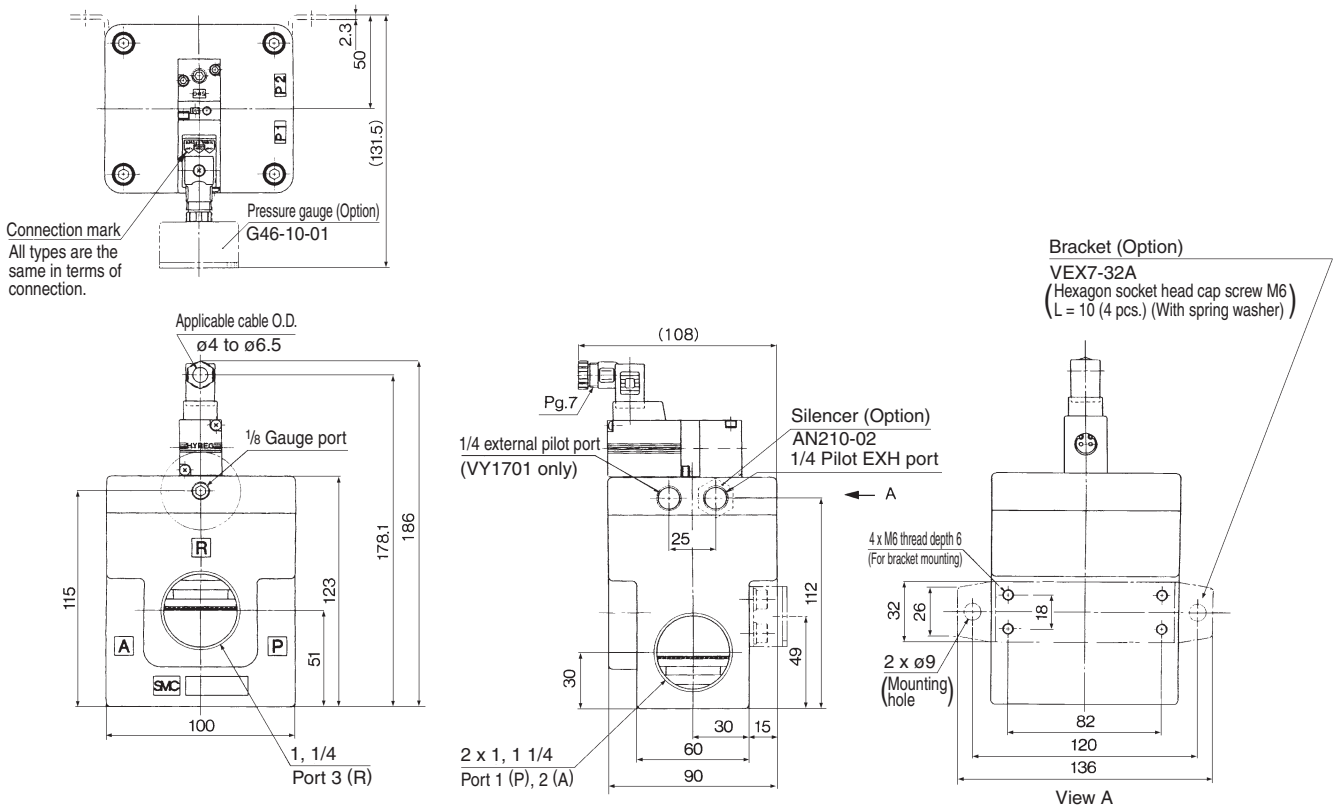


ARJ
AR425 to 935
ARX
AMR
ARM
ARP
IR□-A
IR
IRV
VEX
SRH
SRP
SRF
ITV
IC
ITVH
ITVX
PVQ
VY1
VBA
VBAT
AP100

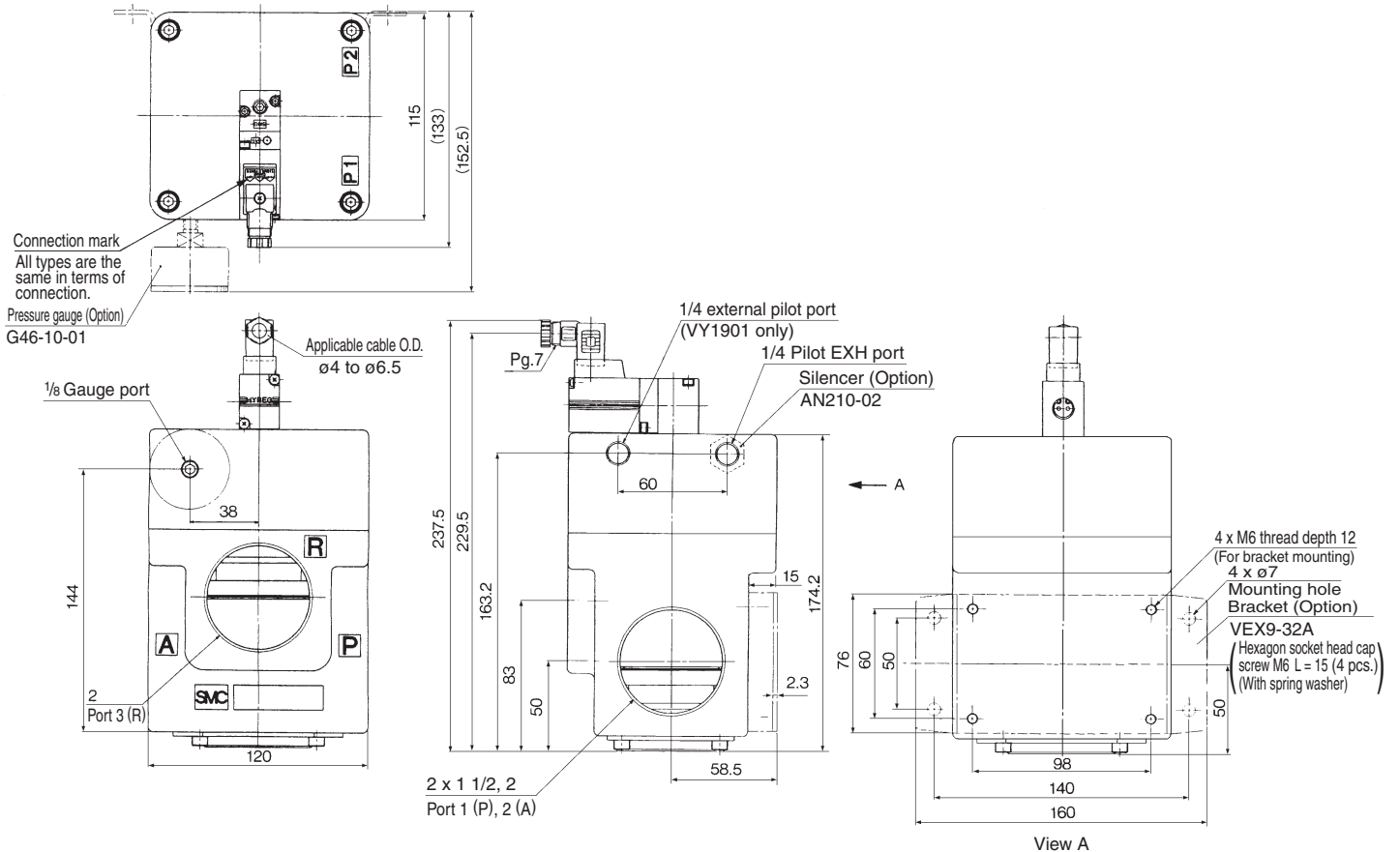
VY1 Series

Dimensions

VY170⁰₁

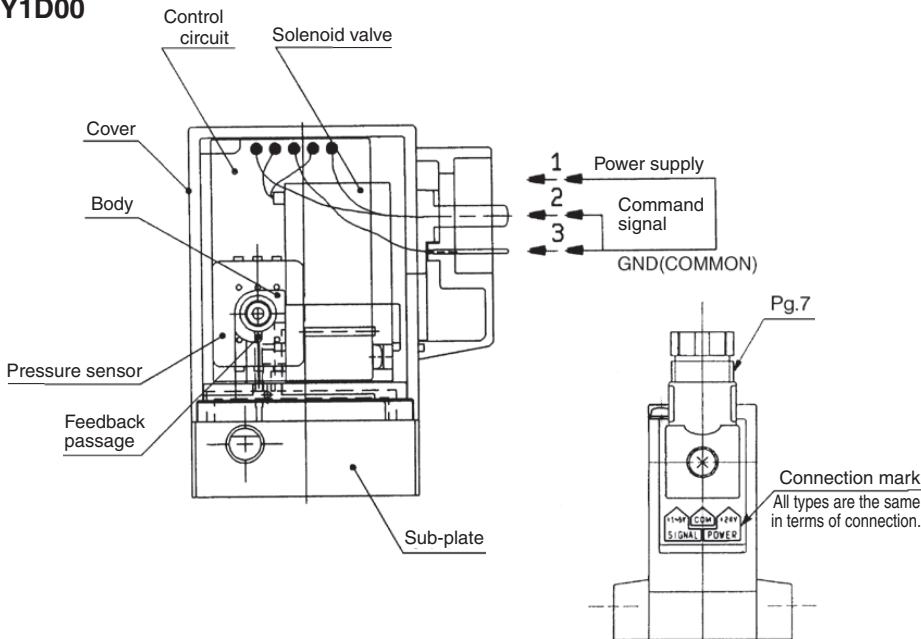


VY190⁰₁



Construction/Component Parts/Working Principle

VY1D00

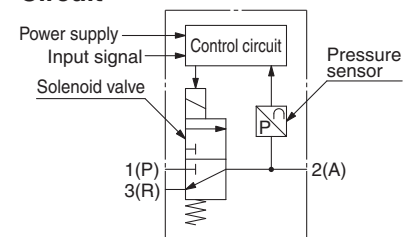


The VY1D00, which is the smallest direct drive, consists of a solenoid, pressure sensor, control circuit, body cover, and a sub-plate. The type with sub-plate can be used alone, and the type without sub-plate can also be used as a pilot valve.

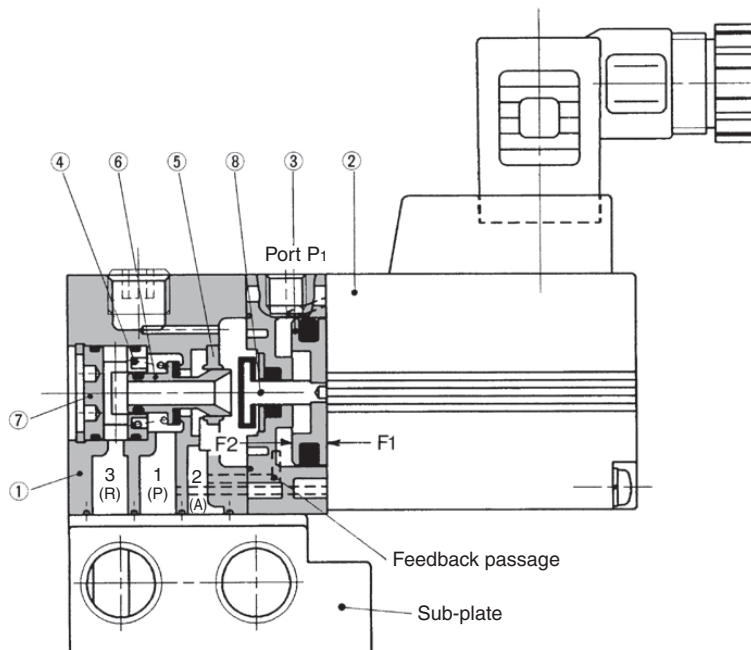
Working principle

- When the command signal is below 1 VDC, (refer to page 992) 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



VY1A0⁰, VY1B0⁰ (Pilot valve: VY1D00-□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: VY1D00-□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

ARJ

AR425
to 935

ARX

AMR

ARM

ARP

IR□-A

IR

IRV

VEX

SRH

SRP

SRF

ITV

IC

ITVH

ITVX

PVQ

VY1

VBA

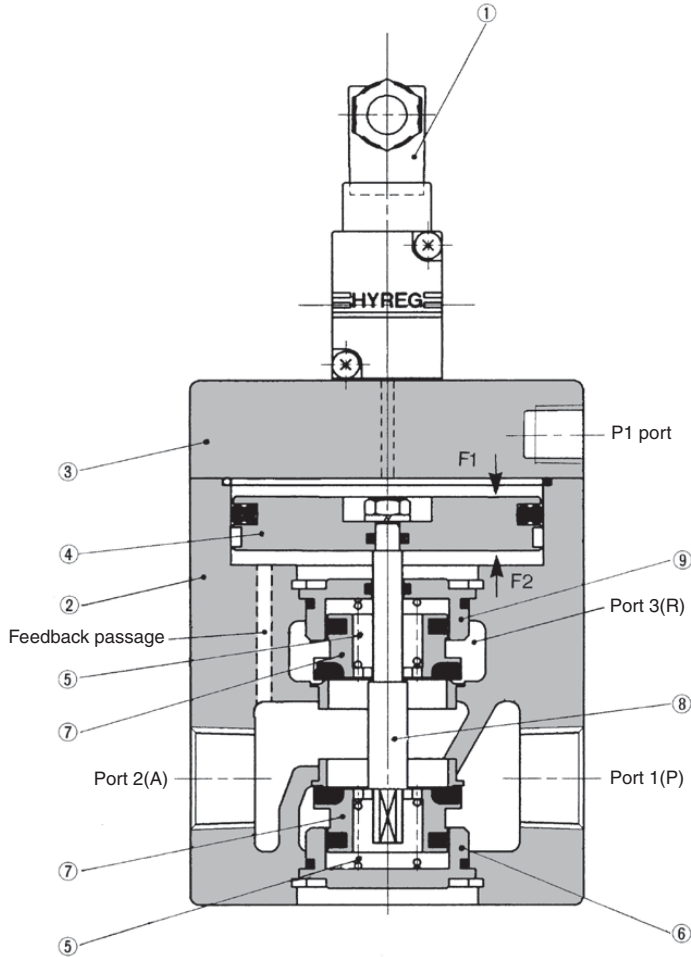
VBAT

AP100

VY1 Series

Construction/Component Parts/Working Principle

VY110₁⁰, VY120₁⁰, VY130₁⁰, VY140₁⁰ (Pilot valve: VY1D00-□00)
 VY150₁⁰, VY170₁⁰, VY190₁⁰ (Pilot valve: VY1B00-□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: VY1_B00-□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

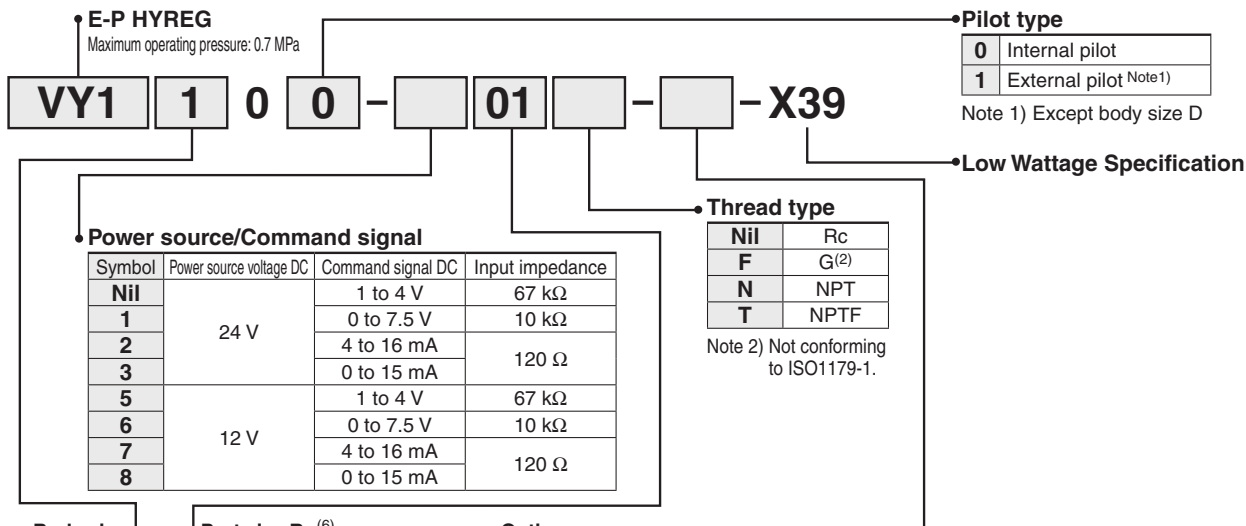
No.	Description	Material
1	Pilot valve assembly	—
2	Body	Aluminum alloy
3	Cover	Aluminum alloy
4	Adjusting piston	Aluminum alloy
5	Spring	Stainless steel
6	Valve guide	Aluminum alloy
7	Poppet valve	Aluminum alloy/Rubber
8	Shaft	Stainless steel
9	Valve guide	Aluminum alloy



1 Low Wattage Specification: 0.8 W or less Symbol -X39

Under operating conditions that the ON time, such as charging to the tank is long, the service life may be shortened due to the heat generation of the product. When the operating pressure is 0.7 MPa or less, it is recommended to use the special product “-X39” (Service life: Approx. 7000 operating hours) that is a type of low wattage and suppresses heat generation. Please note that the product characteristics are those with 0.7 MPa or less of the standard specifications.

How to Order



Mounting	Symbol	Symbol	Port 1(P), 2(A)	Port 3(R)	B (Bracket)	F (Foot)	G (Pressure gauge)	N (Silencer)	Applicable pilot valve ⁽⁴⁾
Base mounted	D	00	Without sub-plate		—	—	—	—	VY1D00- □00-X39 ⁽⁵⁾
		M5	M5		—	—	—	●	
	B	00	Without sub-plate		—	—	—	●	
		M5	M5		—	—	—	—	
		01	1/8		—	—	—	—	
	2	00	Without sub-plate		—	—	—	●	
		01	1/8		—	—	—	●	
		02	1/4		—	—	—	—	
		03	3/8		—	—	—	—	
	4	00	Without sub-plate		—	—	—	●	
		02	1/4		—	—	—	—	
		03	3/8		—	—	—	—	
04		1/2		—	—	—	—		
Body ported	A	M5	M5		● ⁽³⁾	● ⁽³⁾	—	—	VY1B00- □00-X39 ⁽⁵⁾
		01	1/8		● ⁽³⁾	● ⁽³⁾	●	●	
	1	02	1/4		—	—	●	●	
		03	3/8		●	—	●	●	
	3	04	1/2		—	—	—	—	
		05	5/8		—	—	—	—	
	5	06	3/4		●	—	●	●	
		10	1		—	—	—	—	
		12	1 1/4		—	—	—	—	
	7	14	1 1/2		●	—	●	●	
		20	2		—	—	—	—	
		25	2 1/2		—	—	—	—	

Note 3) Only bracket or foot may be mounted.

Note 4) 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 5) □ in the applicable pilot valve part number is designated for the power source/command signal.

Note 6) Face seal type One-touch fittings cannot be used.

Specifications (Specifications other than those below are the same as the standard type.)

Max. operating pressure ⁽⁷⁾	0.7 MPa
Regulating pressure range	0.05 to 0.66 MPa (Supply pressure 0.7 MPa)
External pilot pressure	Set pressure +0.04 MPa to 0.7 MPa
Command signal ⁽⁸⁾	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
Bleed air flow (Pilot EXH port)	When not operating: Zero, When operating: 7 L/min (ANR) (Supply pressure 0.7 MPa)

Note 7) The supply pressure must be under the maximum operating pressure.

If the supply pressure exceeds the maximum operating pressure, this may cause abnormal leakage from the pilot valve or abnormal set pressure to occur.

Note 8) 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 1006.