

ORIGINAL INSTRUCTIONS

# Instruction Manual Vacuum Regulator Series IRV10(A) / IRV20(A)



The intended use of this product is to regulate the vacuum pressure in the pneumatic circuit.

# 1 Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of "Caution", "Warning" or "Danger". They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC) \*1), and other safety regulations.

- \*1) ISO 4414: Pneumatic fluid power - General rules relating to systems.
- ISO 4413: Hydraulic fluid power - General rules relating to systems.
- IÉC 60204-1: Safety of machinery -Electrical equipment of machines. (Part 1: General requirements)
- ISO 10218-1: Manipulating industrial robots -Safety.etc.

This manual contains essential information for the protection of users and others from possible injury and/or equipment damage.

• Refer to product catalogues, Operation Manual and Handling

Precautions for SMC Products for additional information.

• Keep this manual in a safe place for future reference.

A	Caution	Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
A	Warning	Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
A	Danger	Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

# **A** Warning

Always ensure compliance with relevant safety laws and standards.
 All work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.

## 2 Specifications

#### 2.1 Standard Specifications

Model		IRV10(A)	IRV20(A)	
Fluid		Air		
Set pressure range Note 1)		-100∼-1.3kPa		
Withstand pressure Note 2)		100kPa(Except with pressure gauge)		
Atmospheric int	tmospheric intake consumption Note 3) 0.6L/min(ANR) or less		NR) or less	
Knob resolution		0.13kPa or less		
Ambient and flu	nt and fluid temperature 5 to 60°C		60°C	
VAC side tubing	J O.D.	φ6, φ8		
SET side tubing	O.D.	φ1/4", φ5/16" φ1/4",φ5/16",φ3/8"		
Weight(Without	Standard connections	135g (IRV10-C08)	250g (IRV20-C10)	
accessories)	Single sided connection	125g (IRV10A-C08)	250g (IRV20A-C10)	

Table.1

#### 2 Specifications – continued

#### Notes:

- Note 1) Use caution it varies depending on the pressure in vacuum pump side.
- Note 2) For vacuum regulators with a pressure gauge, the pressure gauge will be damaged if positive pressure is supplied. In the event that positive pressure is applied, the vacuum regulator will not be damaged. However, the main valve will be open and positive pressure will enter the vacuum pump. This may cause malfunction of the vacuum pump. When the vacuum regulator is used in the adsorbing and transferring system, refer to the following piping example and avoid supplying positive pressure to the vacuum pump. The vacuum regulator cannot adjust positive pressure.
- Note 3) Pressure is controlled by intaking air from the atmosphere all the

#### 2.2 Selection

## A Caution

- Note that the ejector is not applicable to "vacuum supply" since the flow rate of the ejector is smaller than that of this vacuum regulator and changes in pressure by the flow rate are large.
- This vacuum regulator does not control pressure by connecting with the exhaust side of the vacuum pump.
- Maximum settable vacuum pressure is affected by the atmospheric pressure where the vacuum regulator is used. Atmospheric pressure varies depending on the altitude and weather. Actual maximum settable vacuum pressure may not reach the value in the specification.

# 3 Installation

#### 3.1 Installation

#### **A** Warning

 Do not install the product unless the safety instructions have been read and understood.

#### 3.2 Environment

#### **Warning**

- Do not use in an environment where corrosive gases, chemicals, sea water, water, water steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact.
- Do not mount in a location exposed to radiant heat.
- The vacuum regulator intakes atmospheric pressure all the time. Use it where particles are not present.

#### 3.3 Piping

#### **A** Caution

- Refer to the precautions for handling of the catalogue for the Onetouch fittings.
- Before piping make sure to clean up chips, cutting oil, dust etc.
- When mounting the gauge nut assembly to the gauge port, mount them
  with a clip after piping the Rc1/8 thread. If the mounting order is not
  correct, the body may be broken. [Rc1/8 tightening torque: 7 to 9N·ml
- When installing piping or fittings, ensure sealant material does not enter inside the port. When using seal tape, leave 1.5 to 2 threads exposed on the end of the pipe/fitting.
- When mounting the part assembly (pressure gauge assembly, gauge nut assembly and plug nut assembly) to the gauge port, insert the part assembly and clip to the end. After mounting, check that part assembly doesn't come off. Refer to the catalog for the details of the mounting of part assembly to the gauge port.

#### 3.4 Lubrication

## **A** Caution

 Lubricant adequate for the product life is applied to the product during manufacturing. Do not apply lubricant during use.

#### 3 Installation - continued

## 3.5 Air Supply

## **A** Warning

- Please consult with SMC when using the product in applications other than air
- Do not use air which includes chemicals, synthetic oils containing organic solvents, salt or corrosive gases, etc., as this can cause damage or malfunction.
- If the drain removal from air filter and mist separator is missed, drain will be flown out to the outlet side and may result in a malfunction of the pneumatic equipment. When removing drain is difficult, use of a filter with an auto-drain is recommended.

# A Caution

 The vacuum regulator absorbs dust and water droplets during adsorbing of the workpiece. Install the vacuum filter to avoid the entry of the dust and water droplets into the product. When the entry of water droplets is possible, use the drain separator for vacuum.

#### 3.6 Handling

#### **A** Warning

- 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.
- When a system hazard can be expected with trouble with the vacuum regulator, install a safety circuit and configure the system so that it can avoid the danger.

# A Caution

 Before maintenance, return the set pressure to "0" (atmospheric pressure).

#### 3.7 Mounting / Operation

# A Caution

- Connect piping to the port with "VAC" indication for connection to the vacuum pump.
- To adjust the pressure, turn the knob to the right(clockwise) for

changing "atmospheric pressure to vacuum pressure" and to the left(counterclockwise) for changing "vacuum pressure to atmospheric pressure".

- Pressure cannot be controlled if the air intake hole (side hole of the body) is blocked. Do not touch the air intake hole during pressure adjustment.
- 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.
- The vacuum regulator is designated for vacuum pressure. Do not apply
  positive pressure. If positive pressure is applied, although the vacuum
  regulator will not be broken, the main valve in the pressure adjusting
  valve opens, allowing the positive pressure to the vacuum pump,
  damaging the vacuum pump.
- When the vacuum pump capacity 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.
- The pressure response time after opening and closing of valves (such as solenoid vales) is influenced in large and small measures by the internal capacity (includes piping capacity) of the set side. Since the vacuum pump capacity also affects the response time, consider all these points before operations.
- As the vacuum regulator intakes atmospheric pressure all the time, the vacuum pressure cannot be maintained if the vacuum pump or valve is stopped. It is necessary to keep vacuuming in order to keep absorbing the workpiece.
- The set pressure may vary depending on the elapsed time and change in ambient temperature after pressure setting. If the setting value varies, adjust with the knob.

#### 3 Installation – continued

- If the directional control valve (solenoid valve, mechanical valve, etc.) is mounted and ON-OFF is repeated for a long time, the set pressure may vary. If the setting value varies, adjust with the knob.
- When fixing the vacuum regulator to the bracket or panel, rotate the set nut clockwise with a hook spanner.

Recommended tightening torque of set nut (Unit: N·m)

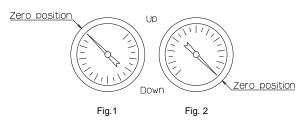
Model	Tool size	Tightening torque
IRV10(A)	34/38	2.0±0.2N·m
IRV20(A)	52/55	3.5±0.3N⋅m

Table.2

Ensure that knurling tool side of the bracket and the knurling tool side of the set nut are facing each other for mounting the bracket.

For general use using bracket for mounting, bracket can be used by tightening the set nut strongly by hand.

- Do not apply positive pressure to the pressure gauge. Malfunction such as the displacement of zero point may occur.
- When using a pressure gauge upside down like Fig.1,it may result in a shifting of the zero point reading. Make sure to use it in the direction like Fig.2.Gravity will affect the zero point of the gauge which is why it needs to be positioned properly.



 There may be pulsation or noise depending on the pressure conditions, piping conditions and ambient environment. In this case, it is possible to improve the problem by changing the pressure conditions and piping conditions.

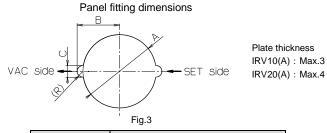
If the problem is not improved, contact your SMC sales representative.

#### 4 How to Order

Refer to the catalogue or drawings for How to Order.

#### 5 Outline Dimensions (mm)

Refer to catalogue for outline dimensions.



Model	Panel Mount				
Model	Α	В	С		
IRV10(A)	φ28	16.5	5		
IRV20(A)	φ38	22	6		
Table.3					

# 6 Maintenance

#### **General Maintenance**

# **A** Warning

- Before maintenance, turn off the power supply and return the pressure in the piping to atmospheric pressure.
- When adding pressure gauge, return the pressure in the piping to atmospheric pressure before removing the plug nut assembly.

#### A Caution

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

# 6 Maintenance – continued

- If handled improperly, compressed air and vacuum air can be dangerous. Maintenance of pneumatic systems should be performed only by qualified personnel.
- After installation and maintenance, apply operating pressure and power to the equipment and perform appropriate functional and leakage tests to make sure the equipment is installed correctly.
- If any electrical connections are disturbed during maintenance, ensure they are reconnected correctly and safety checks are carried out as required to ensure continued compliance with applicable national regulations.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.
- Check periodically adjustment of the regulators.

# 7 Limitations of Use

#### Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

# **A** Warning

- Do not use the vacuum regulator as a pressure relief valve.
- If vacuum pressure needs to be rapidly returned to atmospheric pressure, configure a safety system such as installing 3 port valve on the downstream of the vacuum regulator.

# 8 Contacts

Refer to www.smcworld.com for contacts.

# **SMC** Corporation

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