

Vacuum Regulator

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 -101 kPa, SET pressure of -80 kPa, and initial flow rate setting of 0 ℓ/min (ANR).

Compact

Lightweight

IRV1000

60 ℓ/min (ANR) Note)



□35mm

120g

IRV2000

100 ℓ/min (ANR) Note)



□50mm

270g

IRV3000

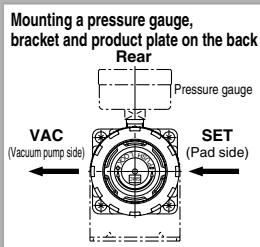
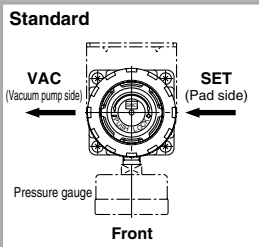
150 ℓ/min (ANR) Note)



□66mm

700g

■ Pressure gauge can be mounted from the front or rear

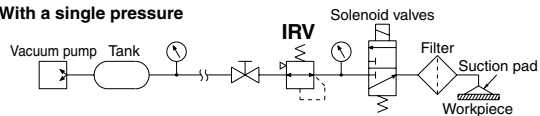


■ Panel mounting is possible.

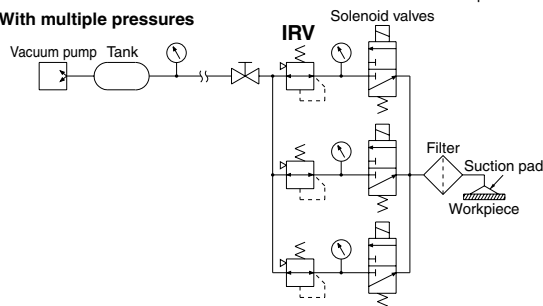
Application Example

Lifting of workpieces

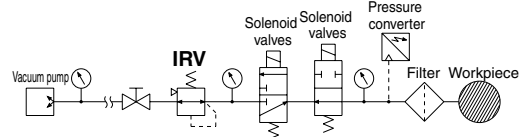
With a single pressure



With multiple pressures



Leak tester



ARJ

AR425 to 935

AMR

ARM

ARP

IR

IRV

VEX1□

SRH

SRP

SRF

ARX20

VCHR

ITV

IC

PVQ

VEF VEP

VER

VEA

VY2

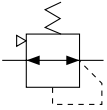
VBA VBAT

AP100

Vacuum Regulator

Series IRV1000/2000/3000

JIS Symbol



Standard Specifications

Model	IRV1000	IRV2000	IRV3000
Fluid	Air		
Set pressure range ⁽¹⁾	-100 to -1.3 kPa		
Atmospheric intake consumption ⁽²⁾	0.6 ℓ/min (ANR) or less		1.1 ℓ/min (ANR) or less
Knob resolution	Within 0.13 kPa		
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)		
Mass (kg) [Without accessory]	0.12	0.27	0.7

Note 1) Use caution it varies depending on the pressure in vacuum pump side.
 Note 2) Taking air from atmosphere all the time.

How to Order

IRV 1 000 - [] 01 [] - [] - []

Vacuum regulator

Body size

1	IRV1000
2	IRV2000
3	IRV3000

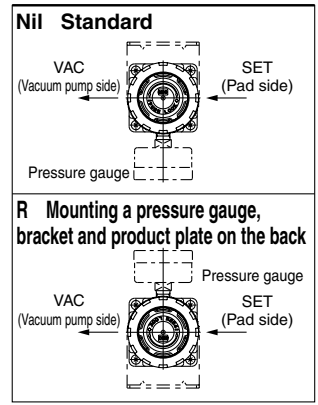
Thread type

Nil	Rc
N*	NPT
F*	G

* Option

Made to Order (Refer to the table below.)

Suffix



Accessory

Nil	None
B	With bracket (Note)
G	With pressure gauge

Note) Brackets are shipped together, (but not assembled).

Specification Combinations

◎ Standard specification ○ Valid combination □ Invalid combination

Specifications	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		◎
Accessory	Bracket	B	○	○
	Pressure gauge	G	○	○
Option specifications	Pressure gauge reverse mounted	R	○	○
	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		○	

Port size

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

Accessory (Option) Part No.

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

* Precision of pressure gauge ±3% (Full span)

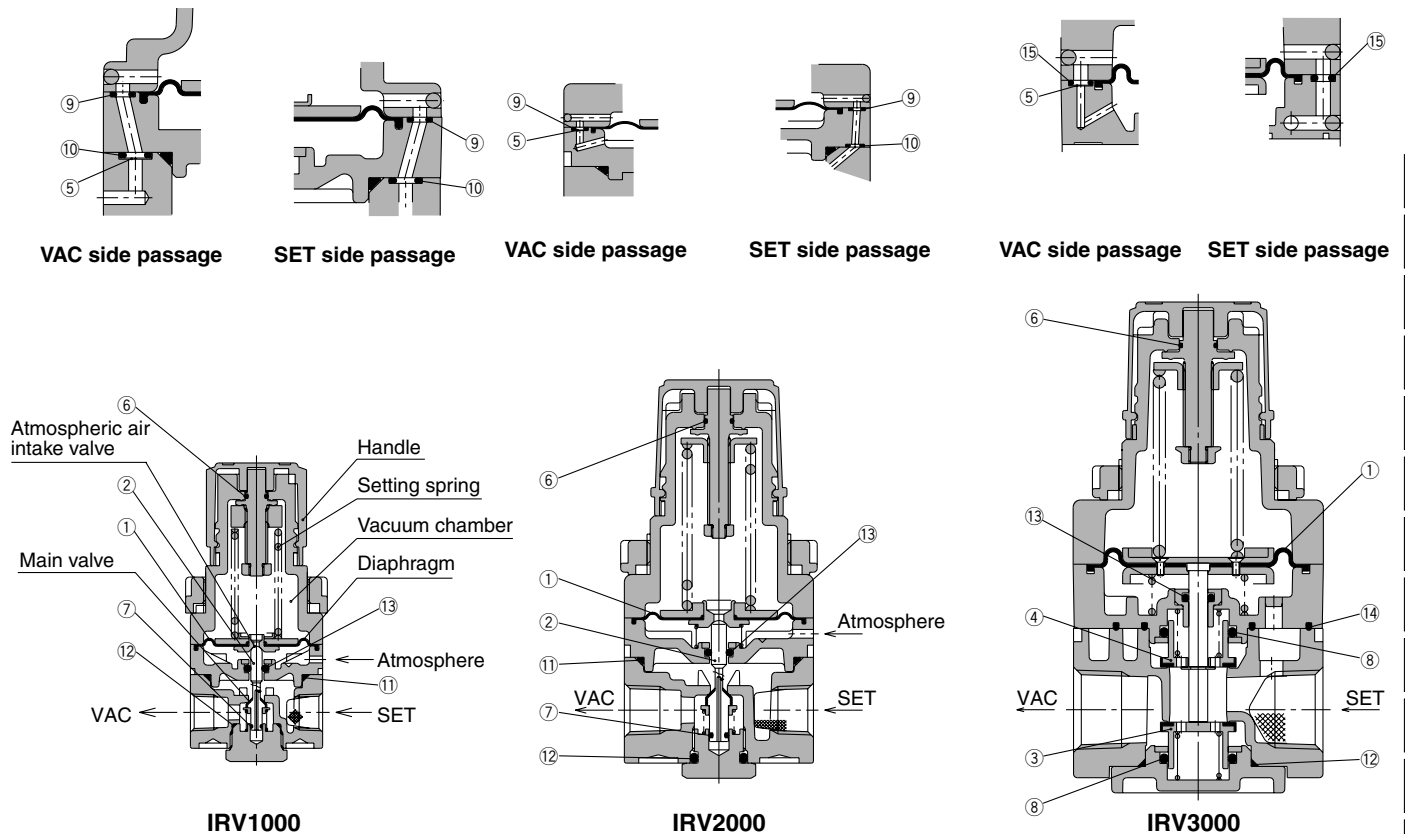


Made to Order Specifications

(For details, refer to page 568.)

Symbol	Specifications/Content
X465□	With digital pressure switch

Construction



Working principle (For IRV1000)

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

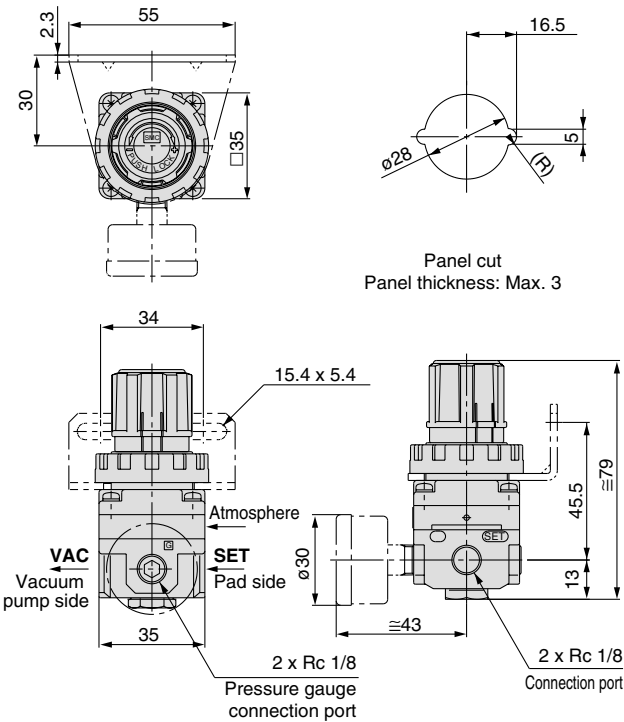
Note 1) For O-ring numbers 8 and 13, use mini-flicking type.

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

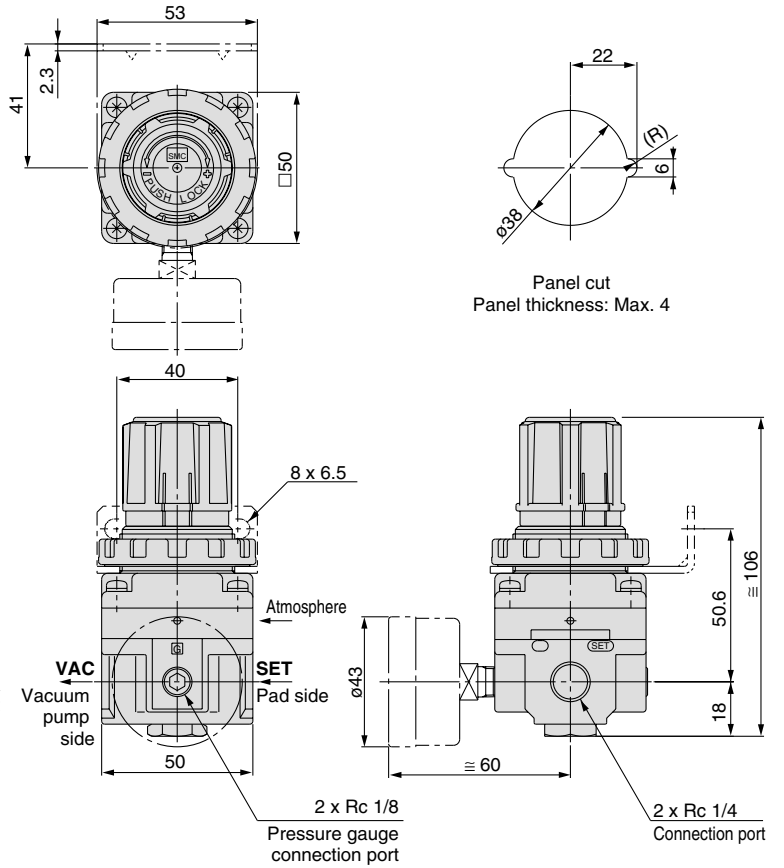
Series IRV1000/2000/3000

Dimensions

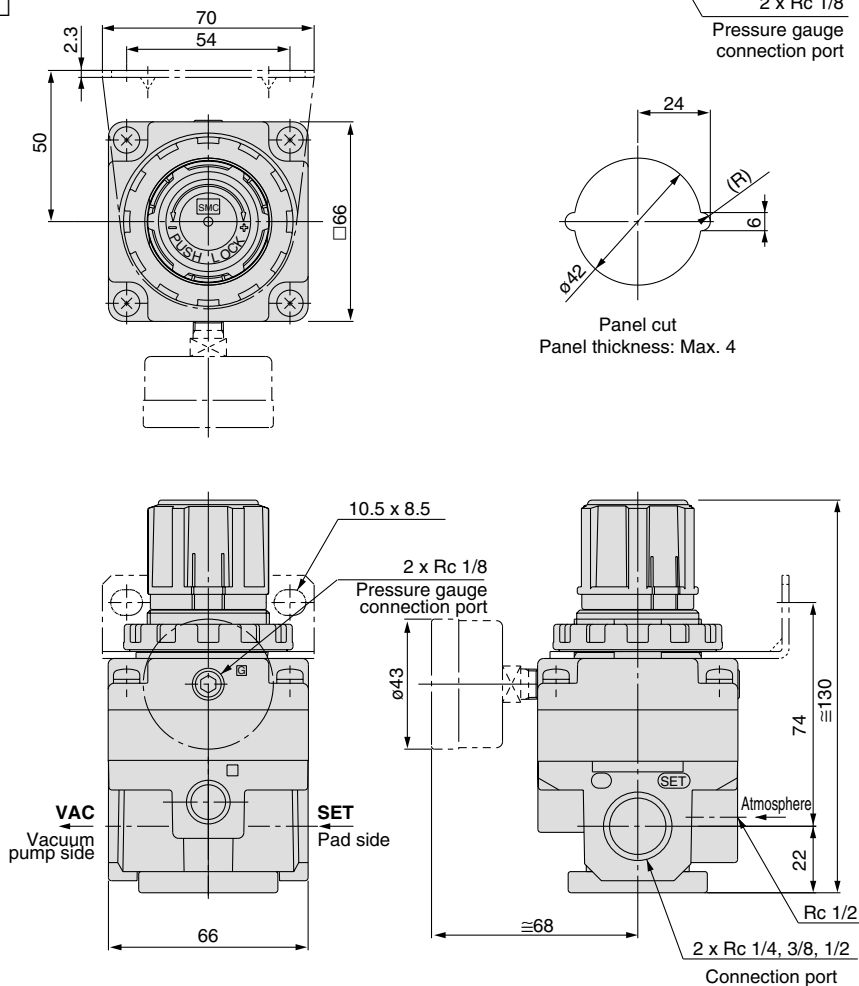
IRV1000-01□



IRV2000-02□



IRV3000-02□ IRV3000-03□ IRV3000-04□

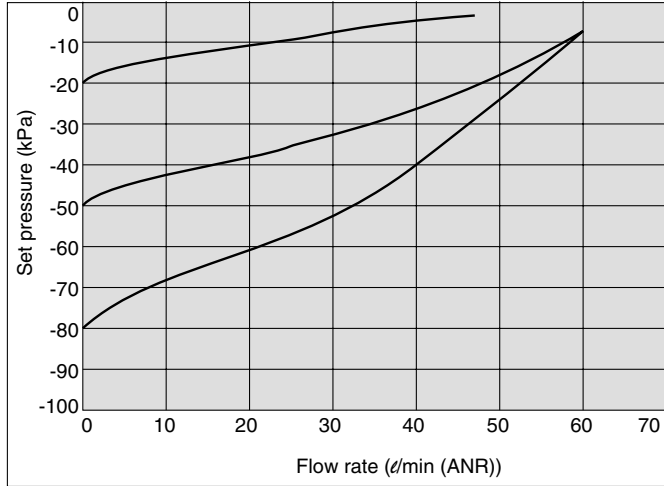


Vacuum Regulator *Series IRV1000/2000/3000*

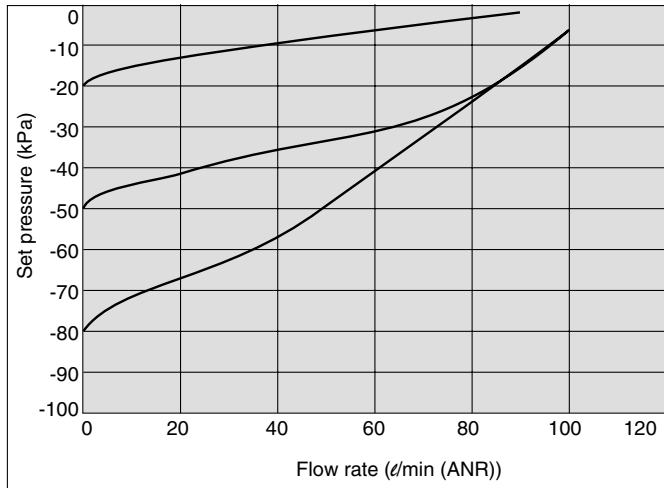
Flow Characteristics

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

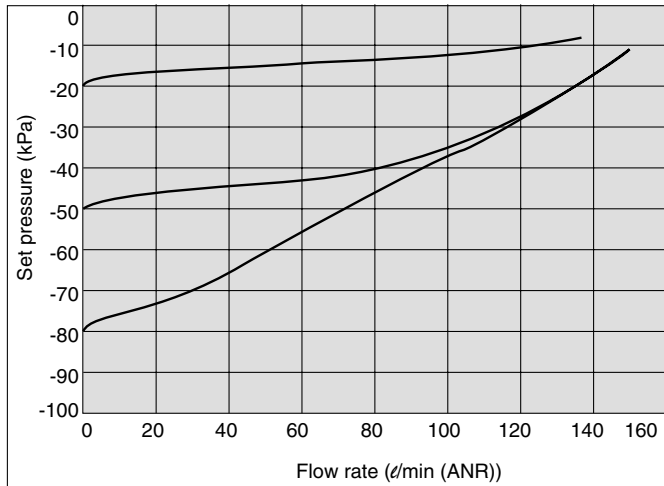
IRV1000



IRV2000



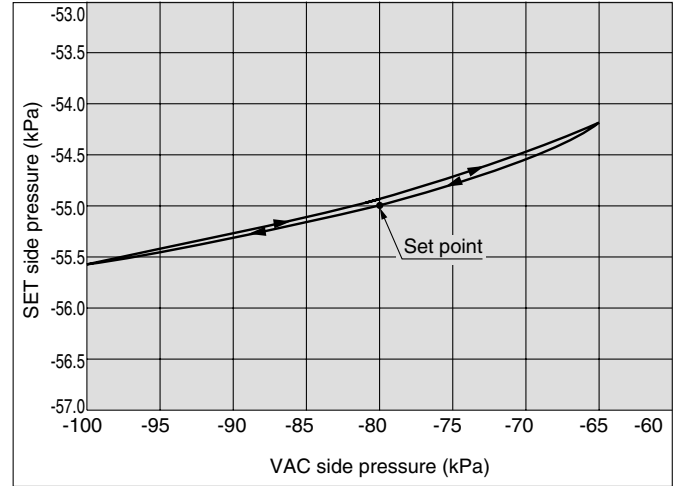
IRV3000



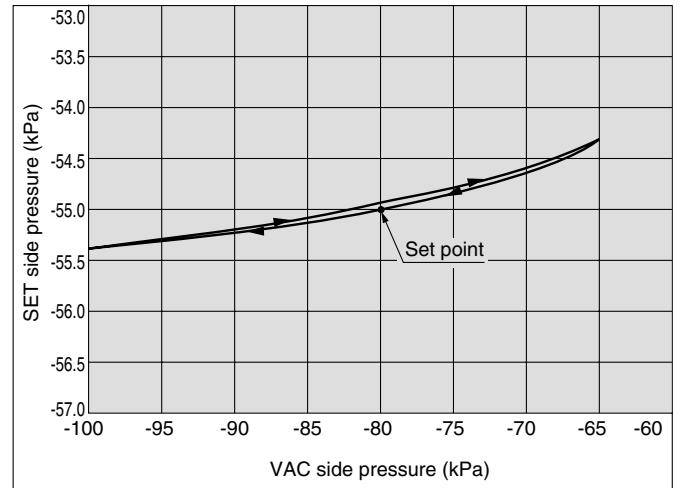
Pressure Characteristics

Vacuum pump exhaust speed: 500 ℓ /min

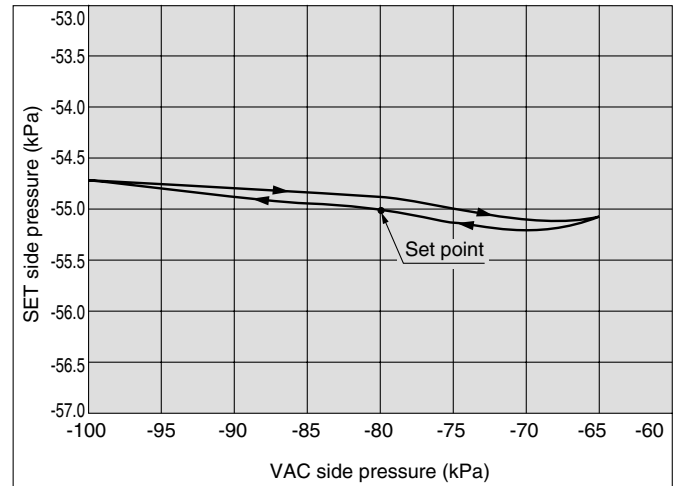
IRV1000



IRV2000



IRV3000



ARJ

AR425
to 935

AMR

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IR

IRV

VEX1

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VBAT

AP100

Series IRV1000/2000/3000

Made to Order Specifications:



Please contact SMC regarding detailed dimensions, specifications, and delivery times.

1. With Digital Pressure Switch

With digital pressure switch (Model: ZSE30-01-□□-ML). But, note that it is not assembled at the time of shipment from factory. Mount a digital pressure switch to the connecting port for pressure gauge.

Specifications

Made to order part no.		-X465□
Pressure switch	Set pressure range (kPa)	-101 to 101
	Desolution of set and display (kPa)	0.2
	Power supply voltage	12 to 24 VDC ±10%, Ripple (p-p) 10% or less (With reverse connection protection)
	Current consumption	45 mA or less (but 70 mA or less at current output)



How to Order

Standard model no. ^{Note)} — **X465** **A**

Note) Except symbol G

• Switch specifications

Symbol	Output specifications
A	NPN output
B	PNP output
C	1 to 5 V output
D	4 to 20 mA output

• With digital pressure switch



Note 1) Please contact SMC separately for details about the external dimensions, etc.

Note 2) For details on handling digital pressure switch and its specifications, refer to pages of ZSE30 series digital pressure switch in Best Pneumatics No. 6.

Note 3) Do not apply positive pressure on vacuum regulator Series IRV, because it is dedicated for negative pressure, while it is able to apply positive pressure on digital pressure switch.

Note 4) Digital pressure switch is enclosed in a single container.



Series IRV1000/2000/3000 Specific Product Precautions

Be sure to read before handling.
Refer to front matters 42 and 43 for Safety Precautions and pages 287 to 291 for Precautions on every series.

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 with a 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.
4. Do not apply force when transferring, mounting and dropping the regulator with a pressure gauge. This may cause misalignment of the pressure gauge pointer.

Operating Environment

Warning

1. Do not use valves in such environments where corrosive gases, chemicals, brine, water or steam is airborne, or where valves can be directly exposed to any of those.
2. Do not use in locations influenced by vibrations or impacts.
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

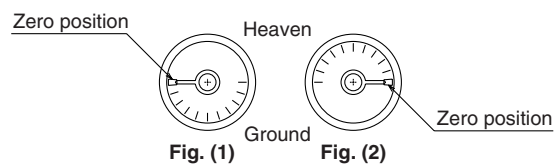
1. These products are designed for use with air. Please contact SMC if any other fluid will be used.
2. Do not use air which includes chemicals, synthetic oils containing organic solvents, salt, or corrosive gases, etc., as this can cause damage or malfunction.

Operation

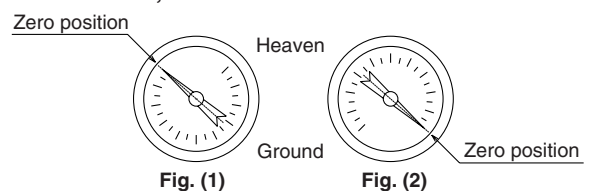
Caution

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. Do not plug the EXH hole (atmospheric air suction hole) on the body of IRV3000.
4. When locking the handle 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 handle, 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. If positive pressure is applied to the regulator with a pressure gauge, the pressure gauge's pointer may be misaligned. Be sure not to apply positive pressure.
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.
8. 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).

For IRV1000



For IRV2000, IRV3000



ARJ

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