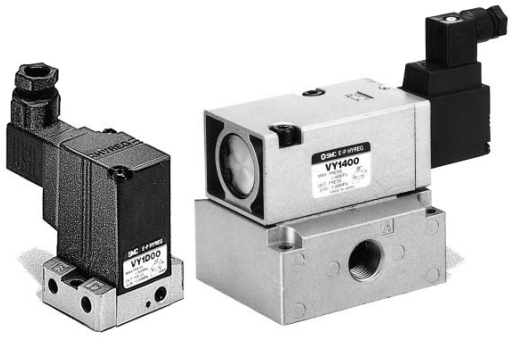
E-P HYREG®
Series VY1

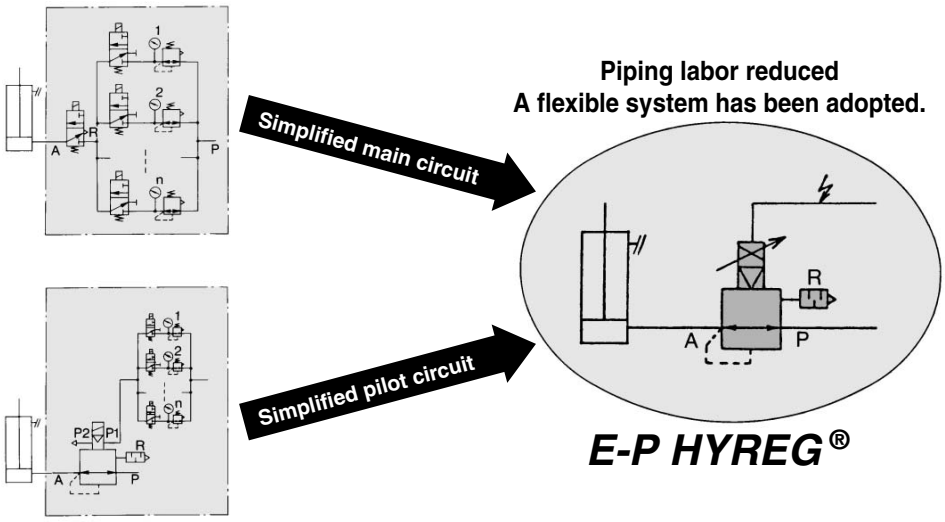
A hybrid regulator is created from a regulator and a solenoid valve



Stepless control through electric signals

A maximum effective area of 670 mm² (2B) can be covered by the combination of an ultra-compact electro-pneumatic pilot valve (22.4 x 30 x 39) and a 3 port, high-capacity exhaust main regulator (Series VEX1□00).

Simple circuit configuration



Ease of handling

Having the amplifier built into the electro-pneumatic pilot valve, only an external (24 VDC) power supply and (1 to 5 VDC) signal voltage need to be connected.

Manifold capable

Using the VVEXB2/4 series, a maximum 10 station manifold is possible.

Application example

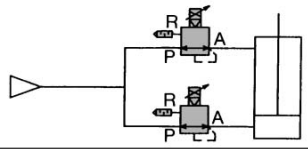
Capable of performing multistage pressure control and stepless pressure control by varying the electrical

Drive and Thrust Control

Cylinder behavior and pressurization control for peening and stamping

Example

Welding pressure control of spot welding gun cylinder (arranged for the 4 port type) Loading cylinder control

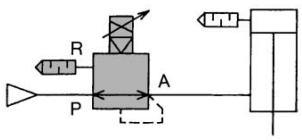


Cylinder Thrust Control

Tension control balancer

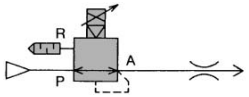
Example

Auto balancer



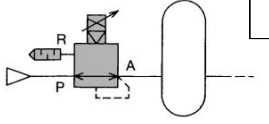
Air Flow Control of Nozzle *

Air blowing
Air cooling



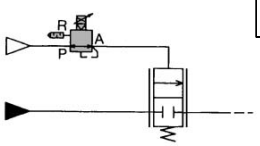
Pressure Control of Tank

Automatic adjustments



Flow Control of Various Fluids

For remote control of another air operated valve



* Please contact SMC.

How to Order

E-P HYREG®

Pilot type

0	Internal pilot
1	External pilot

VY1 1 0 0 — 01 — —

Power source/Command signal

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

Thread type

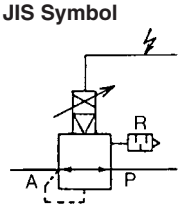
Nil	Rc
F	G
N	NPT
T	NPTF

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

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

Note) Only bracket or foot may be mounted.

JIS Symbol



Standard Specifications

Model		VY1D00-M5	VY1A0$^{0}_{1}$-M5	VY1B0$^{0\ M5}_{1\ 01}$		VY110$^{0\ 01}_{1\ 02}$		VY120$^{0\ 01}_{1\ 02}$		VY130$^{0\ 02\ 03\ 04}_{1}$			VY140$^{0\ 02\ 03\ 04}_{1}$			VY150$^{0\ 04\ 06\ 10}_{1}$			VY170$^{0\ 10}_{1\ 12}$		VY190$^{0\ 14}_{1\ 20}$	
Port size Rc	Port	M5	M5	M5	01	01	02	01	02	02	03	04	02	03	04	04	06	10	10	12	14	20
	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
	A																					
	R																		1 1/4		2	
Weight (kg) (1)		0.11	0.16	0.19		0.25		0.35		0.55			0.75			1.5			2		4	
Hysteresis (2)*		1% F.S.	2.5% F.S.										3% F.S.			5% F.S.						
Sensitivity *		0.5% F.S.	1% F.S.										1.5% F.S.			2% F.S.						
Repeatability *		± 0.5% F.S.	± 1% F.S.										± 1% F.S.			± 2% F.S.						
Response time *		10 ms	30 ms																			
Fluid		Air/Inert gas																				
Ambient and fluid temperature		0 to 50°C (With no condensation)																				
Maximum operating pressure		0.88 MPa																				
Regulating pressure range		0.05 MPa to supply pressure																				
External pilot pressure		— (Direct operated)	Set pressure to 0.88 MPa (VY1□01)																			
Command signal		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		When not operating: Zero, When operating: Max. 10 ℓ/min (ANR) (Supply pressure 0.88 MPa)																				
Installation		Universal																				
Lubrication		Not required (3)																				

Note 1) The weight of the base mounting type (D/B/2/4 size) with sub-plate is indicated.
Note 2) The property values with a "*" mark indicate max. values.
Note 3) To lubricate the outlet side of "VY", use "VY" as an external pilot. Avoid lubrication to the pilot air.

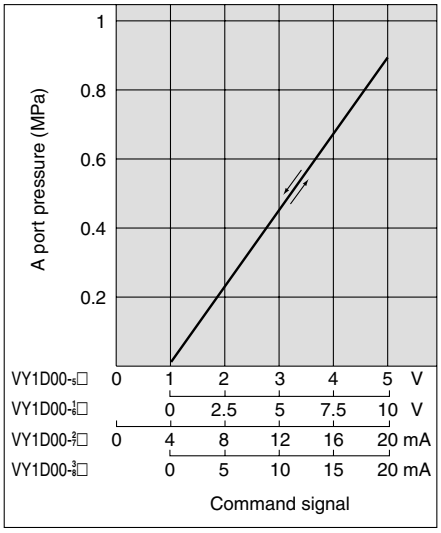
Option

Description		Part no.									
		VY1D00-M5	VY1A0$^{0}_{1}$-M5	VY1B0$^{0\ M5}_{1\ 01}$	VY110$^{0\ 01}_{1\ 02}$	VY120$^{0\ 01}_{1\ 02}$	VY130$^{0\ 02\ 03\ 04}_{1}$	VY140$^{0\ 02\ 03\ 04}_{1}$	VY150$^{0\ 04\ 06\ 10}_{1}$	VY170$^{0\ 10}_{1\ 12}$	VY190$^{0\ 14}_{1\ 20}$
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		

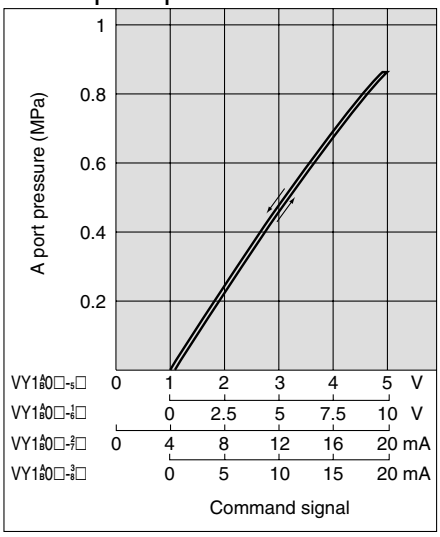
Characteristics

Signal—Outlet Pressure Characteristics (Characteristics of pressure setting)

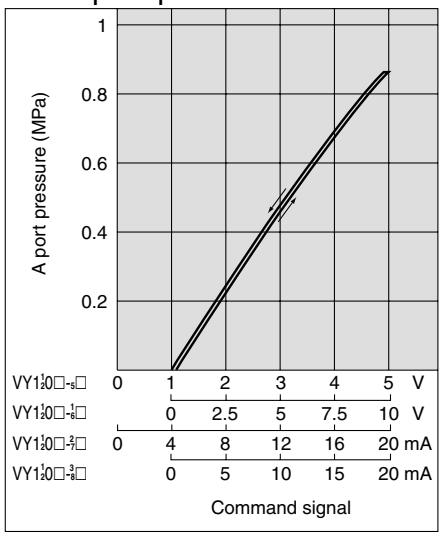
VY1D00



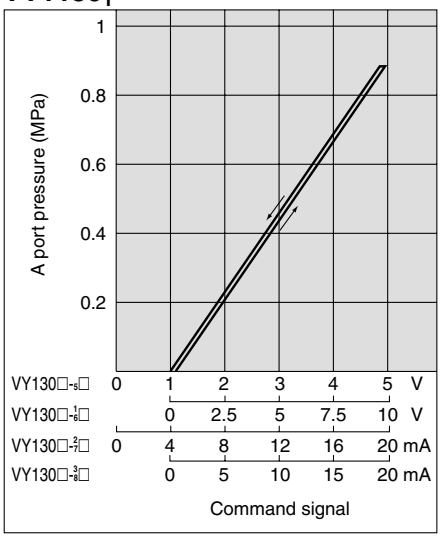
VY1A0$^{0}_{1}$/1B0$^{0}_{1}$



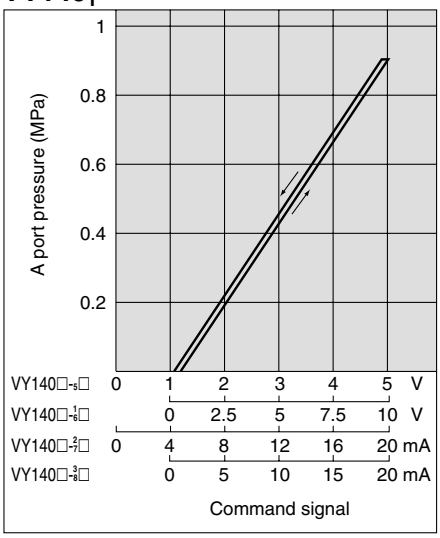
VY110$^{0}_{1}$/120$^{0}_{1}$



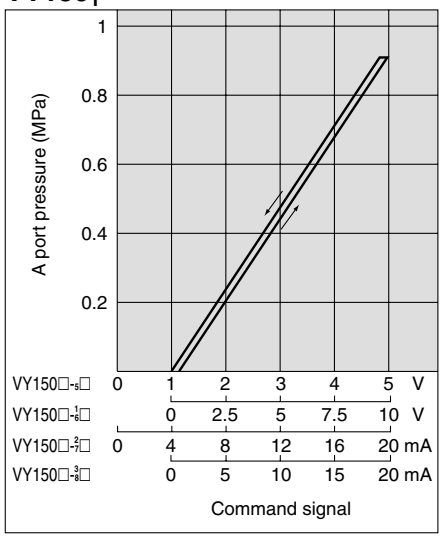
VY1130$^{0}_{1}$



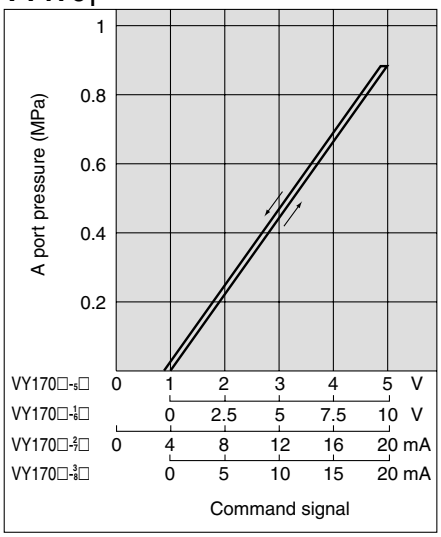
VY140$^{0}_{1}$



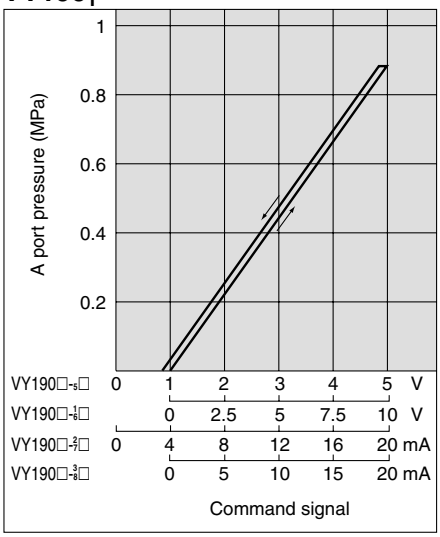
VY150$^{0}_{1}$



VY170$^{0}_{1}$



VY190$^{0}_{1}$



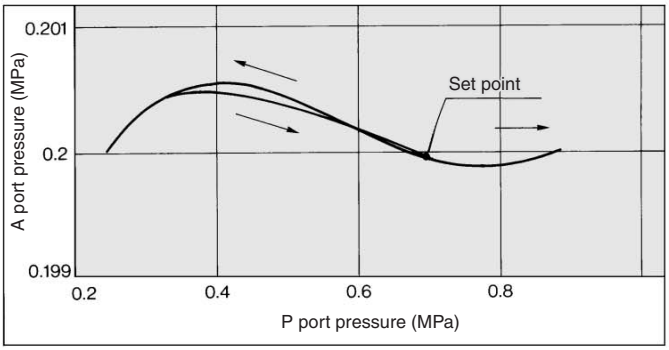
Input signal voltage (current) for starting the operation of a pilot valve VY1D0∗ (direct operated) (There is dispersion in the following range.)

Symbol **VY1D0∗–□∗∗**	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

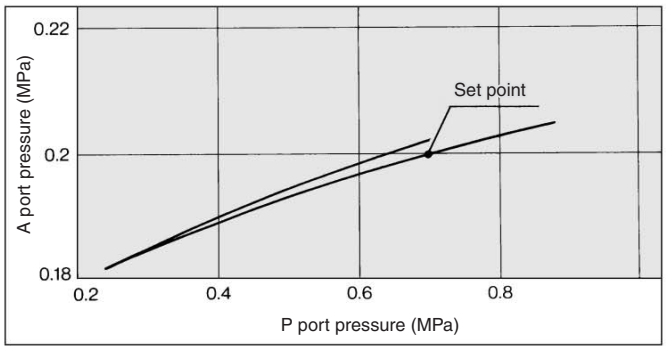
Note) Other body sizes add the dispersion on the above data when the main valve activates.

Pressure Characteristics

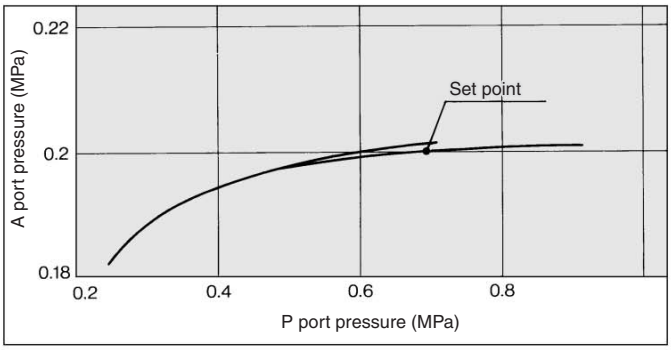
VY1D00



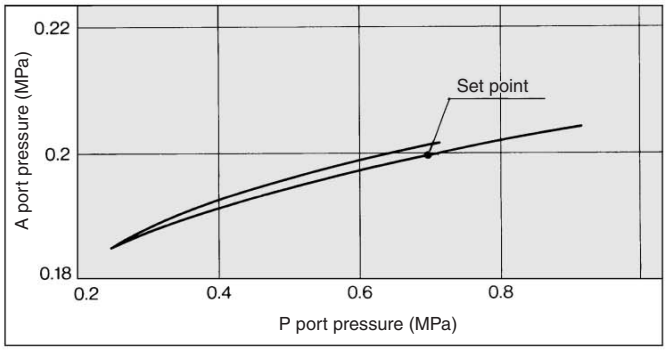
VY1A0$^{0}_{1}$/1B0$^{0}_{1}$



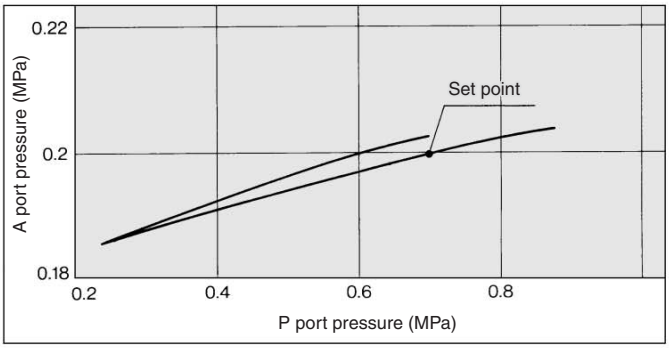
VY11$^{0}_{1}$/120$^{0}_{1}$



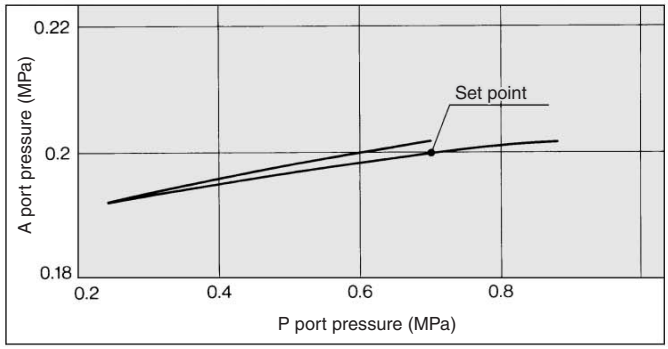
VY130$^{0}_{1}$



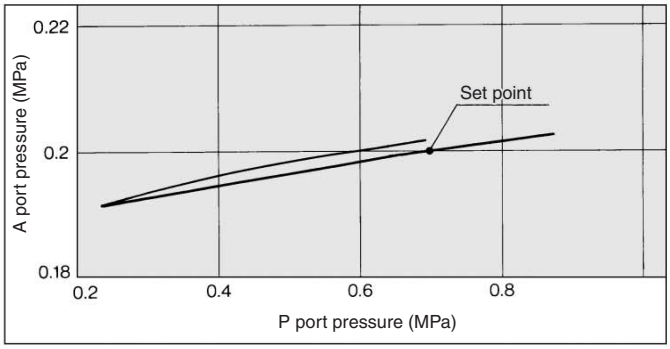
VY140$^{0}_{1}$



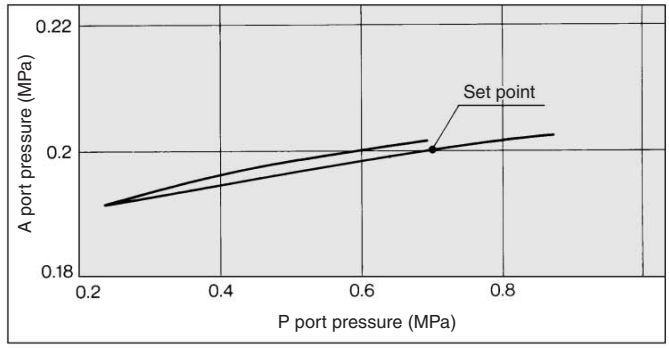
VY150$^{0}_{1}$



VY170$^{0}_{1}$



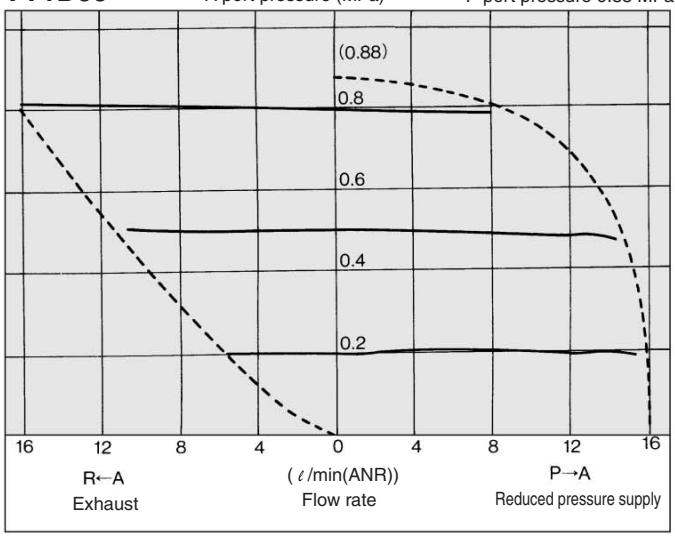
VY190$^{0}_{1}$



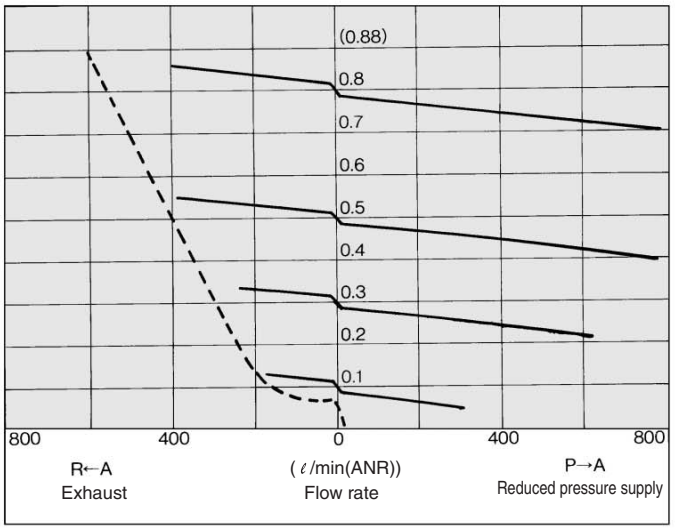
Characteristics

Flow Characteristics

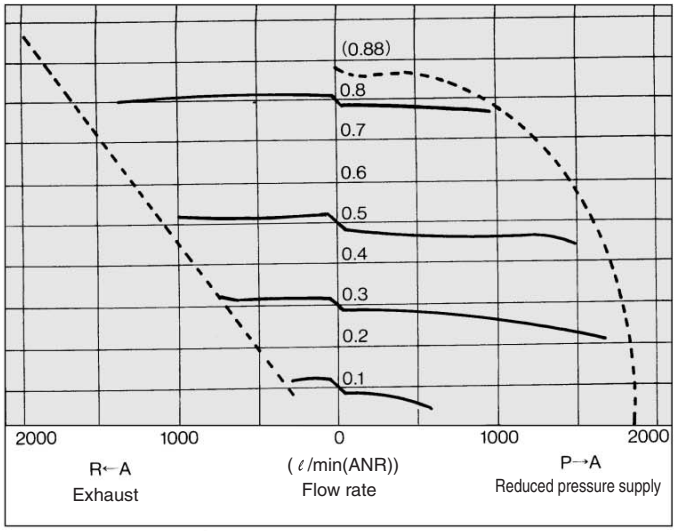
VY1D00 A port pressure (MPa) P port pressure 0.88 MPa



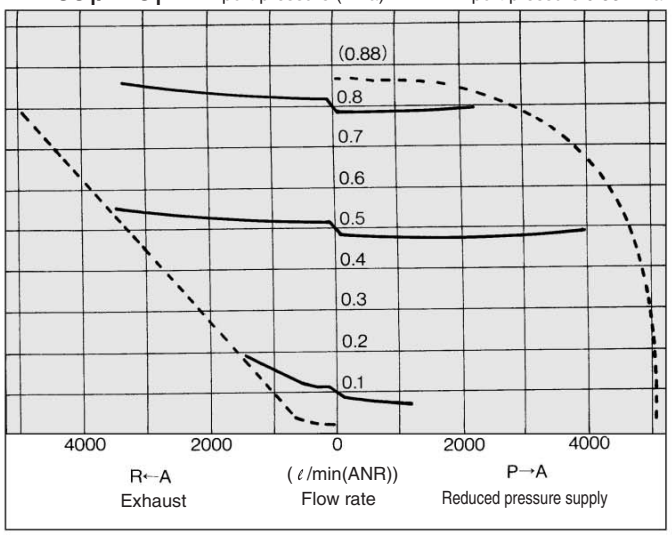
VY1A0$^{0}_{1}$/1B0$^{0}_{1}$ A port pressure (MPa) P port pressure 0.88 MPa



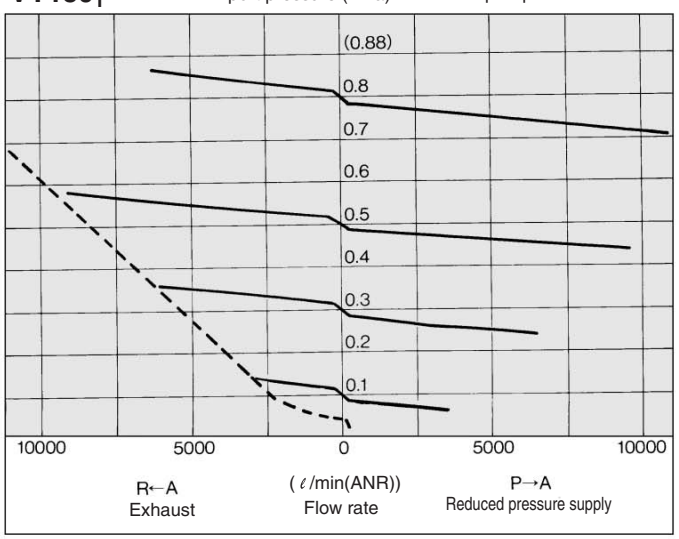
VY110$^{0}_{1}$/120$^{0}_{1}$ A port pressure (MPa) P port pressure 0.88 MPa



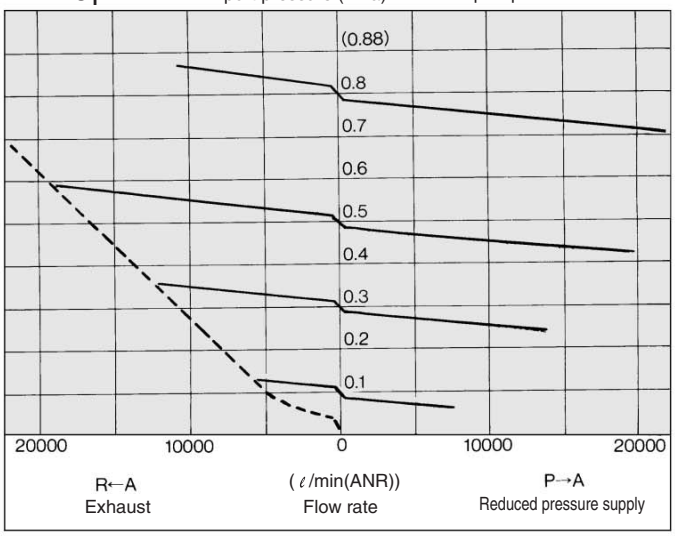
VY130$^{0}_{1}$/140$^{0}_{1}$ A port pressure (MPa) P port pressure 0.88 MPa



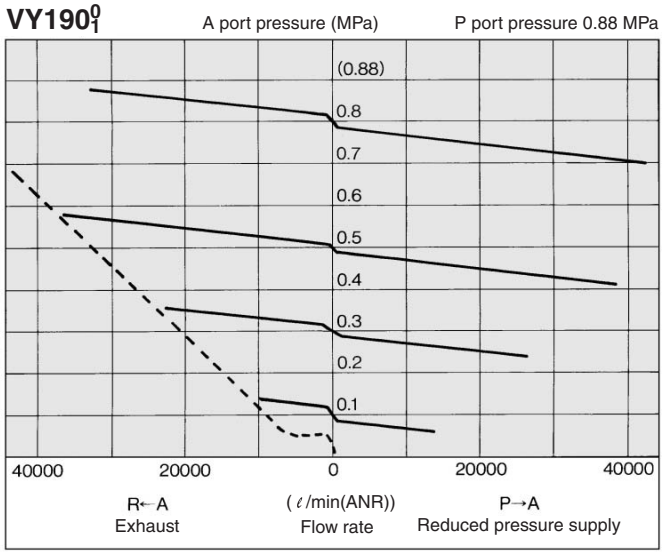
VY150$^{0}_{1}$ A port pressure (MPa) P port pressure 0.88 MPa



VY170$^{0}_{1}$ A port pressure (MPa) P port pressure 0.88 MPa

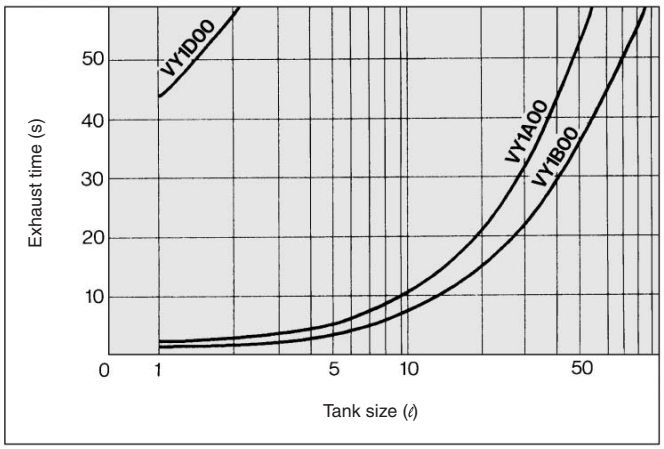


VY190$^{0}_{1}$

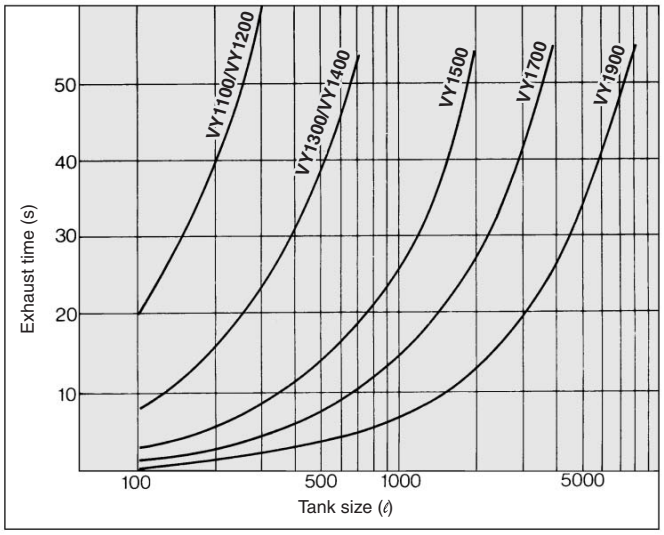


Exhaust Time

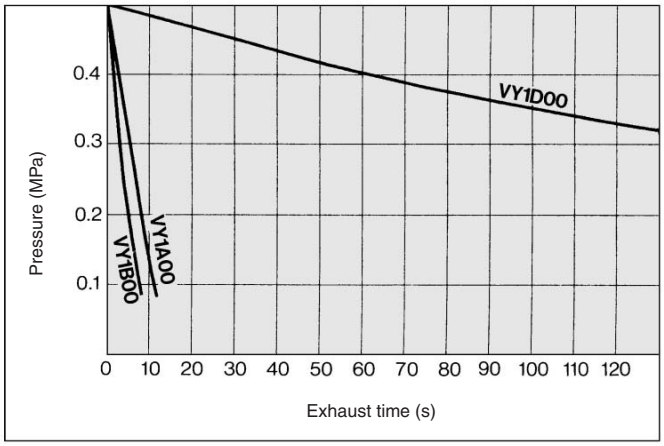
1.Exhaust Time from 0.5 MPa to 0.1 MPa



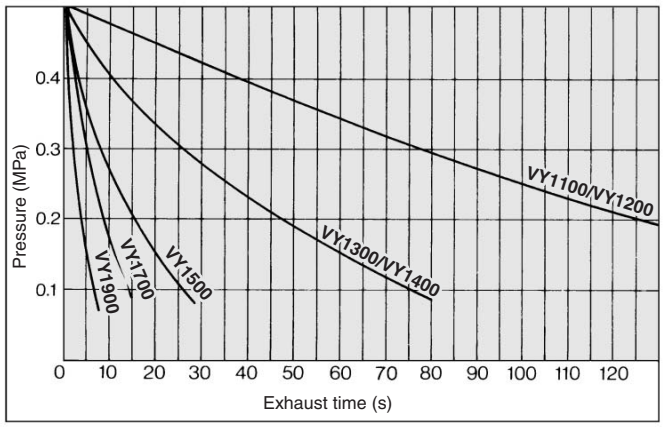
Exhaust Time from 0.5 MPa to 0.1 MPa



2.Exhaust Time from 10ℓ Tank



Exhaust Time from 1000ℓ Tank

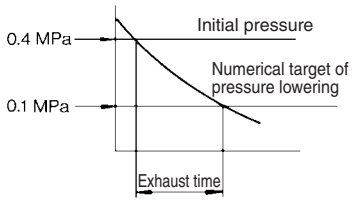


3. Exhaust time from optional pressure point

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 – 3 = 24 s.

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



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

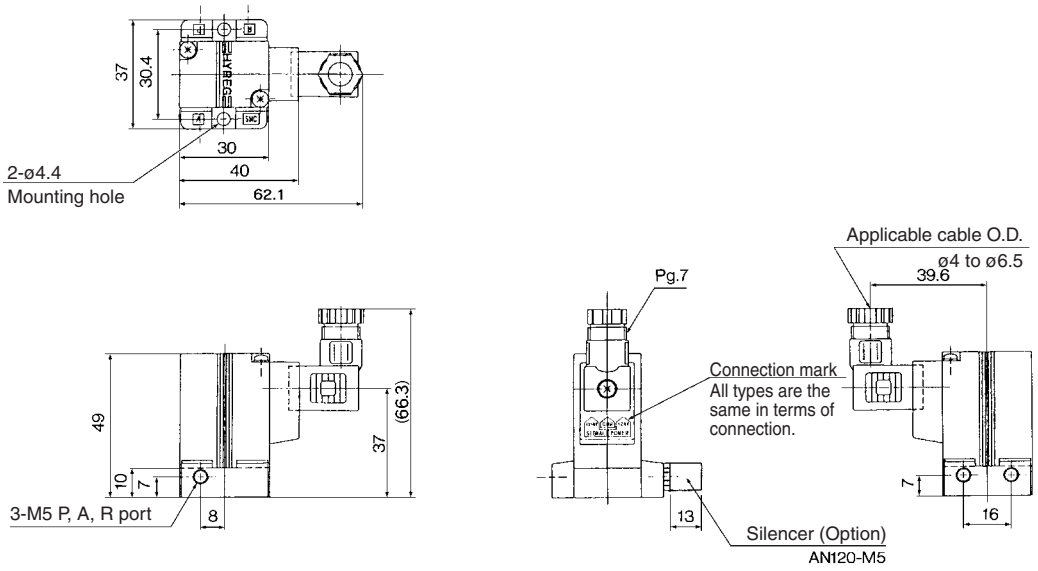
$$= \frac{500}{1000} \times 24$$

$$\cong 12$$

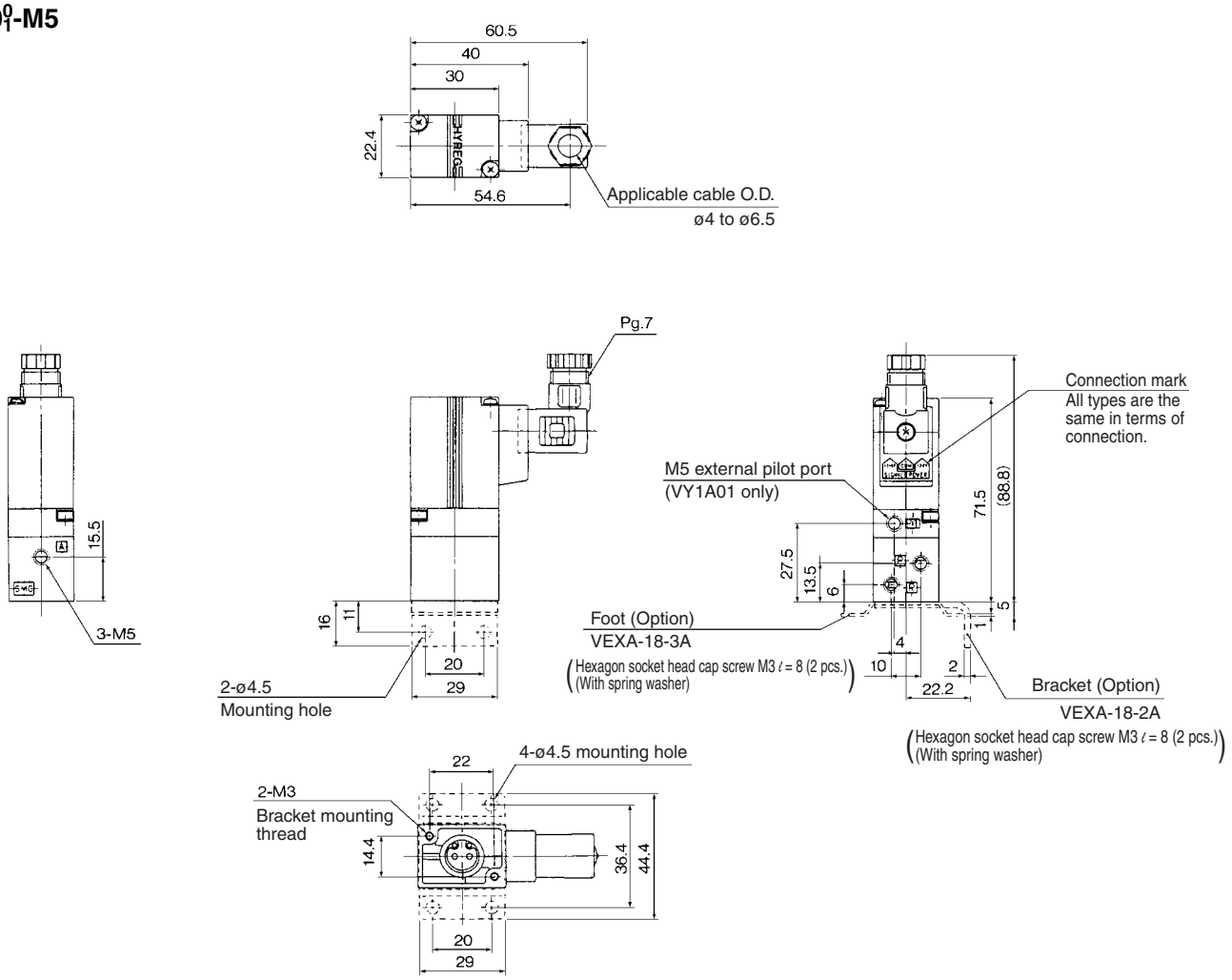
Then, the result is 12 s.

Dimensions

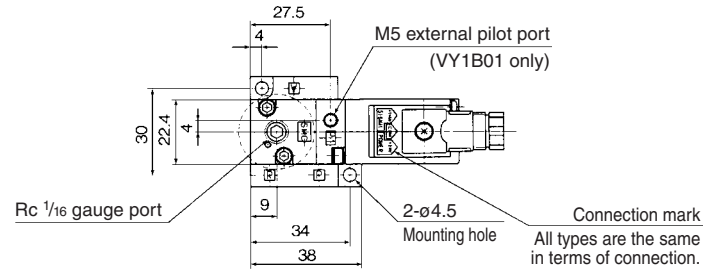
VY1D00-M5

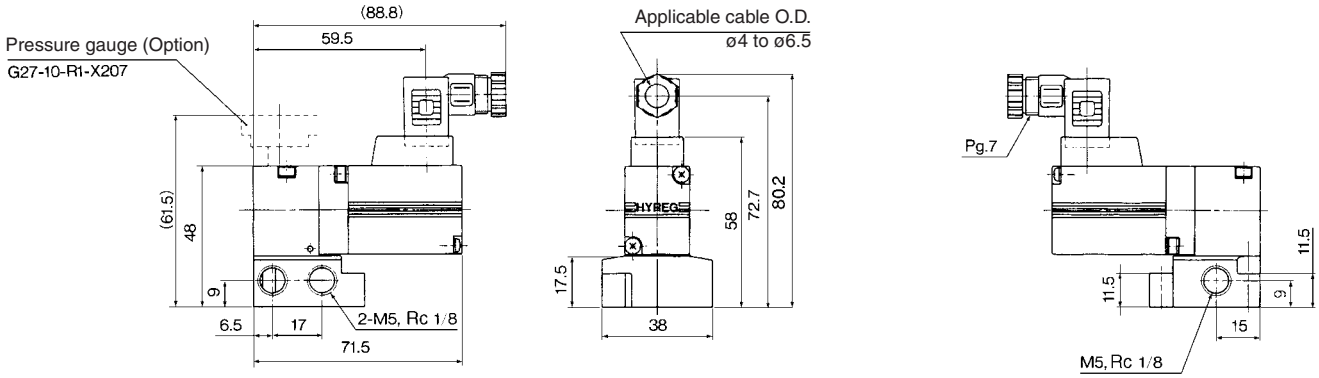


VY1A0⍰-M5

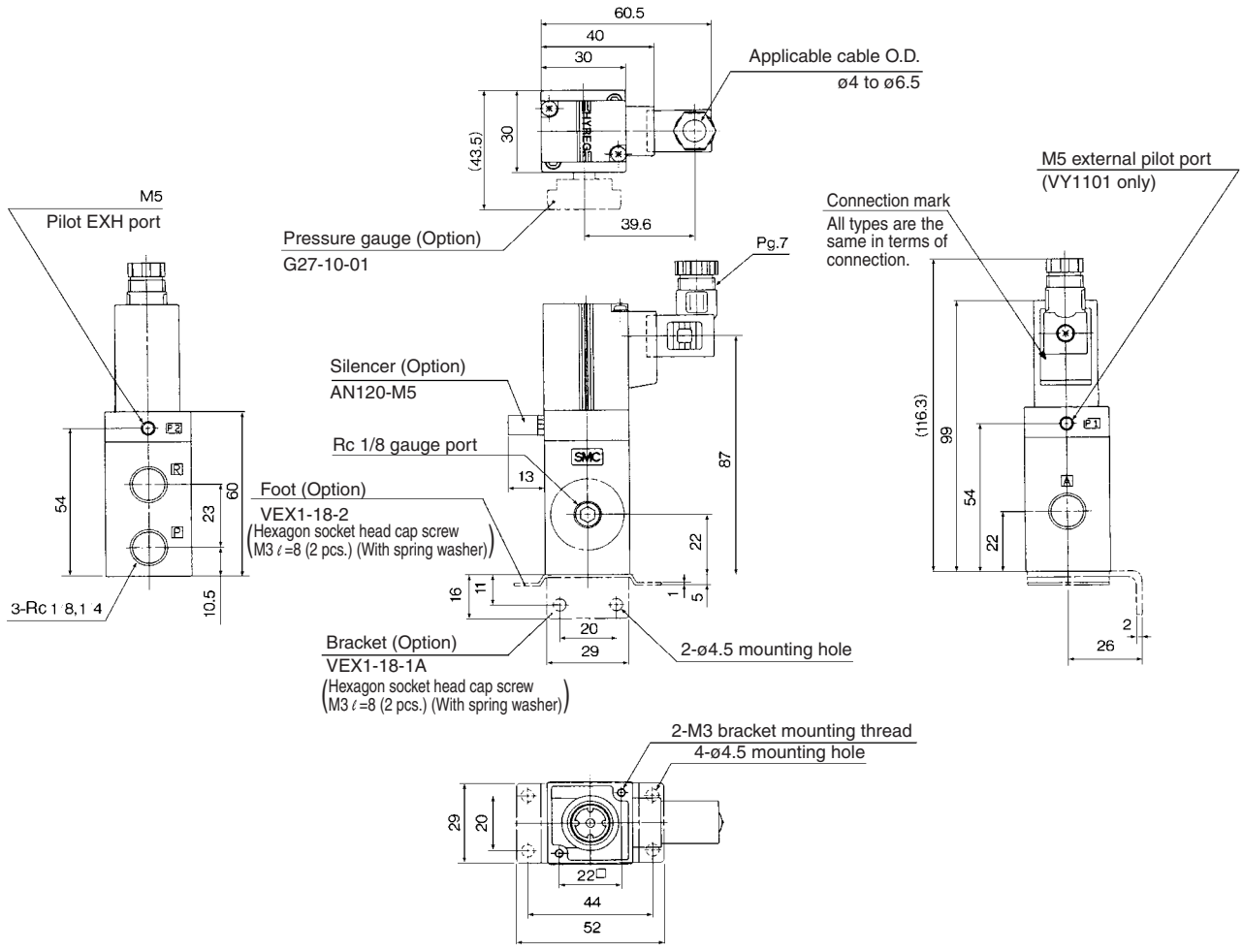


VY1B0$^{0}_{1}$-M5$^{}_{01}$



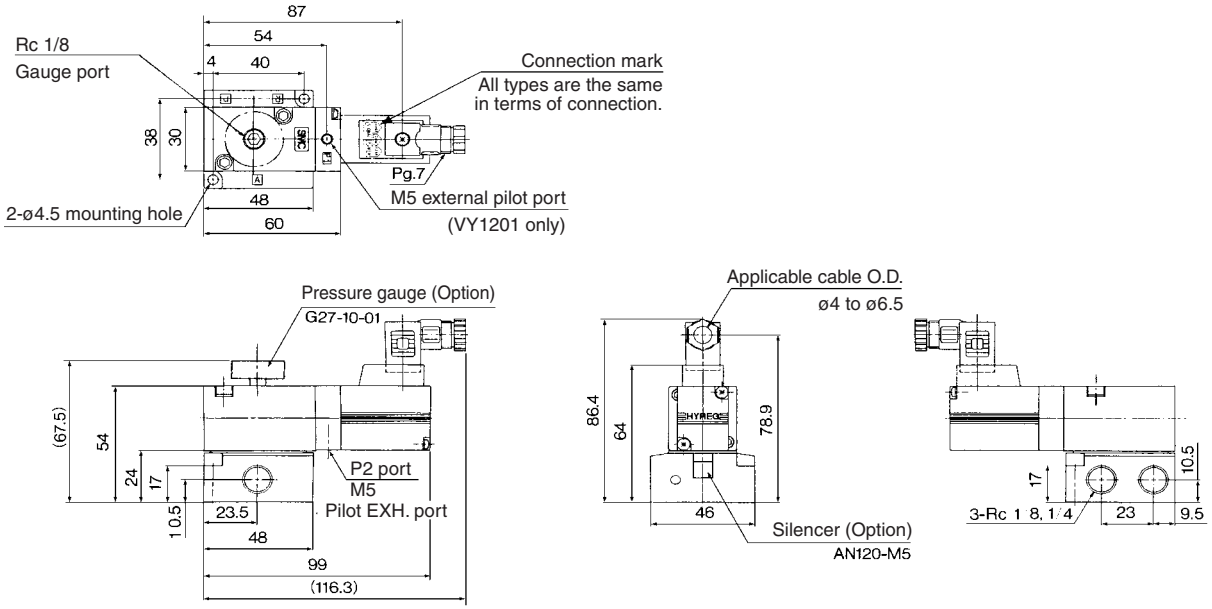


VY110$^{0}_{1}$-01$^{}_{02}$

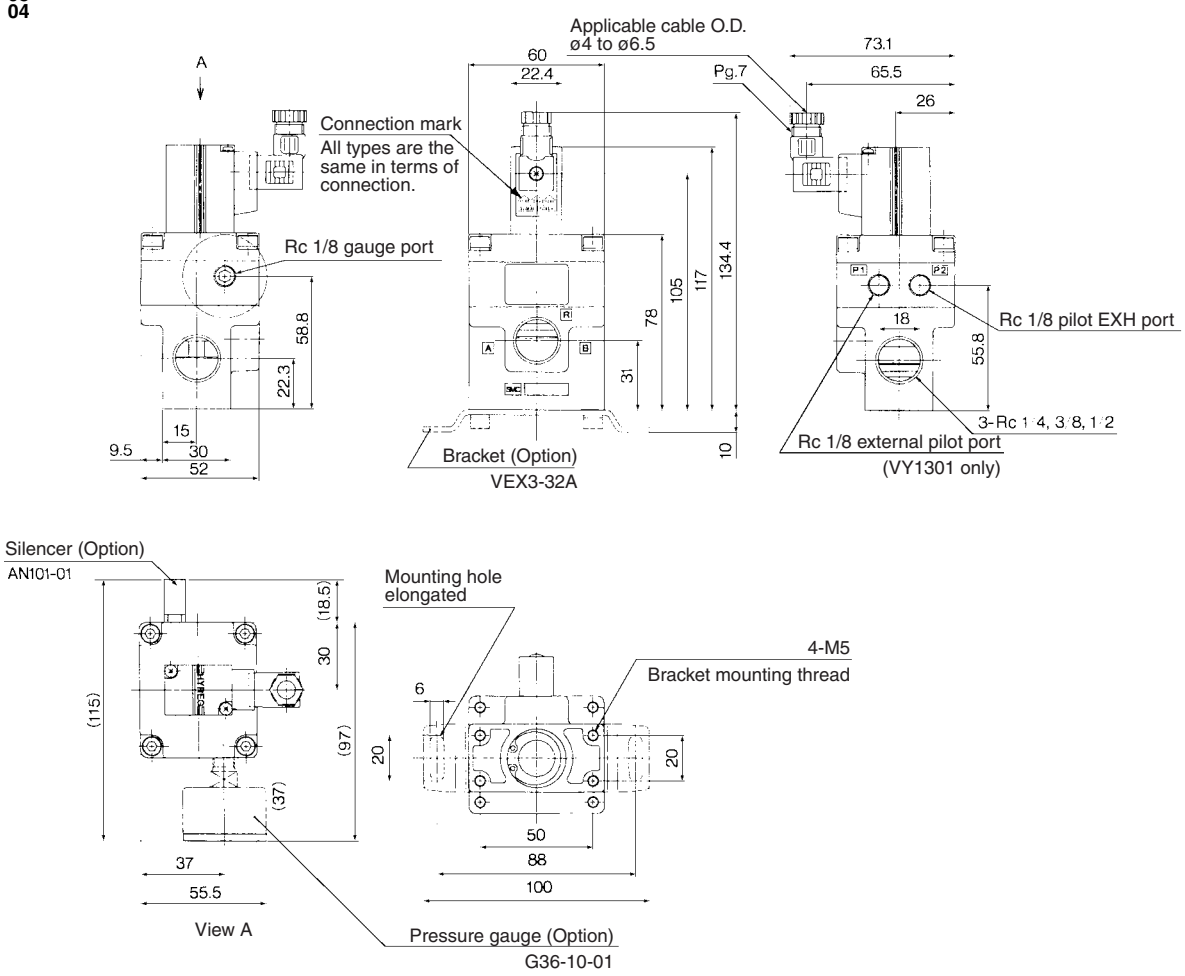


Dimensions

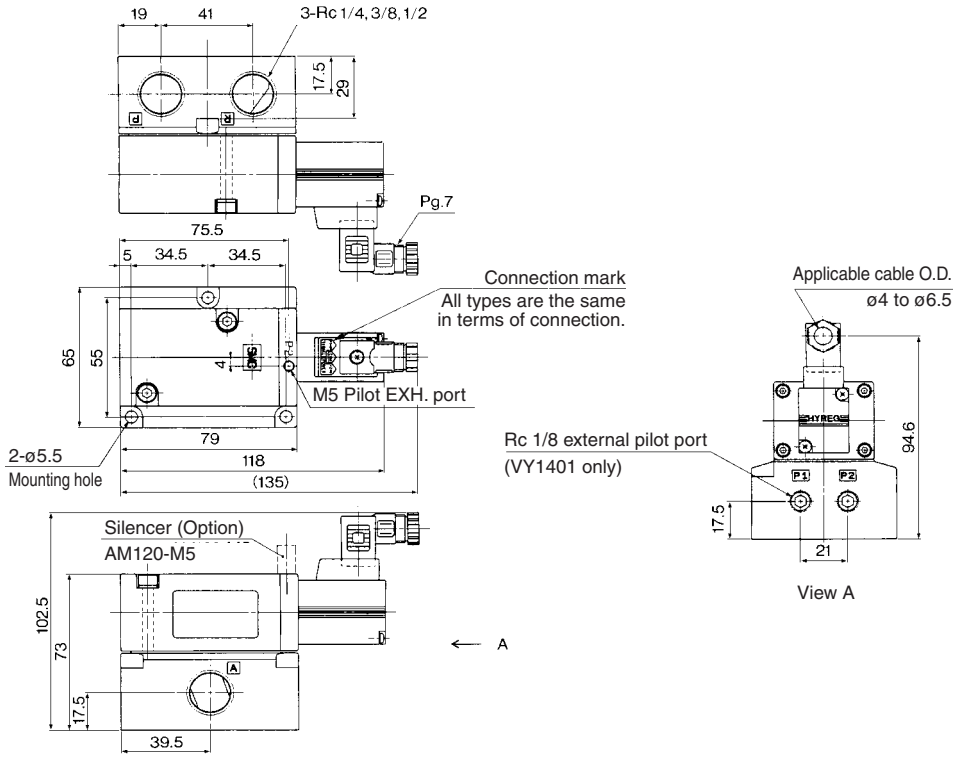
VY120$^{0}_{1}$-$^{01}_{02}$



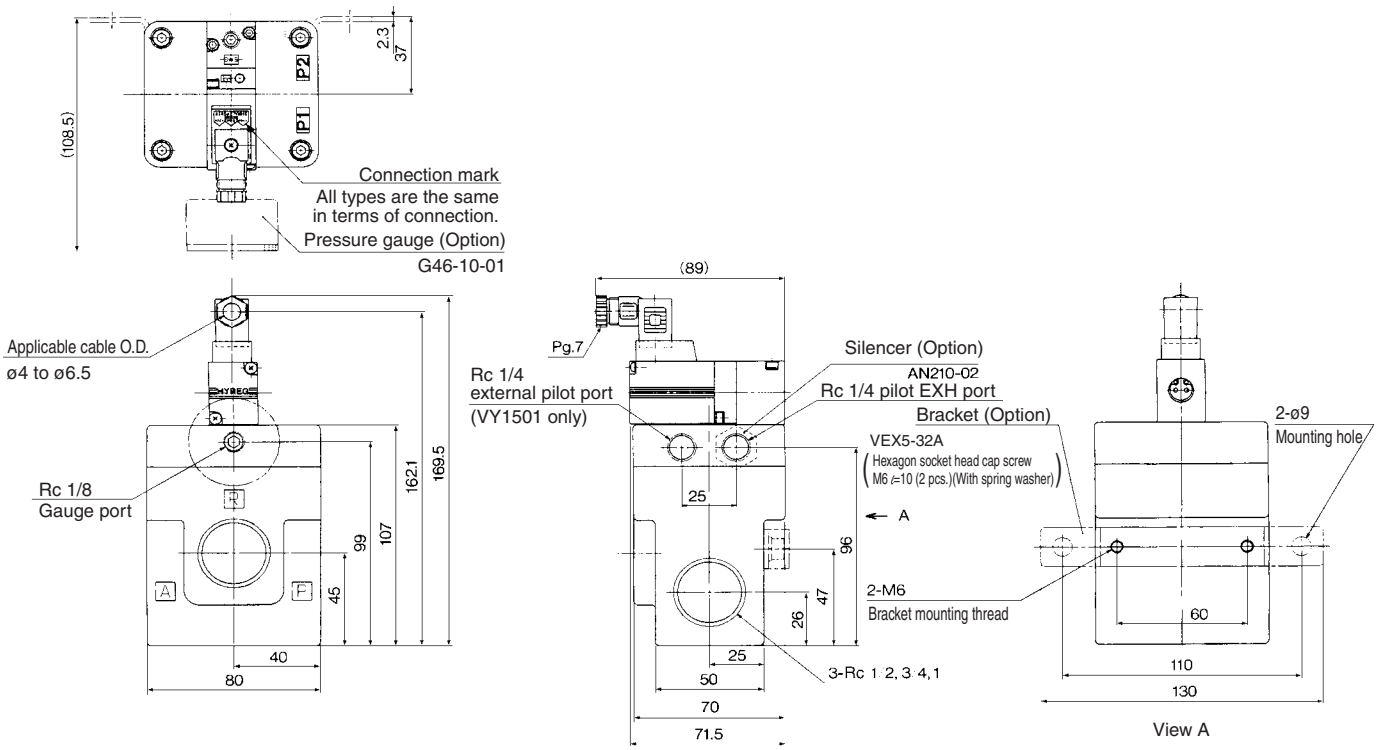
VY130$^{0}_{1}$-$^{02}_{03}$ $^{}_{04}$



VY140$^{0}_{1}$-$^{02}_{03}_{04}$

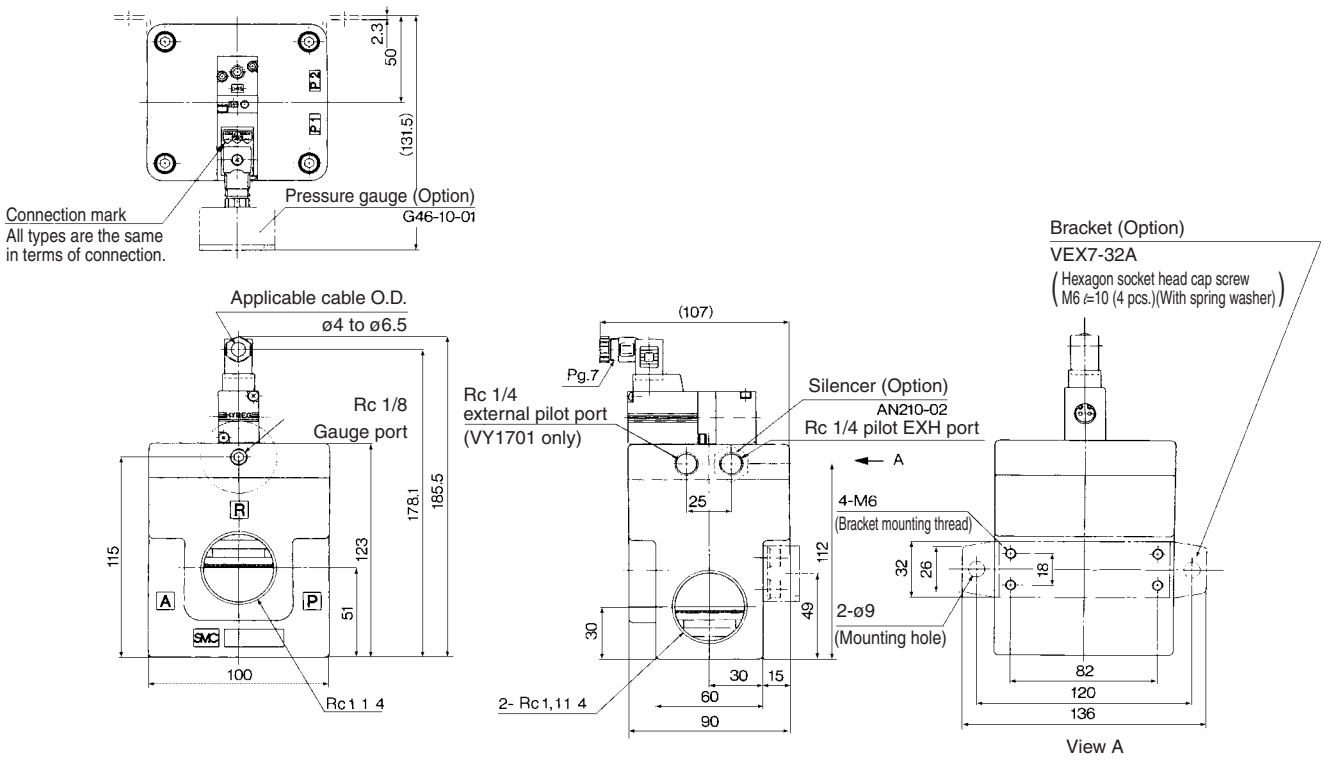


VY150$^{0}_{1}$-$^{04}_{06}_{10}$

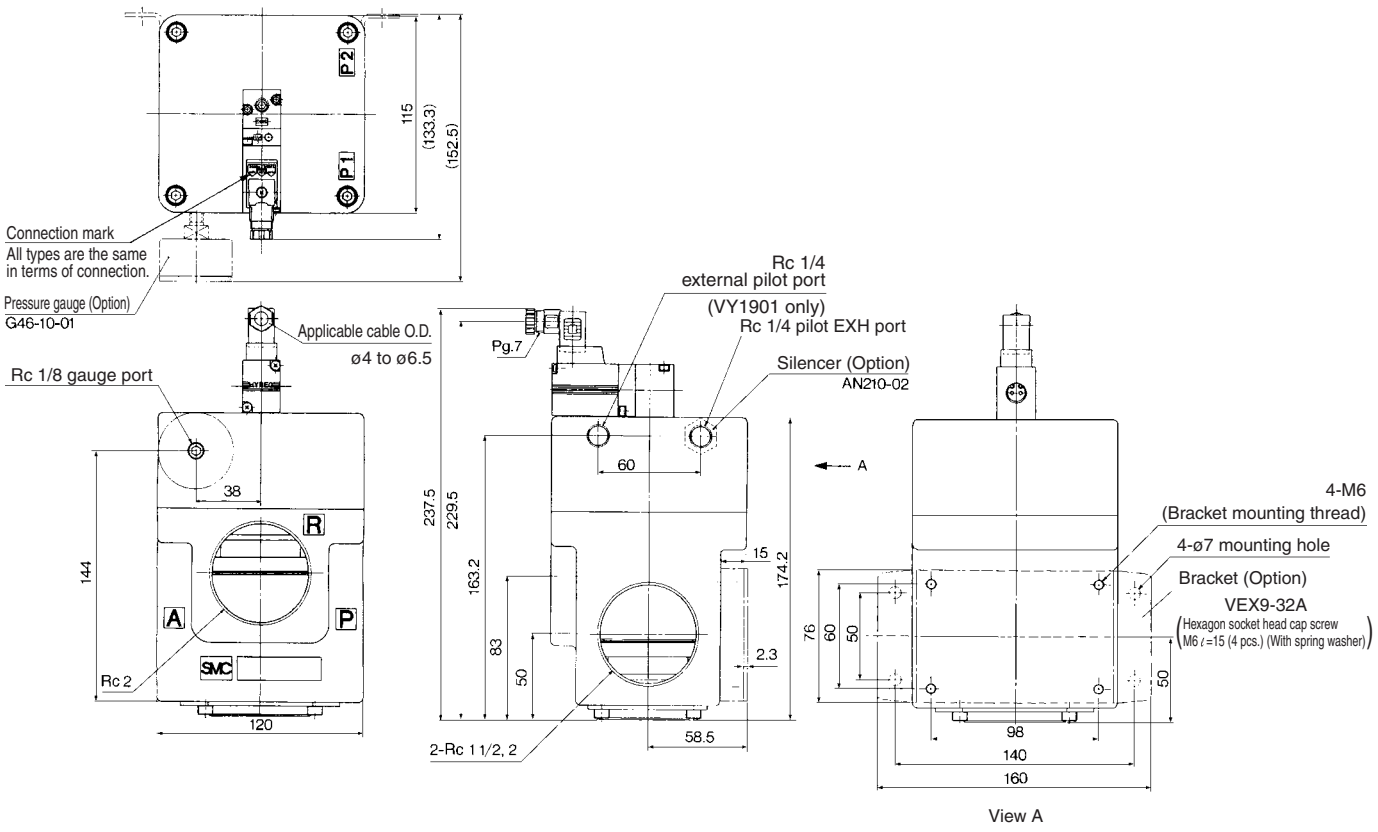


Dimensions

VY170$^{0}_{1}$-$^{10}_{12}$



VY190$^{0}_{1}$-$^{14}_{20}$



⚠Precautions

Be sure to read before handling. Refer to pages 14-21-3 to 14-21-4 for Safety Instructions and Common Precautions.

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 ≅ 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
Rc 1	36 to 38
Rc 1 1/4	40 to 42
Rc 1 1/2	48 to 50
Rc 2	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 page 14-14-2.

Pressure Gauge

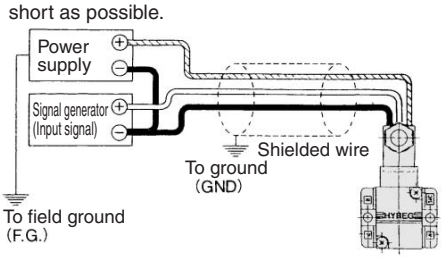
⚠Caution

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 killler on the 100 V power supply or signal source line. The length of the power suply and signal lines must be kept as short as possible.

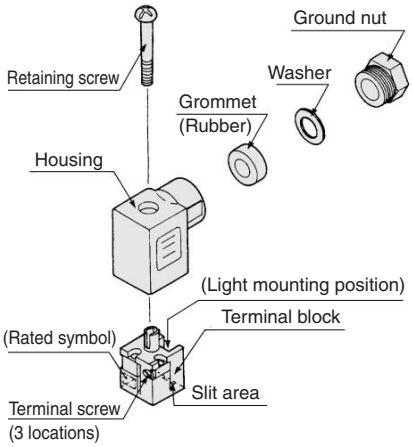


Terminal no.	Details of wire connection
1	Power supply
2	Input signal
3	GND (COMMOM)

How to Use DIN Terminal

⚠Caution

- **Wiring procedures**
  1. Loosen the retaining screw and pull the connector from the solenoid valve terminal block.
  2. 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.
  3. 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.
  4. 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 cord outlet.
- **Precautions**
  Kindly insert the connector straight in without tilting it, and pull it out straight.
- **Applicable wire**
  Cord external diameter: ø4 to ø6.5 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 page 14-10-7.) If input signal out of operation is exceeding the lower limit of operation start voltage (current), the solenoid valve inside pilot valve starts to activate and may turn to the operation state. Life expectancy of this product is dependant upon the operating time of the solenoid valve inside the pilot valve. Take precautions not to leave in operation state when out of operation.

Service Life

⚠Caution

Reference time of the service life for the pilot valve part is approximately 4000 to 5000 hours. (when using AF + AFM) Under ultra dried air (dew point –40°C equivalent), the life expectancy may shorten to approximately 3000 hours.

Related Products:

Silencer (Series AN)

- Noise reducing effect: 30 dB or more.
- Large effective area

Model	Connection R	Effective area (mm²)
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 Vol. 5.

Exhaust cleaner (Series AMC)

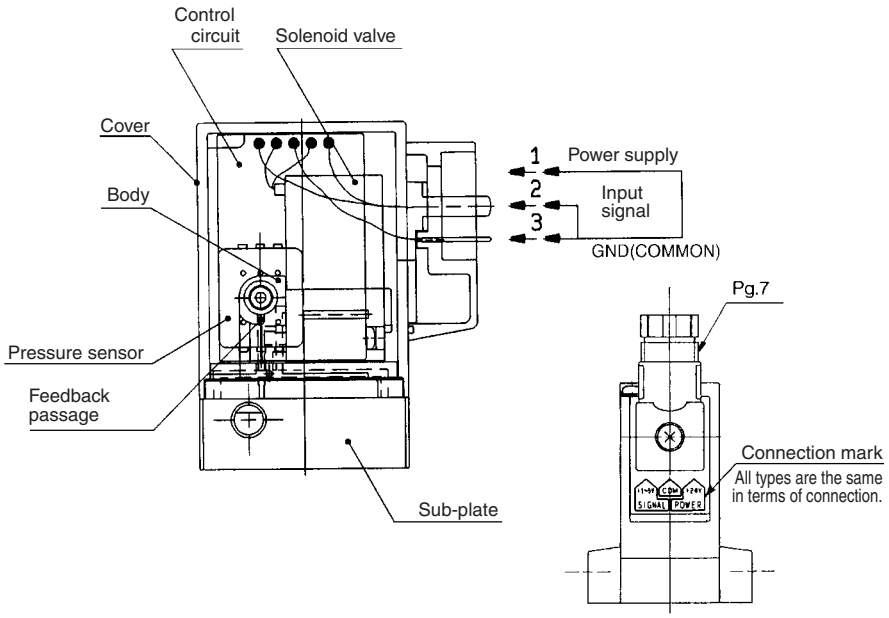
- Provides noise reduction and oil mist collecting functions.
- Can also be used in a common piping system.

Model	Connection R	Effective area (mm²)	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 Vol. 5.

Construction/Working Principle

VY1D00-M5



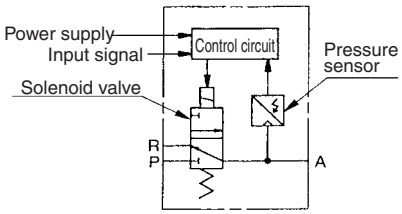
The VY1D00, which is the smallest direct drive, consists of a solenoid, pressure sensor, control circuit, body cover, and a sub plate. The type with sub-plate can be used alone, and the type without sub-plate can also be used as a pilot valve.

Working principle

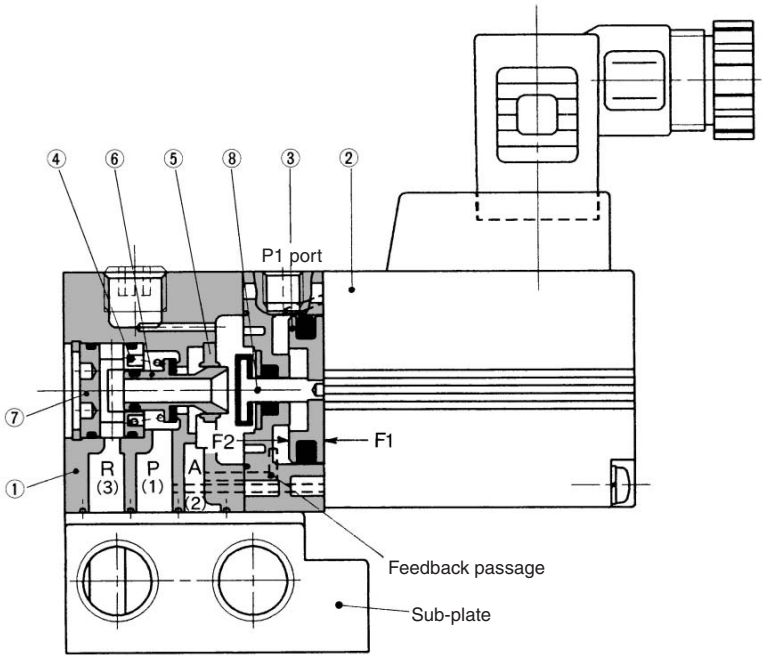
- When the command signal is below 1 VDC, (refer to page 14-10-7) the solenoid valve is inactive, and the port A pressure is zero.
- When a command signal between 1 and 5 VDC is provided, the solenoid is activated.
- The port A pressure is fed back to the control circuit by the pressure sensor.
- The 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 A pressure (from P to A).
  2) If the feedback signal is greater, current is not supplied to valve to reduce the port A pressure (from A to R).

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

Circuit



VY1A0$^{0}_{1}$, VY1B0$^{0}_{1}$ (Pilot valve: VY1D00-00)



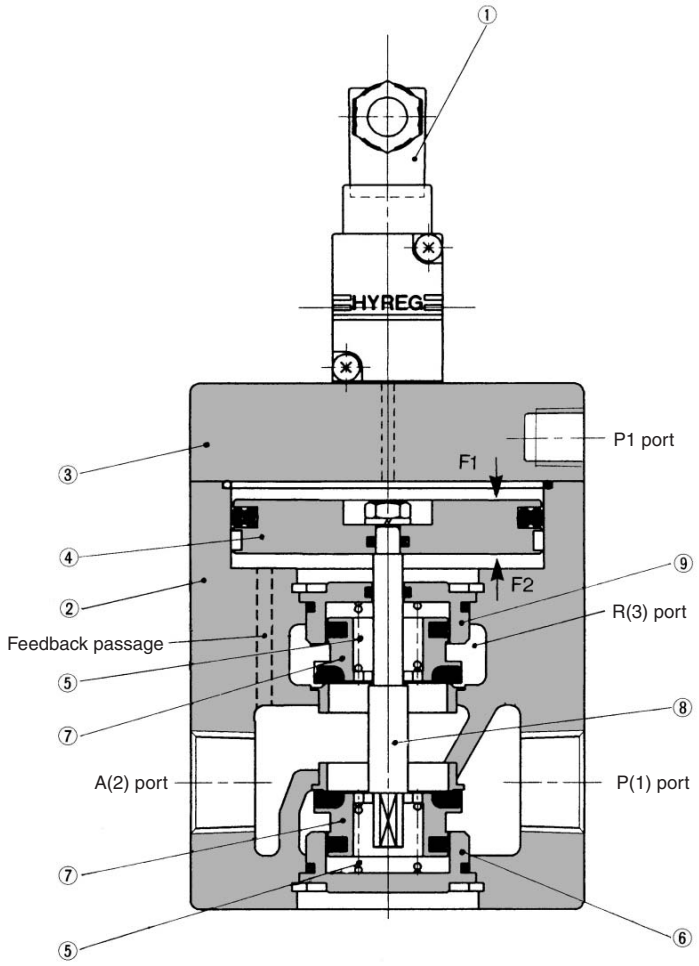
Working principle

- The supply (P to A) valve of valve ⑥ and the exhaust (A to 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: VY1-D00-00), 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 A pressure that coprresponds to the pilot pressure is established.
- When the port 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 A to port R When the port A pressure drops to reach a balance, the regulator returns to the set state.
- Conversely, if the port 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 P to port A. When the port A pressure balances, the regulator reuturns to the set state.

Component Parts

No.	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	NBR
⑦	Retainer	Aluminum alloy
⑧	Rod	NBR

VY110$^{0}_{1}$, VY120$^{0}_{1}$, VY130$^{0}_{1}$, VY140$^{0}_{1}$ (Pilot valve: VY1D00-00)
VY150$^{0}_{1}$, VY170$^{0}_{1}$, VY190$^{0}_{1}$ (Pilot valve: VY1B00-00)



Working principle

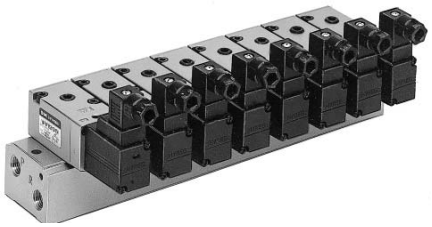
- The pair of poppet valves ⑦ close due to the balance between actuating forces F1 and F2. Actuating force F1 is applied to the top surface of pressure regulation piston ④ by the pilot pressure (pilot valve assembly ①: VY1$^{B}_{D}$00-00), and actuating force F2 is applied to the bottom surface of the piston by the port A pressure that pases through the feedback passage. Thus, the port A pressure that corresponds to the pilot pressure is established. The poppet valve, which maintains a pressure balance with the port A pressure, is backed up by spring ⑤ (refer to the diagram on the left).
- When the port 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 A to port R. When the port A pressure drops to reach a balance, the regulator returns to the state shown in the diagram to the left.
- Conversely, if the port 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 P to port A. When the port A pressure rises to reach a balance, the regulator returns to the state shown in the diagram to the left.

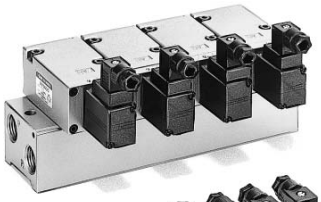
Component Parts

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	NBR
⑧	Shaft	Stainless steel
⑨	Valve guide	Aluminum alloy

E-P HYREG®
Manifold Specifications

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





Specifications

Applicable valve	VY1B0⁰₁	VY120⁰₁	VY140⁰₁
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 P, A, R port	1/8	1/4	1/4, 3/8, 1/2
Blanking plate assembly (3)	VEXB-6	VEX1-17	VEX4-5

Note 1) VY1B0⁰₁6 stations or more, VY120⁰₁5 stations or more, VY140⁰₁4 stations or more supply pressure to the P ports on both sides of the manifold and exhaust pressure from the R port 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 □

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 A facing you).

Ex.) **VVEX2-2-5-02**
- VY1200-00-G — 4 pcs.
- VEX1-17 ——— 1 pc.

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

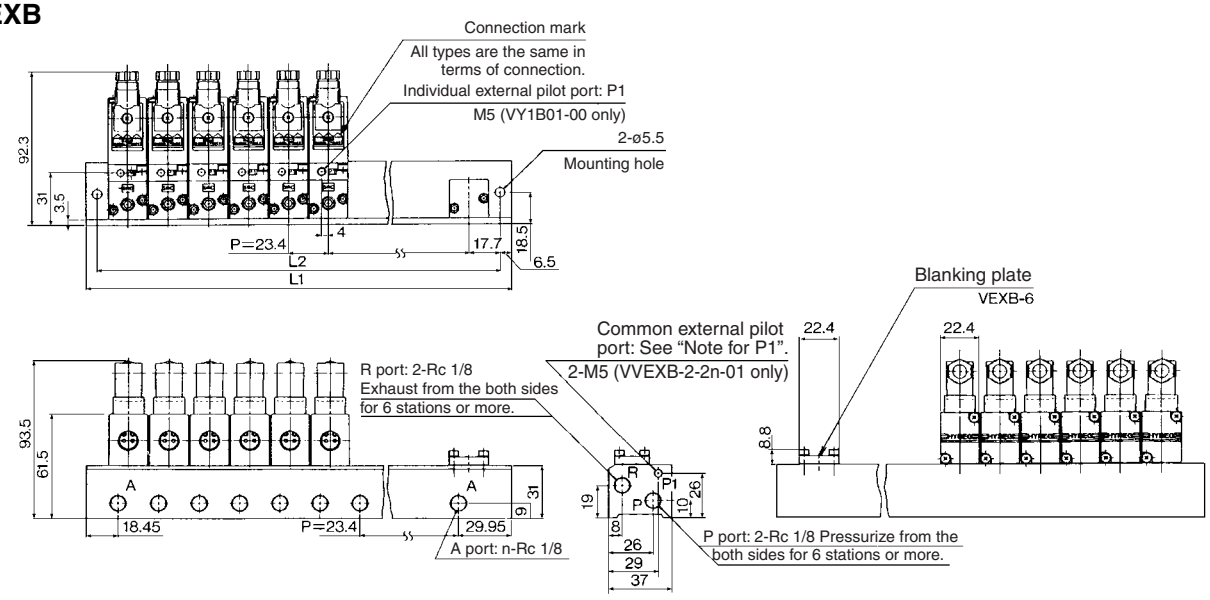
Piping thread type

Nil	Rc
F	G
N	NPT
T	NPTF

Body size		Pilot type		Valve stations		Port size		
B	For VY1B0⁰₁	**1**	Internal pilot	**22***	2 stations	**01**	P, R	A
				⋮	⋮		1/8	
		2	Common external pilot	**210***	10 stations			
2	For VY120⁰₁	**1**	Internal pilot	**2**	2 stations	**02**	1/4	
				⋮	⋮			
		2	Common external pilot	**8**	8 stations			
4	For VY140⁰₁	**1**	Internal pilot	**2**	2 stations	**A**	3/8	1/4
				⋮	⋮	**B**	3/8	
		2	Common external pilot	**6**	6 stations	**C**	1/2	3/8

Dimensions

VVEXB

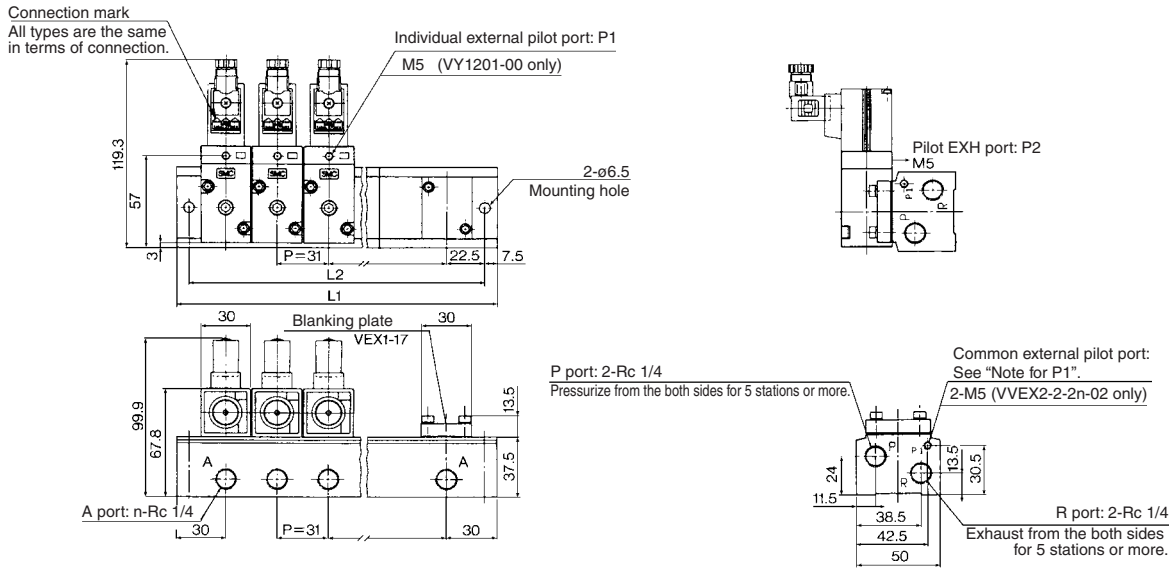


Dimension \ Stations	2	3	4	5	6	7	8	9	10
L1	71.8	95.2	118.6	142	165.4	188.8	212.2	235.6	259
L2	58.8	82.2	105.6	129	152.4	175.8	199.2	222.6	246

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.

Dimensions

VVEX2

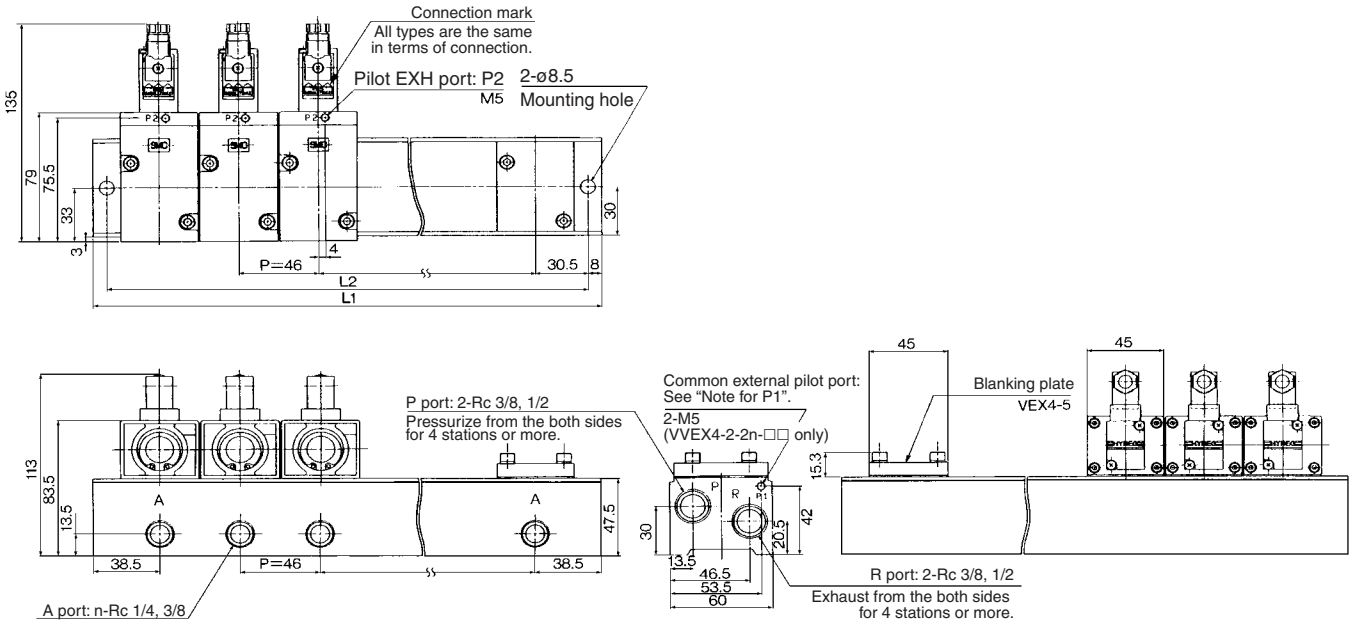


Dimension \ Stations	2	3	4	5	6	7	8
L1	91	122	153	184	215	246	277
L2	76	107	138	169	200	231	262

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.

Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by labels of **"Caution", "Warning"** or **"Danger"**. To ensure safety, be sure to observe ISO 4414 Note 1), JIS B 8370 Note 2) and other safety practices.

⚠ **Caution :** Operator error could result in injury or equipment damage.

⚠ **Warning :** Operator error could result in serious injury or loss of life.

⚠ **Danger :** In extreme conditions, there is a possible result of serious injury or loss of life.

Note 1) ISO 4414: Pneumatic fluid power--General rules relating to systems.
Note 2) JIS B 8370: General Rules for Pneumatic Equipment

⚠ Warning

1. The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.

Since the products specified here are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or after analysis and/or tests to meet your specific requirements. The expected performance and safety assurance will be the responsibility of the person who has determined the compatibility of the system. This person should continuously review the suitability of all items specified, referring to the latest catalog information with a view to giving due consideration to any possibility of equipment failure when configuring a system.

2. Only trained personnel should operate pneumatically operated machinery and equipment.

Compressed air can be dangerous if an operator is unfamiliar with it. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced operators.

3. Do not service machinery/equipment or attempt to remove components until safety is confirmed.

1. Inspection and maintenance of machinery/equipment should only be performed once measures to prevent falling or runaway of the driver objects have been confirmed.
2. When equipment is to be removed, confirm the safety process as mentioned above. Cut the supply pressure for this equipment and exhaust all residual compressed air in the system.
3. Before machinery/equipment is restarted, take measures to prevent shooting-out of cylinder piston rod, etc.

4. Contact SMC if the product is to be used in any of the following conditions:

1. Conditions and environments beyond the given specifications, or if product is used outdoors.
2. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, clutch and brake circuits in press applications, or safety equipment.
3. An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.

Common Precautions

Be sure to read before handling.
For detailed precautions on every series, refer to main text.

Selection

⚠ Warning

1. Confirm the specifications.

Products represented in this catalog are designed for use in compressed air appllications only (including vacuum), unless otherwise indicated.
Do not use the product outside their design parameters.
Please contact SMC when using the products in applications other than compressed air (including vacuum).

Mounting

⚠ Warning

1. Instruction manual

Install the products and operate them only after reading the instruction manual carefully and understanding its contents. Also keep the manual where it can be referred to as necessary.

2. Securing the space for maintenance

When installing the products, please allow access for maintenance.

3. Tightening torque

When installing the products, please follow the listed torque specifications.

Piping

⚠ Caution

1. Before piping

Make sure that all debris, cutting oil, dust, etc, are removed from the piping.

2. Wrapping of pipe tape

When screwing piping or fittings into ports, ensure that chips from the pipe threads or sealing material do not get inside the piping. Also, when the pipe tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.

Air Supply

⚠ Warning

1. Operating fluid

Please consult with SMC when using the product in applications other than compressed air (including vacuum).
Regarding products for general fluid, please ask SMC about applicable fluids.

2. Install an air dryer, aftercooler, etc.

Excessive condensate in a compressed air system may cause valves and other pneumatic equipment to malfunction.
Installation of an air dryer, after cooler etc. is recommended.

3. Drain flushing

If condensate in the drain bowl is not emptied on a regular basis, the bowl will over flow and allow the condensate to enter the compressed air lines.
If the drain bowl is difficult to check and remove, it is recommended that a drain bowl with the auto-drain option be installed.
For compressed air quality, refer to “Air Preparation Equipment” catalog.

4. Use clean air

If the compressed air supply is contaminated with chemicals, cynthetic materials, corrosive gas, etc., it may lead to break down or malfunction.

Operating Environment

⚠ Warning

1. Do not use in environments where the product is directly exposed to corrosive gases, chemicals, salt water, water or steam.

2. Do not expose the product to direct sunlight for an extended period of time.

3. Do not use in a place subject to heavy vibrations and/or shocks.

4. Do not mount the product in locations where it is exposed to radiant heat.

Maintenance

⚠ Warning

1. Maintenance procedures are outlined in the operation manual.

Not following proper procedures could cause the product to malfunction and could lead to damage to the equipment or machine.

2. Maintenance work

If handled improperly, compressed air can be dangerous.
Assembly, handling and repair of pneumatic systems should be performed by qualified personnel only.

3. Drain flushing

Remove drainage from air filters regularly. (Refer to the specifications.)

4. Shut-down before maintenance

Before attempting any kind of maintenance make sure the supply pressure is shut of and all residual air pressure is released from the system to be worked on.

5. Start-up after maintenance and inspection

Apply operating pressure and power to the equipment and check for proper operation and possible air leaks. If operation is abnormal, please verify product set-up parameters.

6. Do not make any modifications to be product.

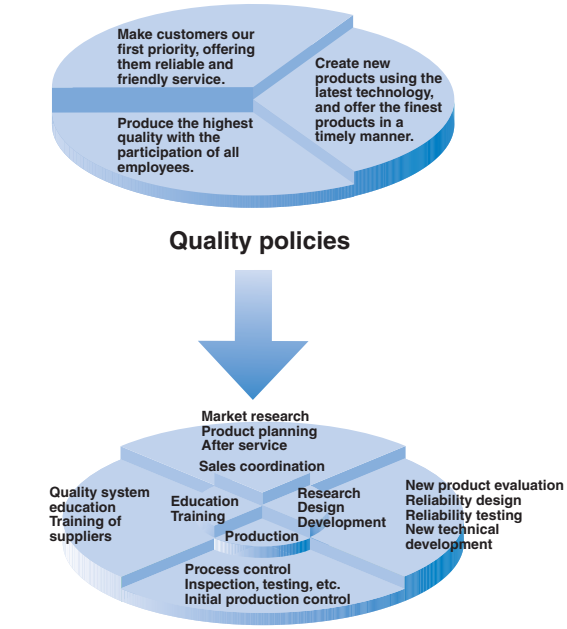
Do not take the product apart.

Quality Assurance Information (ISO 9001, ISO 14001)

Reliable quality of products in the global market

To enable our customers throughout the world to use our products with even greater confidence, SMC has obtained certification for international standards “ISO 9001” and “ISO 14001”, and created a complete structure for quality assurance and environmental controls. SMC products pursue to meet its customers’ expectations while also considering company’s contribution in society.

SMC’s quality control system



Quality management system

ISO 9001

This is an international standard for quality control and quality assurance. SMC has obtained a large number of certifications in Japan and overseas, providing assurance to our customers throughout the world.



Environmental management system

ISO 14001

This is an international standard related to environmental management systems and environmental inspections. While promoting environmentally friendly automation technology, SMC is also making diligent efforts to preserve the environment.



SMC Product Conforming to Inter

SMC products complying with EN/ISO, CSA/UL standards are supporting

CE Mark

The CE mark indicates that machines and components meet essential requirements of all the EC Directives applied.
It has been obligatory to apply CE marks indicating conformity with EC Directives when machines and components are exported to the member Nations of the EU.
Once “A manufacturer himself” declares a product to be safe by means of CE marking (declaration of conformity by manufacturer), free distribution inside the member Nations of the EU is permissible.

■ CE Mark

SMC provides CE marking to products to which EMC and Low Voltage Directives have been applied, in accordance with CETOP (European hydraulics and pneumatics committee) guide lines.

■ As of February 1998, the following 18 countries will be obliged to conform to CE mark legislation

Iceland, Ireland, United Kingdom, Italy, Austria, Netherlands, Greece, Liechtenstein, Sweden, Spain, Denmark, Germany, Norway, Finland, France, Belgium, Portugal, Luxembourg

■ EC Directives and Pneumatic Components

• Machinery Directive

The Machinery Directive contains essential health and safety requirements for machinery, as applied to industrial machines e.g. machine tools, injection molding machines and automatic machines. Pneumatic equipment is not specified in Machinery Directive. However, the use of SMC products that are certified as conforming to EN Standards, allows customers to simplify preparation work of the Technical Construction File required for a Declaration of Conformity.

• Electromagnetic Compatibility (EMC) Directive

The EMC Directive specifies electromagnetic compatibility. Equipment which may generate electromagnetic interference or whose function may be compromised by electromagnetic interference is required to be immune to electromagnetic affects (EMS/immunity) without emitting excessive electromagnetic affects (EMI/emission).

• Low Voltage Directive

This directive is applied to products, which operate above 50 VAC to 1000 VAC and 75 VDC to 1500 VDC operating voltage, and require electrical safety measures to be introduced.

• Simple Pressure Vessels Directive

This directive is applied to welded vessels whose maximum operating pressure (PS) and volume of vessel (V) exceed 50 bar/L. Such vessels require EC type examination and then CE marking.

national Standards

you to comply with EC directives and CSA/UL standards.

Mark of compliance for CSA/UL

Mark of compliance for CSA

NRTL /C

■ CSA Standards & UL Standards

UL and CSA standards have been applied in North America (U.S.A. and Canada) symbolizing safety of electric products, and are defined to mainly prevent danger from electric shock or fire, resulting from trouble with electric products. Both UL and CSA standards are acknowledged in North America as the first class certifying body. They have a long experience and ability for issuing product safety certificate. Products approved by CSA or UL standards are accepted in most states and governments beyond question.
Since CSA is a test certifying body as the National Recognized Testing Laboratory (NRTL) within the jurisdiction of Occupational Safety and Health Administration (OSHA), SMC was tested for compliance with CSA Standards and UL Standards at the same time and was approved for compliance with the two Standards. The above CSA NRTL/C logo is described on a product label in order to indicate that the product is approved by CSA and UL Standards.

■ TSSA (MCCR) Registration Products

TSSA is the regulation in Ontario State, Canada. The products that the operating pressure is more than 5 psi (0.03 MPa) and the piping size is bigger than 1 inch. fall into the scope of TSSA regulation.

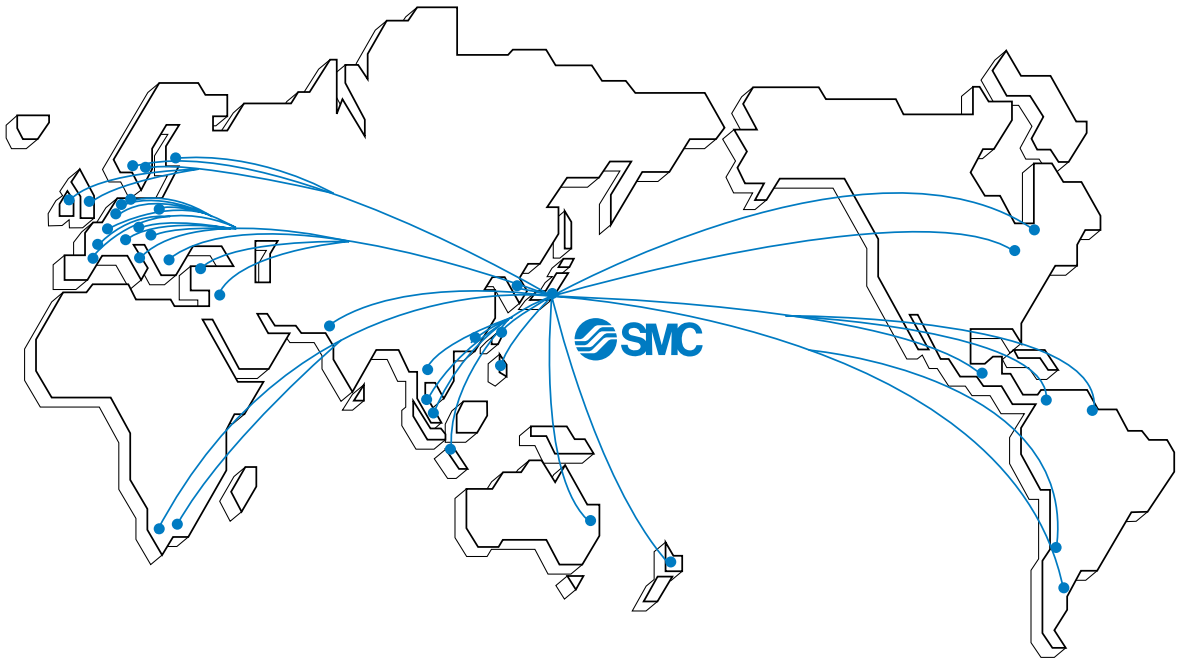
Products conforming to CE Standard

With CE symbol for simple visual recognition

In this catalog each accredited product series is indicated with a CE mark symbol. However, in some cases, every available models may not meet CE compliance. Please visit our web site for the latest selection of available models with CE mark.

http://www.smcworld.com

SMC's Global Service Network



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