Series 10-IRV10/20 Vacuum Regulator

RoHS

How to Order

Standard connections

10-IRV □-□ C08 □ □

Clean series

Body size

10	Max. flow 140 L/min (ANR)
20	Max. flow 240 L/min (ANR)

Fittings

Nil	Straight
L	Elbow

Straight

Connection tubing O.D.

Symbol	Tubing O.D.		10-IRV10	10-IRV20
C06	Metric	ø6	●	●
C08		ø8	●	●
C10		ø10	—	●
N07	Inch	ø1/4"	●	●
N09		ø5/16"	●	●
N11		ø3/8"	—	●

Accessory ② [Supplied with product]

Nil	None Note 1)		
GN	Gauge nut assembly Note 2)		
G	Pressure gauge assembly Note 3) Note 4) (10-IRV10: With GZ33-K-01-X5, 10-IRV20: With GZ43-K-01-X5)		
ZN	Note 4) Digital pressure switch assembly	NPN open collector 1 output	With ZSE20-N-M-01-L
ZP		PNP open collector 1 output	With ZSE20-P-M-01-L
ZA		NPN open collector 2 outputs + Copy function	With ZSE20A-X-M-01-J
ZB		PNP open collector 2 outputs + Copy function	With ZSE20A-Y-M-01-J

Note 1) Two plug nuts are mounted on the gauge port.
Note 2) One plug nut, one gauge nut assembly, and two clips are included. The pressure gauge assembly and digital pressure switch assembly are not included.
Note 3) Pressure gauge accuracy: Within ±3% of full scale
Note 4) 1 plug nut and 2 clips are included in the pressure gauge assembly and the digital pressure switch assembly. (For details, refer to page 1125 of the IRV10/20 series catalog.)

Accessory ① [Supplied with product]

Nil	None
B	With bracket
L	With bottom bracket

Bottom bracket

Single sided connections

10-IRV 20 A-□ C08 □ □

Clean series

Body size

10	Max. flow 140 L/min (ANR)
20	Max. flow 240 L/min (ANR)

Single sided connections

A	Single sided connections

Fittings

Nil	Straight
L	Elbow

Elbow

Connection tubing O.D.

Symbol	Tubing O.D.		10-IRV10A	10-IRV20A
C06	Metric	ø6	●	●
C08		ø8	●	●
C10		ø10	—	●
N07	Inch	ø1/4"	●	●
N09		ø5/16"	●	●
N11		ø3/8"	—	●

Accessory ② [Supplied with product]

Nil	None Note 1)		
GN	Gauge nut assembly Note 2)		
G	Pressure gauge assembly Note 3) Note 4) (10-IRV10: With GZ33-K-01-X5, 10-IRV20: With GZ43-K-01-X5)		
ZN	Note 4) Digital pressure switch assembly	NPN open collector 1 output	With ZSE20-N-M-01-L
ZP		PNP open collector 1 output	With ZSE20-P-M-01-L
ZA		NPN open collector 2 outputs + Copy function	With ZSE20A-X-M-01-J
ZB		PNP open collector 2 outputs + Copy function	With ZSE20A-Y-M-01-J

Note 1) Two plug nuts are mounted on the gauge port.
Note 2) One gauge nut assembly and one clip are included. The pressure gauge assembly and digital pressure switch assembly are not included.
Note 3) Pressure gauge accuracy: Within ±3% of full scale
Note 4) 1 clip is included in the pressure gauge assembly and the digital pressure switch assembly. (For details, refer to page 1125 of the IRV10/20 series catalog.)

Accessory ① [Supplied with product]

Nil	None
B	With bracket
L	With bottom bracket

Bottom bracket

Standard Specifications

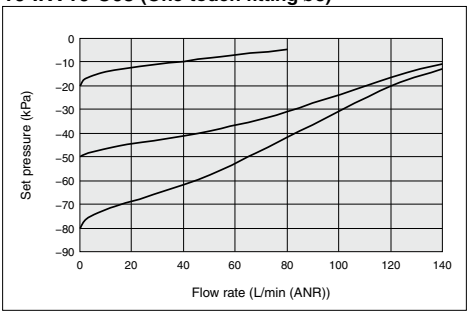
Model		10-IRV10	10-IRV20
Fluid		Air	
Set pressure range Note 1)		−100 to −1.3 kPa	
Atmospheric intake consumption Note 2)		0.6 L/min (ANR) or less	
Knob resolution		0.13 kPa or less	
Ambient and fluid temperature		5 to 60°C	
VAC side tubing O.D.		ø6, ø8 ø1/4", ø5/16"	ø6, ø8, ø10 ø1/4", ø5/16", ø3/8"
SET side tubing O.D.			
Weight (Without accessories)	**Standard connections**	135 g (10-IRV10-C08)	250 g (10-IRV20-C10)
	Single sided connections	125 g (10-IRV10A-C08)	250 g (10-IRV20A-C10)

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

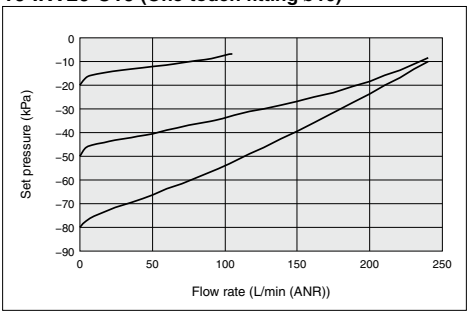
Flow Rate Characteristics (Representative Value)

Conditions:
Vacuum pump exhaust speed: 2500 L/min
VAC side pressure: −101 kPa (At initial setting)

10-IRV10-C08 (One-touch fitting ø8)

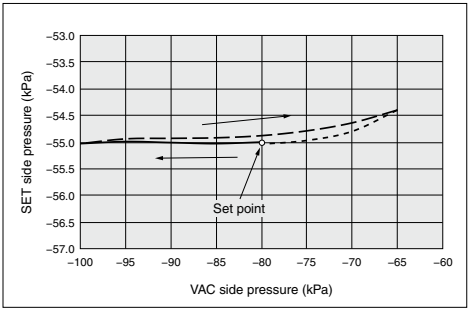


10-IRV20-C10 (One-touch fitting ø10)

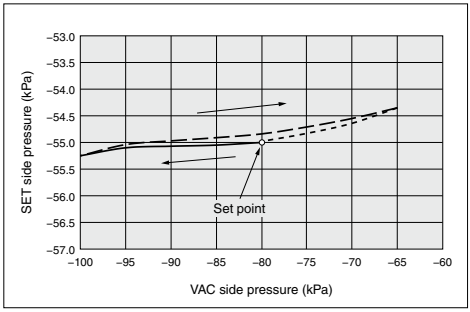


Pressure Characteristics (Representative Value)

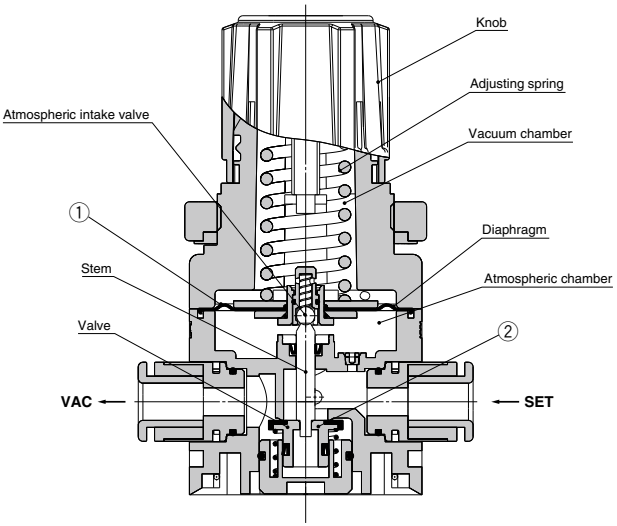
10-IRV10



10-IRV20



Construction



Working principle

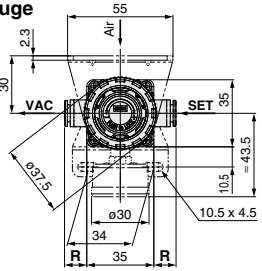
When the knob is turned to the right (clockwise), the adjusting spring's generated force pushes down the diaphragm and the valve. This connects the VAC side and SET side, and the degree of vacuum on the SET side increases (becomes closer to an absolute vacuum). Furthermore, the SET side vacuum pressure 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 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 vacuum chamber is lost, and the diaphragm is pushed down. This causes the atmospheric intake valve to close and the 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.

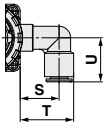
Replacement Parts

No.	Description	Material	Part no.	
			10-IRV10	**10-IRV20**
1	**Diaphragm assembly**	HNBR, etc.	P601010-2	P601020-2
2	**Valve assembly**	HNBR, etc.	P601010-3	P601020-3

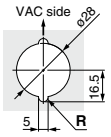
Dimensions/10-IRV10: Standard Connections

10-IRV10-□□□G: With pressure gauge

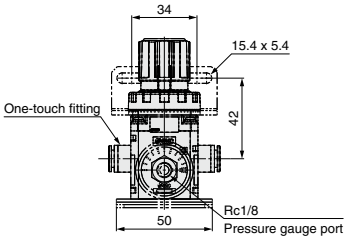


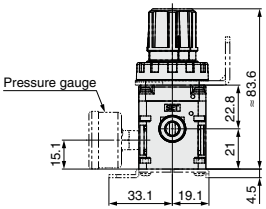


Elbow fitting



Panel cut
Panel plate thickness: Max. 3

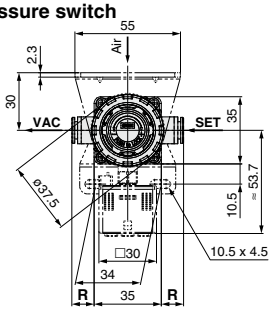


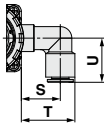


Fitting Part Dimensions (mm)

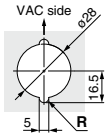
Fitting size	VAC/SET			
	Straight	Elbow	Elbow	Elbow
	R	S	T	U
ø6	9.9	19.1	25.5	20
ø8	11.6	20.3	27.9	23
ø1/4"	9.9	19.3	25.9	20.5
ø5/16"	11.6	20.3	27.9	23

10-IRV10-□□□Z$^{N}_{A}{}^{P}_{B}$: With digital pressure switch

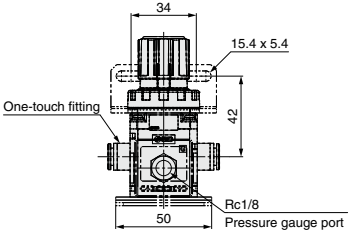


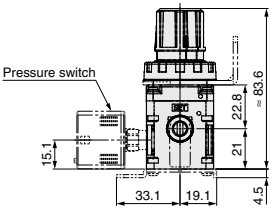


Elbow fitting



Panel cut
Panel plate thickness: Max. 3



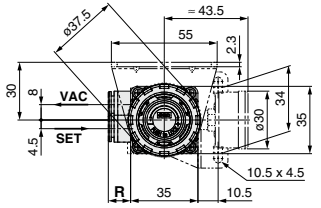


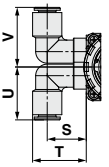
Fitting Part Dimensions (mm)

Fitting size	VAC/SET			
	Straight	Elbow	Elbow	Elbow
	R	S	T	U
ø6	9.9	19.1	25.5	20
ø8	11.6	20.3	27.9	23
ø1/4"	9.9	19.3	25.9	20.5
ø5/16"	11.6	20.3	27.9	23

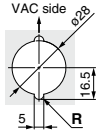
Dimensions/10-IRV10A: Single Sided Connections

10-IRV10A-□□□G: With pressure gauge

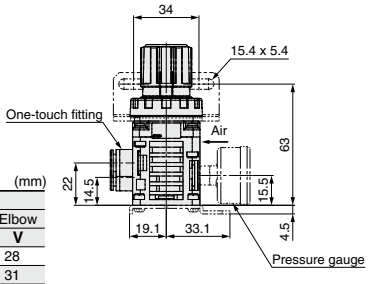


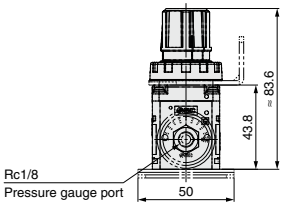


Elbow fitting



Panel cut
Panel plate thickness: Max. 3

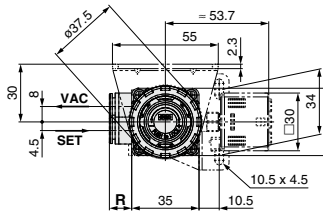


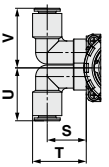


Fitting Part Dimensions (mm)

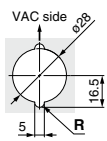
Fitting size	VAC/SET				
	Straight	Elbow	Elbow	Elbow	Elbow
	R	S	T	U	V
ø6	9.9	19.1	25.5	24.5	28
ø8	11.6	20.3	27.9	27.5	31
ø1/4"	9.9	19.3	25.9	25	28.5
ø5/16"	11.6	20.3	27.9	27.5	31

10-IRV10A-□□□Z$^{N}_{P}$$_{B}$: With digital pressure switch

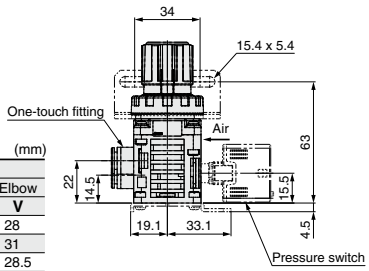


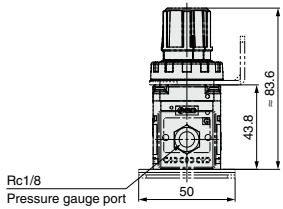


Elbow fitting



Panel cut
Panel plate thickness: Max. 3



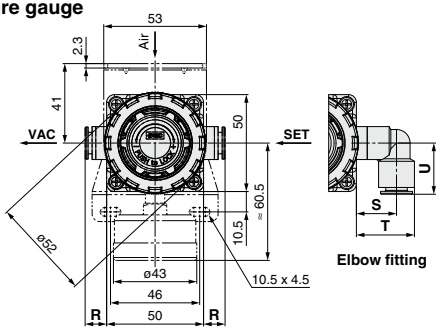


Fitting Part Dimensions (mm)

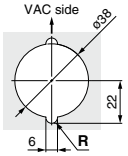
Fitting size	VAC/SET				
	Straight	Elbow	Elbow	Elbow	Elbow
	R	S	T	U	V
ø6	9.9	19.1	25.5	24.5	28
ø8	11.6	20.3	27.9	27.5	31
ø1/4"	9.9	19.3	25.9	25	28.5
ø5/16"	11.6	20.3	27.9	27.5	31

Dimensions/10-IRV20: Standard Connections

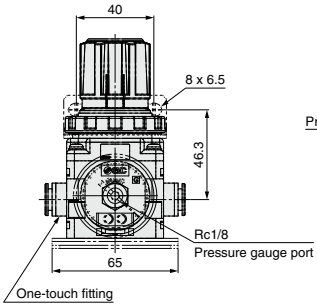
10-IRV20-□□□G: With pressure gauge

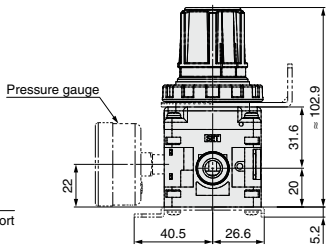


Elbow fitting



Panel cut
Panel plate thickness: Max. 4

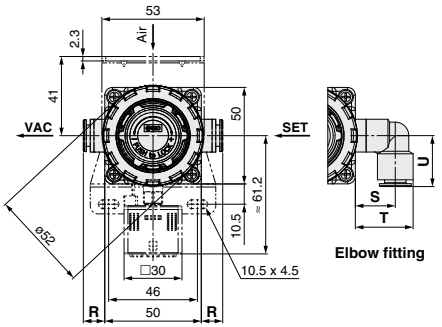




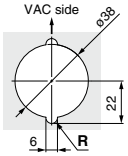
Fitting Part Dimensions (mm)

Fitting size	VAC/SET			
	Straight	Elbow	Elbow	Elbow
	R	S	T	U
ø6	9.1	18	24.4	20.3
ø8	10.5	19.2	26.8	23.3
ø10	11.1	20.7	30	26.4
ø1/4"	8.8	18.2	24.8	20.6
ø5/16"	10.5	19.2	26.8	23.3
ø3/8"	11	20.4	29.4	26.2

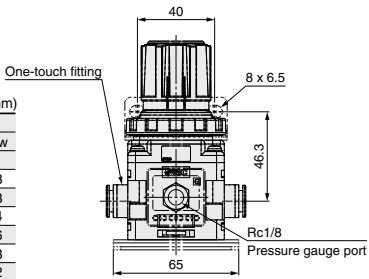
10-IRV20-□□□Z$^{N}_{P}$$_{A}$$_{B}$: With digital pressure switch

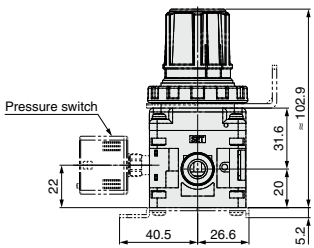


Elbow fitting



Panel cut
Panel plate thickness: Max. 4



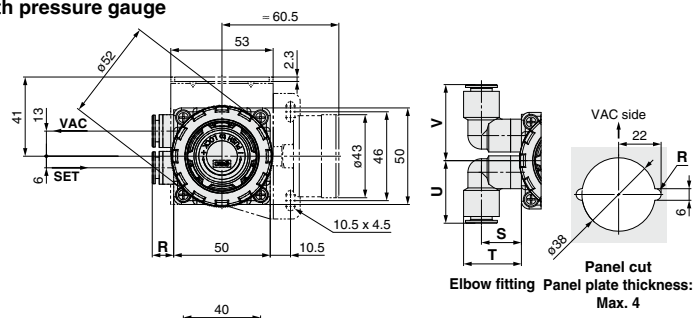


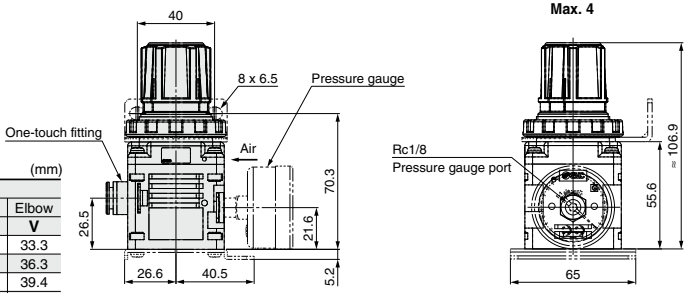
Fitting Part Dimensions (mm)

Fitting size	VAC/SET			
	Straight	Elbow	Elbow	Elbow
	R	S	T	U
ø6	9.1	18	24.4	20.3
ø8	10.5	19.2	26.8	23.3
ø10	11.1	20.7	30	26.4
ø1/4"	8.8	18.2	24.8	20.6
ø5/16"	10.5	19.2	26.8	23.3
ø3/8"	11	20.4	29.4	26.2

Dimensions/10-IRV20A: Single Sided Connections

10-IRV20A-□□□G: With pressure gauge

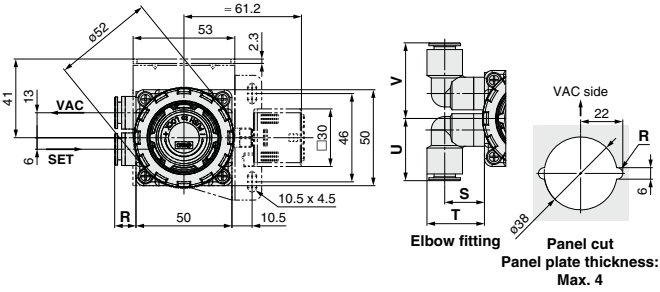


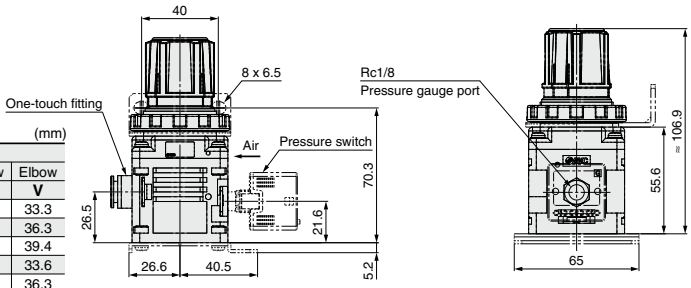


Fitting Part Dimensions (mm)

Fitting size	VAC/SET				
	Straight	Elbow	Elbow	Elbow	Elbow
	R	S	T	U	V
ø6	9.1	18	24.4	26.3	33.3
ø8	10.5	19.2	26.8	29.3	36.3
ø10	11.1	20.7	30	32.4	39.4
ø1/4"	8.8	18.2	24.8	26.6	33.6
ø5/16"	10.5	19.2	26.8	29.3	36.3
ø3/8"	11	20.4	29.4	32.2	39.2

10-IRV20A-□□□Z$^{N}_{P}$$_{B}$: With digital pressure switch





Fitting Part Dimensions (mm)

Fitting size	VAC/SET				
	Straight	Elbow	Elbow	Elbow	Elbow
	R	S	T	U	V
ø6	9.1	18	24.4	26.3	33.3
ø8	10.5	19.2	26.8	29.3	36.3
ø10	11.1	20.7	30	32.4	39.4
ø1/4"	8.8	18.2	24.8	26.6	33.6
ø5/16"	10.5	19.2	26.8	29.3	36.3
ø3/8"	11	20.4	29.4	32.2	39.2

Series 10-IRV10/20
Specific Product Precautions

Be sure to read this before handling. Refer to page 1382 for Safety Instructions.

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

Operating Environment

⚠Warning

1. Do not use in an atmosphere having corrosive gases, chemicals, sea water, water, water steam, or where there is direct contact with any of these.
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 Supply

⚠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 malfunction.

Precautions

⚠Caution

1. Connect piping to the port with "VAC" indication for connection to the vacuum pump.
2. 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".
3. When adjusting pressure, do not touch the lateral hole (atmospheric intake hole) of the body.
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 vacuum 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 trouble with the vacuum pump.
6. 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.
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 (includes piping capacity) of the set side. Since the vacuum pump capacity also affects the response time, consider all these points before operations.
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.

10-IRV10

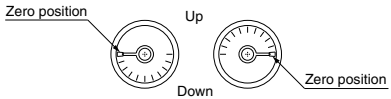


Fig. 1 Fig. 2

10-IRV20

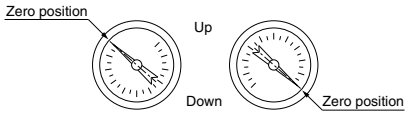


Fig. 1 Fig. 2