

Vacuum Regulator

Series *IRV1000/2000/3000*



Allows adjustment of vacuum line pressure

Series IRV1000/2000/3000

3 sizes

offered in the series

Variations have been expanded to three sizes from only one in the previous series T203. Selection is possible to accommodate the applicable flow rate.

Note) Flow rate corresponds to VAC pressure of -101kPa, SET pressure of -80kPa, and initial flow rate setting of 0/min(ANR).

Compact

Light weight

IRV1000

60
/min (ANR) ^{Note)}



□ 35mm

120g

IRV2000

100
/min (ANR) ^{Note)}



□ 50mm

270g

IRV3000

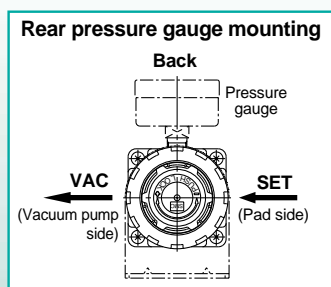
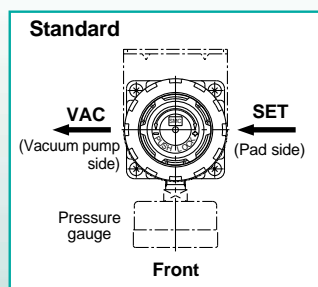
150
/min (ANR) ^{Note)}



□ 66mm

700g

■ Pressure gauge can be mounted from the front or rear

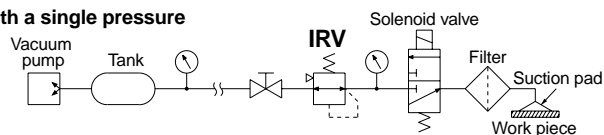


■ Panel mounting capability is standard

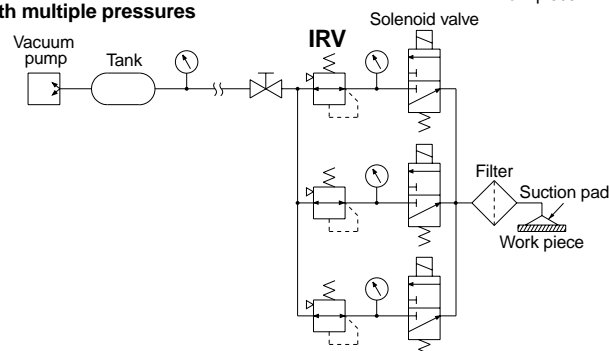
Applications

Lifting of work pieces

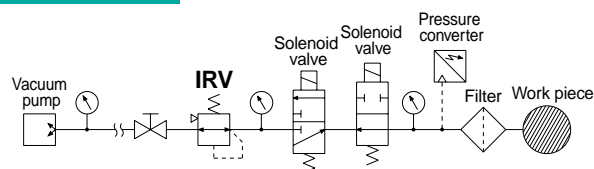
With a single pressure



With multiple pressures



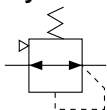
Leak tester



Vacuum Regulator

Series *IRV1000/2000/3000*

Symbol



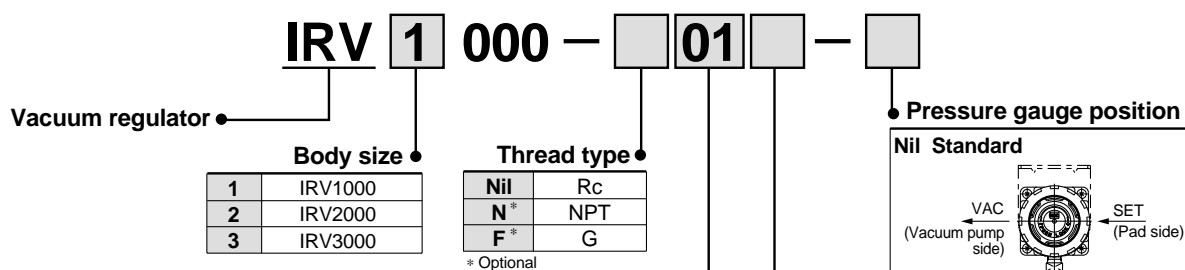
Standard Specifications

Model	IRV1000	IRV2000	IRV3000
Fluid	Air		
Regulating pressure range ^{Note 1)}	-100 to -1.3kPa		
Atmospheric intake consumption ^{Note 2)}	0.6 /min (ANR) or less		1.1 /min (ANR) or less
Knob resolution	0.13kPa or less		
Ambient and fluid temperature	5 to 60°C		
Port size	Rc 1/8	Rc 1/4	Rc 1/4, 3/8, 1/2
Pressure gauge port size	Rc 1/8 (2 locations)		
Weight (kg) [without accessory]	0.12	0.27	0.7

Note 1) Note that the pressure range fluctuates depending on the vacuum pump pressure.

Note 2) Air is always supplied from the atmosphere.

How to Order



Specification Combinations

● Standard specification ○ Valid combination
□ Invalid combination

Specification		Symbol	Applicable model		
			IRV1000	IRV2000	IRV3000
Standard specifications	Connection Rc 1/8	01	●		
	Connection Rc 1/4	02		●	●
	Connection Rc 3/8	03			●
	Connection Rc 1/2	04			●
Accessories	Bracket	B	○	○	○
	Pressure gauge	G	○	○	○
	Rear pressure gauge mounting	R	○	○	○
Options	Connection NPT 1/8	N01	○		
	Connection NPT 1/4	N02		○	○
	Connection NPT 3/8	N03			○
	Connection NPT 1/2	N04			○
	Connection G 1/8	F01	○		
	Connection G 1/4	F02		○	○
	Connection G 3/8	F03			○
	Connection G 1/2	F04			○

Accessory

Nil	None
B	With bracket ^{Note)}
G	With pressure gauge

Note) Brackets are shipped with the package (unassembled).

Port size

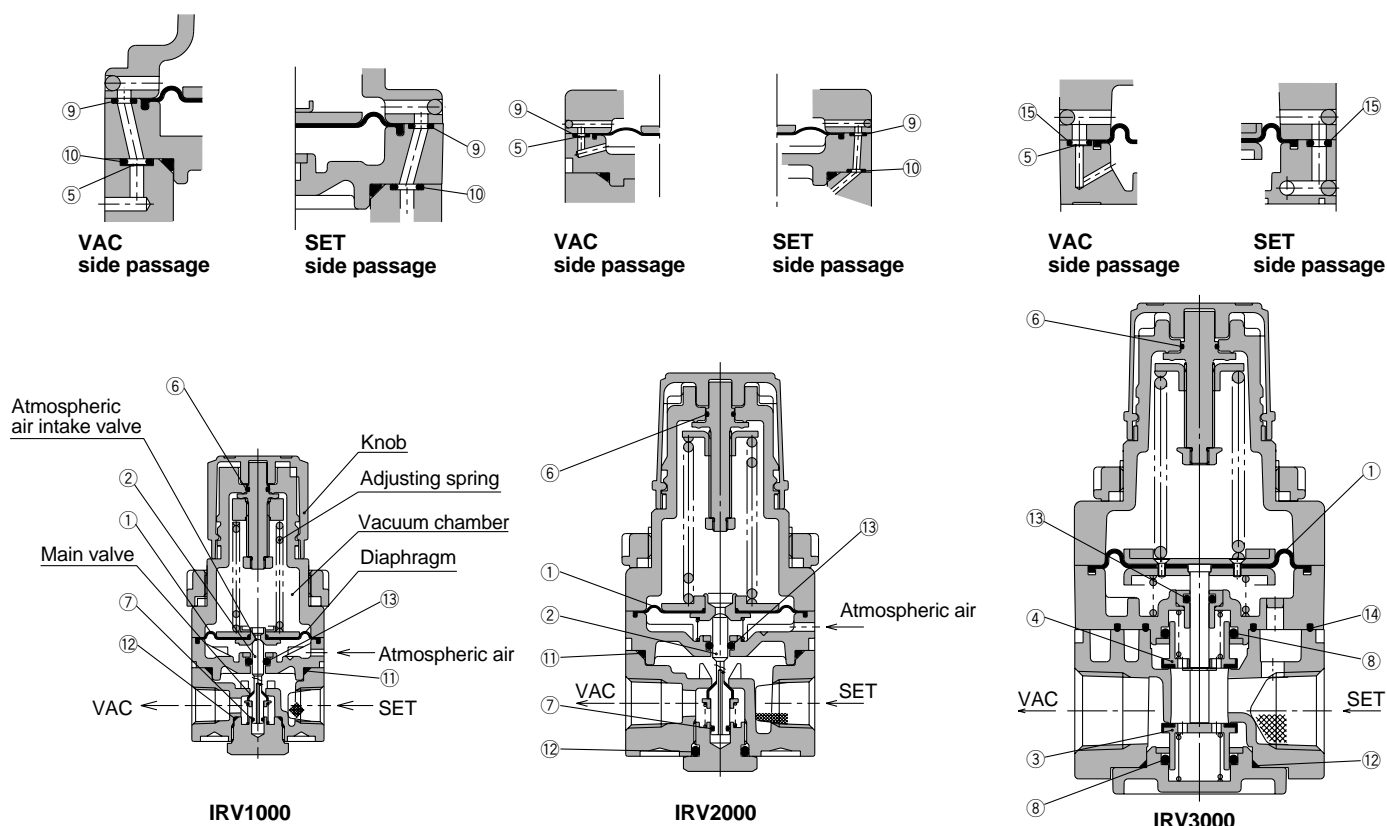
Symbol	Size	Applicable model		
		IRV1000	IRV2000	IRV3000
01	1/8	●	—	—
02	1/4	—	●	●
03	3/8	—	—	●
04	1/2	—	—	●

Accessory (Optional) Part Nos.

Description	Part no.		
	IRV1000	IRV2000	IRV3000
Bracket	P53801018	P53802016	P53803013
Pressure gauge*	GZ33-K-01	GZ43-K-01	GZ43-K-01

* Pressure gauge accuracy: ±3% (full span)

Construction



Working principle (for IRV1000)

When the knob is turned to the right, the adjusting spring's generated force pushes down the diaphragm and the main valve. This connects the VAC side and SET side, and the degree of vacuum on the SET side increases (becomes closer to an absolute vacuum). Furthermore, the SET side vacuum pressure moves through the air passage into the vacuum chamber, where it is applied to the top side of the diaphragm and counters the adjusting spring's compression force; and this adjusts the SET side pressure. When the degree of vacuum on the SET side is higher than the designated setting value (becomes closer to an absolute vacuum), the balance between the adjusting spring and the SET side pressure in the vacuum chamber is lost, and the diaphragm is pushed up. This causes

the main valve to close and the atmospheric intake valve to open, which lets atmospheric air into the SET side. When the adjusting spring's compression force and the SET side pressure are balanced, the SET side pressure is set. Also, when the degree of vacuum of the SET side pressure is lower than the designated setting value (becomes closer to the atmosphere), the balance between the adjusting spring and the SET side pressure of the vacuum chamber is lost, and the diaphragm is pushed down. This causes the atmospheric intake valve to close and the main valve to open, which lets air into the VAC side. When the adjusting spring's compression force and the SET side pressure are balanced, the SET side pressure is set.

Replacement parts

No.	Description	Material	Part no.		
			IRV1000	IRV2000	IRV3000
1	Diaphragm assembly	H-NBR, etc.	P538010-6	P538020-3	P538030-5
2	Valve	Stainless steel, H-NBR	P53801005	P53802005	—
3	Valve	Brass, H-NBR	—	—	P53803015
4	Valve	Brass, H-NBR	—	—	P53803016
5	Fixed orifice	SUS304	P36202018	P36202018	P36203017
6	O-ring	H-NBR	ø4.35 x 1	ø6 x 1	ø8.31 x 1
7	O-ring	H-NBR	ø2 x 0.6	ø3.2 x 1	—
8	O-ring	NBR	—	—	JISB2401 P16 ^{Note 1)}
9	O-ring	NBR	ø1.7 x 0.85	ø2.5 x 1	—
10	O-ring	NBR	ø2.5 x 1	ø3 x 1	—
11	O-ring	NBR	ø24 x 1.5	ø39.5 x 2	—
12	O-ring	NBR	ø10 x 1.3	JISB2401 P11	ø27.8 x 1.5
13	O-ring	NBR	JISB2401 P3 ^{Note 1)}	JISB2401 P4 ^{Note 1)}	JISB2401 P5 ^{Note 1)}
14	Seal (A)	NBR	—	—	P36203015
15	Seal (B)	NBR	—	—	P36203016
Repair kit no. (A set of above nos. ① to ⑮.)			KT-IRV1000	KT-IRV2000	KT-IRV3000

Note 1) For O-ring numbers 8 and 13, use mini-flicking type.

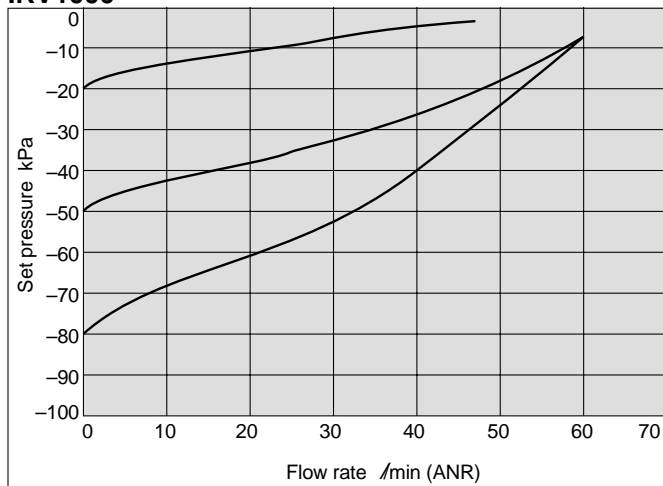
Note 2) Replacement part numbers correspond to the item numbers in the figures.

Series IRV1000/2000/3000

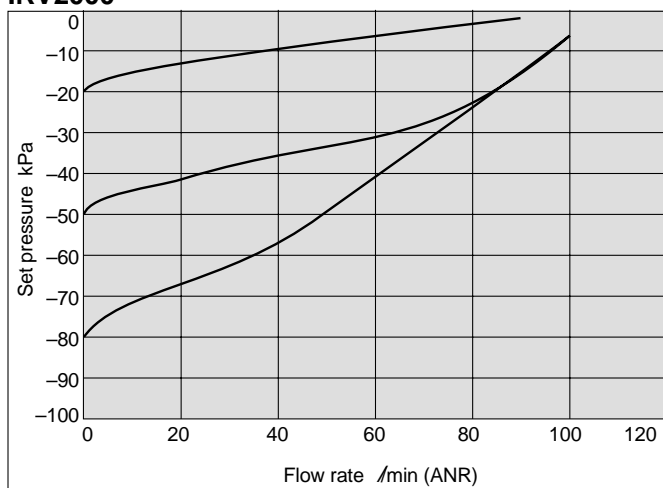
Flow Characteristics

Conditions: Vacuum pump exhaust speed 500/min
VAC side pressure -101kPa at initial setting

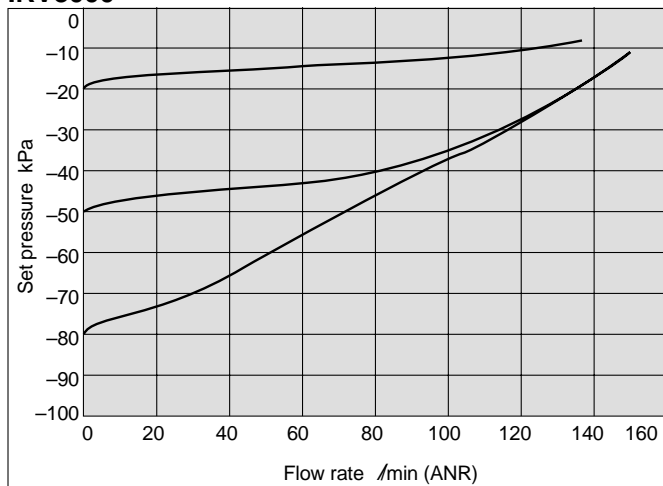
IRV1000



IRV2000



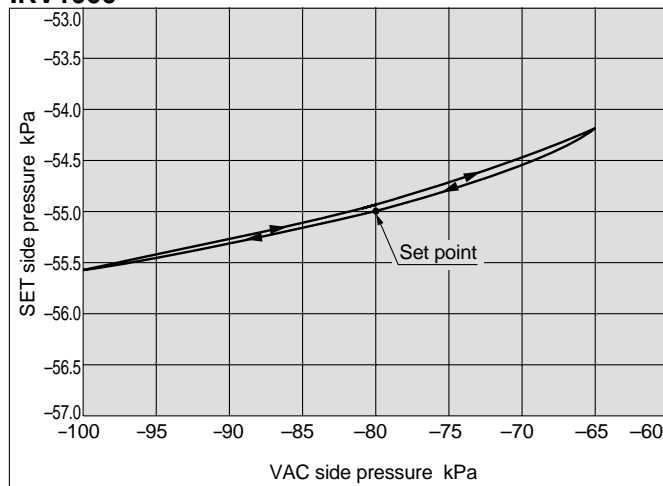
IRV3000



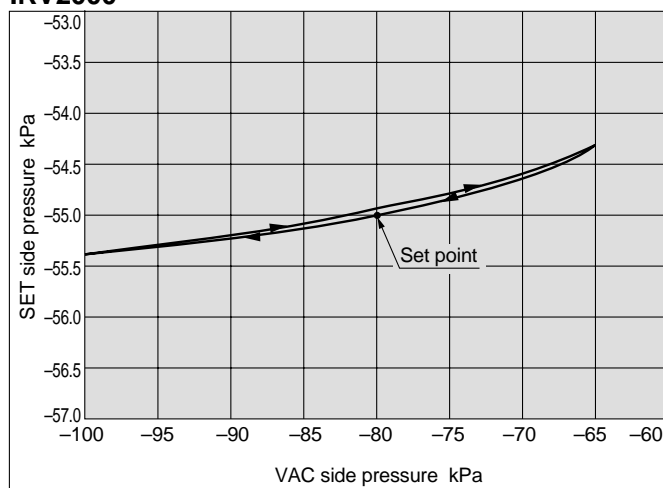
Pressure Characteristics

Conditions: Vacuum pump exhaust speed 500/min

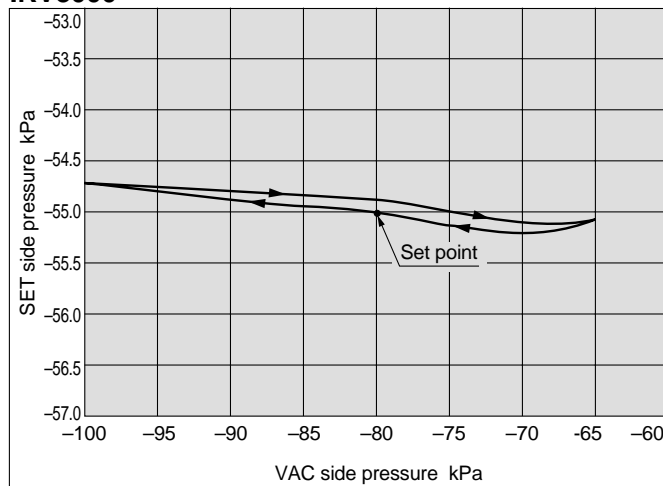
IRV1000



IRV2000



IRV3000








Series *IRV1000/2000/3000*

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 – Recommendations for the application of equipment to transmission and control 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.

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 after confirmation of safe locked-out control positions.
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. (Bleed air into the system gradually to create back-pressure.)

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, 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.



Series IRV1000/2000/3000 Vacuum Regulator Precautions

Be sure to read before handling.

Handling

⚠ Warning

1. When a system hazard can be expected due to a drop in vacuum pressure caused by power loss or vacuum pump trouble, install a safety circuit and configure the system so that it can avoid the danger.
2. When a system hazard can be expected due to malfunction of the vacuum regulator, install a safety circuit and configure the system so that it can avoid the danger.

⚠ Caution

1. When installing a pressure gauge on an existing regulator, be sure to reduce the set pressure to 0 (atmospheric pressure) before removing the plug.
2. Do not remove the body screw while the negative pressure is applied.
3. Before removing the valve guide for inspection, reduce the set pressure to 0 (atmospheric pressure) and also shut down the vacuum pump pressure completely.

Operating Environment

⚠ Warning

1. Do not operate in locations having an atmosphere of corrosive gases, chemicals, sea water, water or steam, or where there will be contact with the same.
2. Do not operate in locations where vibration or impact occurs.
3. This vacuum regulator always uses atmospheric air, therefore, do not use in dusty environments.
4. In locations which receive direct sunlight, provide a protective cover, etc.
5. In locations near heat sources, block off any radiated heat.

Vacuum Supply

⚠ Caution

1. This vacuum regulator is not to be used for adjusting vacuum pump pressures.
2. Note that an ejector's flow rate is smaller than that of the vacuum regulator, and therefore, it is not suitable as a "vacuum supply".

Air

⚠ Caution

1. These products are designed for use with air. Contact SMC if any other fluid will be used.
2. Do not use air which includes chemicals, synthetic oils containing organic solvents, salt, or corrosive gases, etc., as this can cause damage or malfunction.

Piping

⚠ Caution

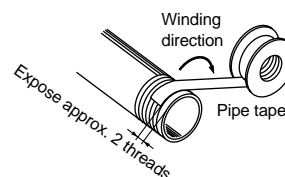
1. Preparation before piping

Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.

2. Wrapping of pipe tape

When connecting pipes and fittings, etc., be sure that chips from the pipe threads and sealing material do not get inside.

Further, when pipe tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.



Operating

⚠ Caution

1. Connect piping to the port with "VAC" indication (upper right of the port) for connection to the vacuum pump.
2. To adjust the pressure, turn the knob to the right for changing "atmospheric pressure to vacuum pressure" and to the left for changing "vacuum pressure to atmospheric pressure".
3. When adjusting pressure, do not touch the lateral hole in the mid-section of the body and the lateral hole (atmospheric air suction hole) below the "VAC" indication.
4. When locking the knob after setting the pressure, press down the knob until the orange band is hidden and a click is heard. On the other hand, when unlocking the knob, pull it up until the orange band is visible and a click is heard.
5. This vacuum regulator is for use with negative pressure only. Be sure that positive pressure is not applied instead. In the event that positive pressure is applied, the vacuum regulator will not be damaged; however, the main valve of the pressure adjustment valve will open and positive pressure will enter the vacuum pump. This may cause malfunction of the vacuum pump.
6. When the capacity of the vacuum pump is relatively small or when the inside diameter of the piping is small, a change in the set pressure (the pressure difference between the non-flow and flow conditions) may be large. In this case, change the vacuum pump or the inside diameter of the piping. When changing the vacuum pump is not possible, add a capacity tank (the capacity depends on the operating conditions) to the VAC side.
7. The pressure response time after opening and closing of valves (such as solenoid valves) is influenced in large and small measures by the internal capacity of the setting side (includes piping capacity). Since the vacuum pump capacity also affects the response time, consider all these points when operating.

SMC CORPORATION

1-16-4 Shimbashi, Minato-ku, Tokyo 105-0004, JAPAN
Tel: 03-3502-2740 Fax: 03-3508-2480
URL <http://www.smcworld.com>
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1st printing June, 2000 D-SMC.L.A. P-80 (N)

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Printed in Japan.