# Vacuum Regulator

## Single Sided Connections Series

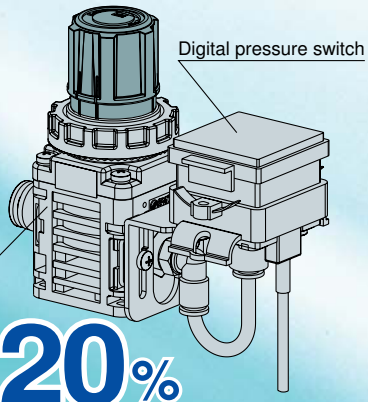
For ease of installation and panel mounting



Single sided connections

**Integrated digital pressure switch for panel mounting**

(Made to Order)




**Mass reduced by 20%**

(Compared with the existing IRV2000 with IRV20 fitting)

**New and Improved IRV Series**

**Max. flow**

(Over twice the flow of the existing models)

**140 ℓ/min (ANR)**

Existing IRV1000:
60 ℓ/min (ANR)

**240 ℓ/min (ANR)**

Existing IRV2000:
100 ℓ/min (ANR)

Standard connections





Series IRV10



Series IRV20

## Series IRV10/20

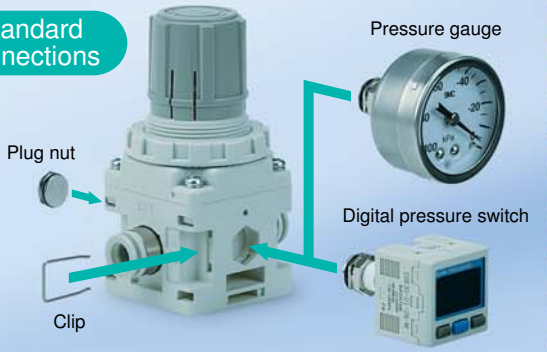
SMC

CAT.ES60-20A

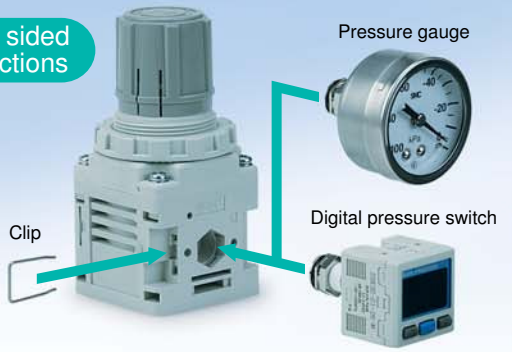
## Easy to attach/detach the pressure gauge or digital pressure switch due to attachment by clip.

**Mounting direction of the pressure gauge or digital pressure switch can be changed.** (Standard connections only)

Standard connections




Single sided connections

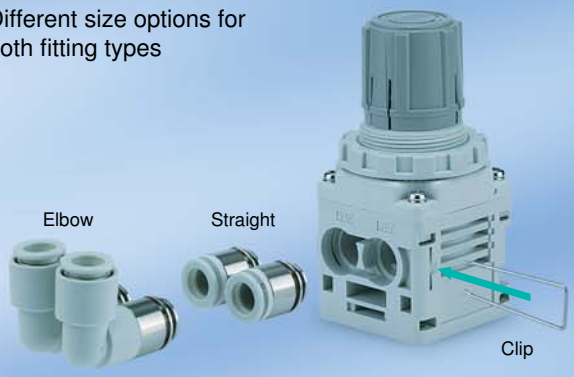



**Mounting angle of the pressure gauge or digital pressure switch can be changed easily (in 60 degree increments).**



## Built-in one-touch fittings

Different size options for both fitting types




| Fitting type | Applicable tubing O.D. (mm) | Model | |
|---|---|---|---|
| | | IRV10 | IRV20 |
| Straight Elbow | ø6 | ● | ● |
| | ø8 | ● | ● |
| | ø10 | — | ● |
| | ø1/4" | ● | ● |
| | ø5/16" | ● | ● |
| | ø3/8" | — | ● |

Standard connections

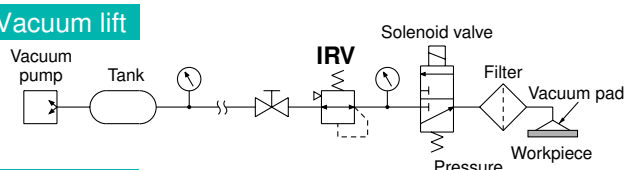



Single sided connections

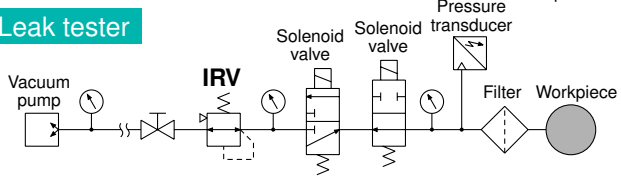



## Applications

Vacuum lift

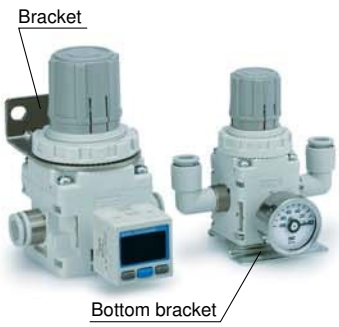



Leak tester

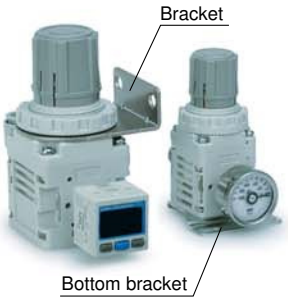



## Mounting Variations

Standard connections




Single sided connections



# Vacuum Regulator
# Series IRV10/20

## How to Order

### Standard connections

**IRV 20 – □ C08 □ □**

**Body size**

| | |
|---|---|
| **10** | Max. flow 140 ℓ/min (ANR) |
| **20** | Max. flow 240 ℓ/min (ANR) |

**Fittings**

| | |
|---|---|
| **Nil** | Straight |
| **L** | Elbow |



**Straight** **Elbow**

**Connection tubing O.D.**

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

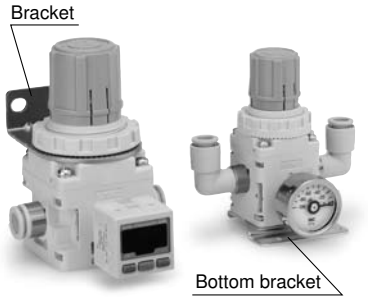
**Accessory ② Note 1)**

| | | | |
|---|---|---|---|
| **Nil** | None | | |
| **G** | With pressure gauge Note 2) (IRV10: With GZ33-K-01, IRV20: With GZ43-K-01) | | |
| **ZN** | With digital pressure switch | NPN open collector 1 output | With ZSE30A-01-N-ML |
| **ZP** | | PNP open collector 1 output | With ZSE30A-01-P-ML |
| **ZA** | | NPN open collector 2 outputs | With ZSE30A-01-A-ML |
| **ZB** | | PNP open collector 2 outputs | With ZSE30A-01-B-ML |

Note 1) Plug nut and gauge nut are included. (For details, refer to back page 3.) Accessories are included in the same container.
Note 2) Pressure gauge accuracy: Within ±3% of full scale

**Accessory ① Note 1)**

| | |
|---|---|
| **Nil** | None |
| **B** | With bracket |
| **L** | With bottom bracket |




### Single sided connections

**IRV 20 A – □ C08 □ □ – □**

**Body size**

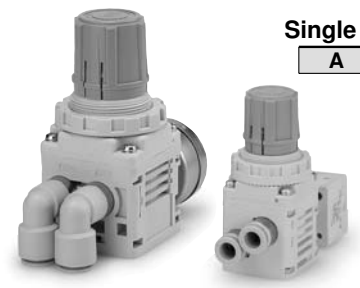
| | |
|---|---|
| **10** | Max. flow 140 ℓ/min (ANR) |
| **20** | Max. flow 240 ℓ/min (ANR) |

**Single sided connections**

| | |
|---|---|
| **A** | Single sided connections |

**Fittings**

| | |
|---|---|
| **Nil** | Straight |
| **L** | Elbow |



**Elbow** **Straight**

**Connection tubing O.D.**

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

**Made to Order**
For details, refer to page 10.

| Symbol | Specification |
|---|---|
| **X1** | Integrated digital pressure switch for panel mounting |

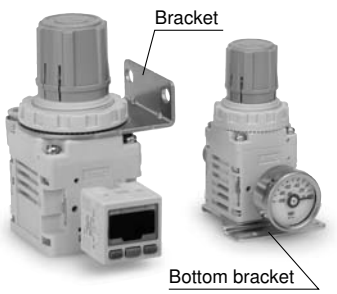
**Accessory ② Note 1)**

| | | | |
|---|---|---|---|
| **Nil** | None | | |
| **G** | With pressure gauge Note 2) (IRV10A: With GZ33-K-01, IRV20A: With GZ43-K-01) | | |
| **ZN** | With digital pressure switch | NPN open collector 1 output | With ZSE30A-01-N-ML |
| **ZP** | | PNP open collector 1 output | With ZSE30A-01-P-ML |
| **ZA** | | NPN open collector 2 outputs | With ZSE30A-01-A-ML |
| **ZB** | | PNP open collector 2 outputs | With ZSE30A-01-B-ML |

Note 1) Gauge nut is included. Accessories are included in the same container.
Note 2) Pressure gauge accuracy: Within ±3% of full scale

**Accessory ① Note 1)**

| | |
|---|---|
| **Nil** | None |
| **B** | With bracket |
| **L** | With bottom bracket |



## Standard Specifications

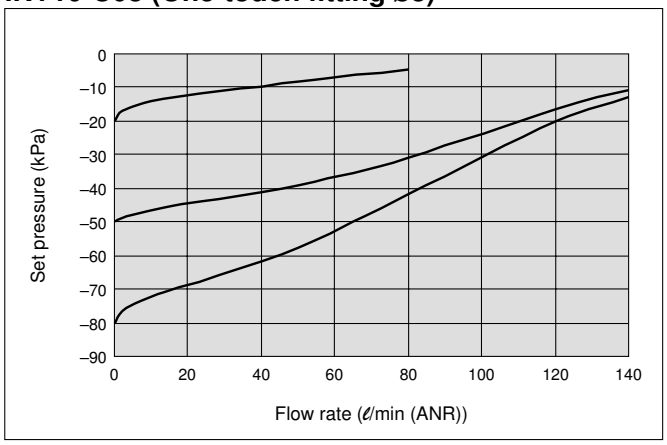
| Model | | IRV10 | IRV20 |
|---|---|---|---|
| **Fluid** | | Air | |
| **Set pressure range** Note 1) | | –100 to –1.3 kPa | |
| **Atmospheric intake consumption** Note 2) | | 0.6 ℓ/min (ANR) or less | |
| **Knob resolution** | | 0.13 kPa or less | |
| **Ambient and fluid temperature** | | 5 to 60°C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

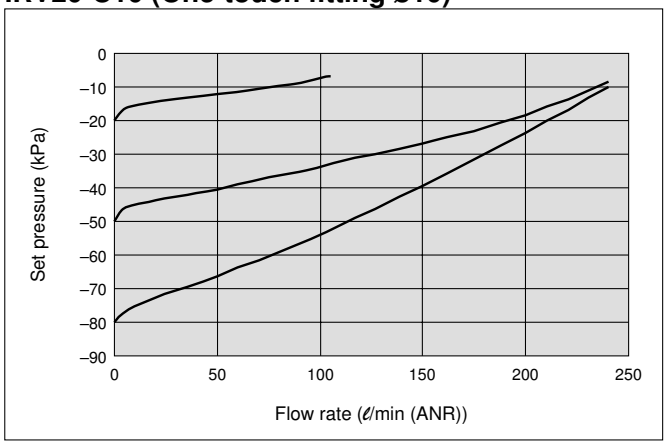
## Flow-rate Characteristics (Representative Value)

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

### IRV10-C08 (One-touch fitting ø8)

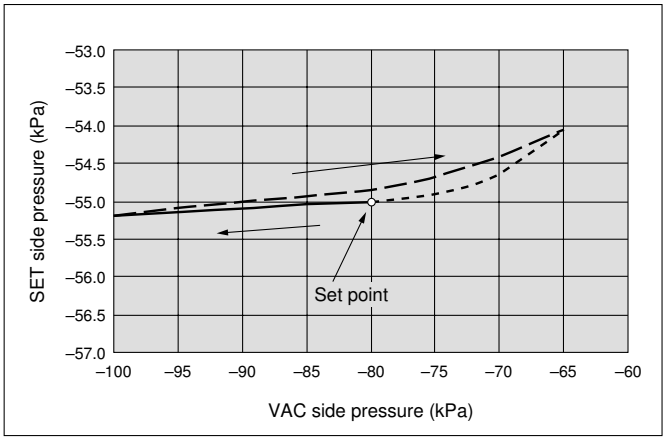



### IRV20-C10 (One-touch fitting ø10)

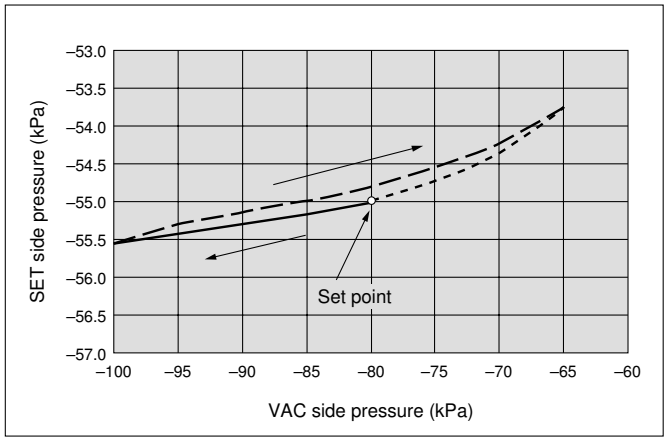



## Pressure Characteristics (Representative Value)

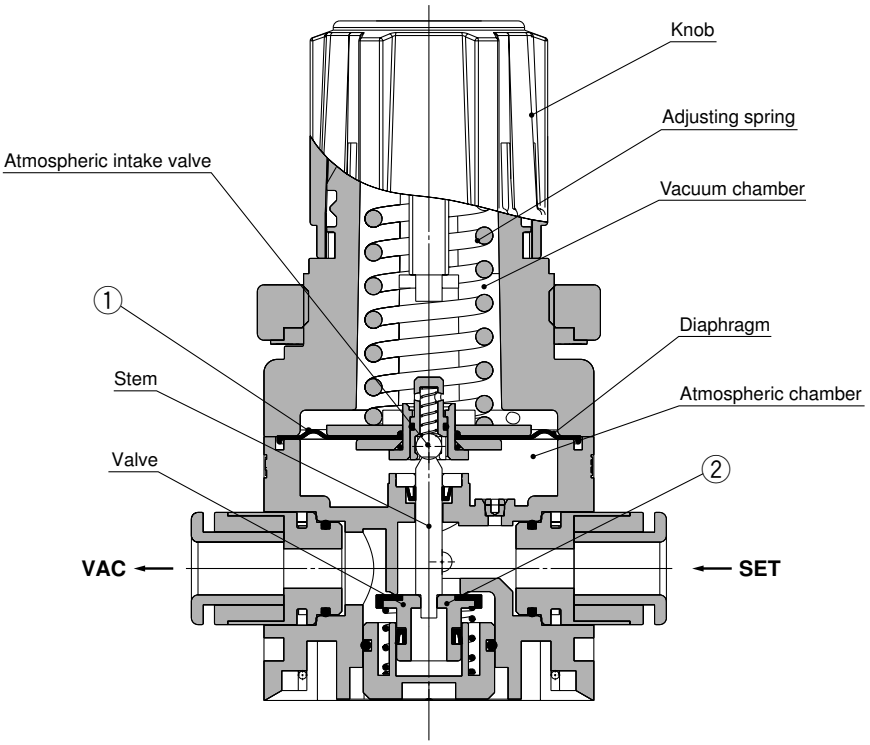
### IRV10




### IRV20



## Construction




### Working principle

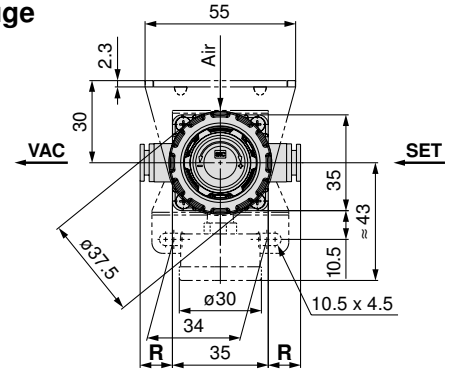
When the knob is turned to the right (clockwise), the adjusting spring's generated force pushes down the diaphragm and the valve. This connects the VAC side and SET side, and the degree of vacuum on the SET side increases (becomes closer to an absolute vacuum). Furthermore, the SET side vacuum pressure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

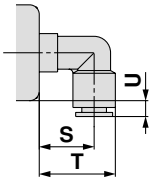
## Replacement Parts

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

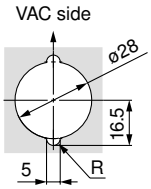
## Dimensions/IRV10: Standard Connections

### IRV10-□□□G: With pressure gauge

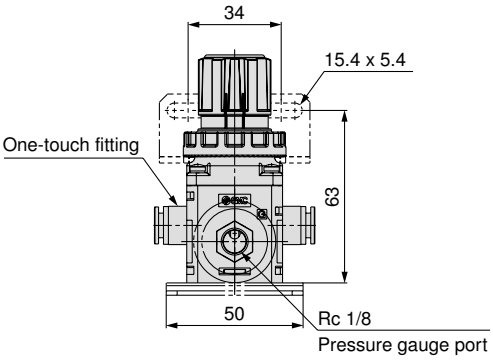


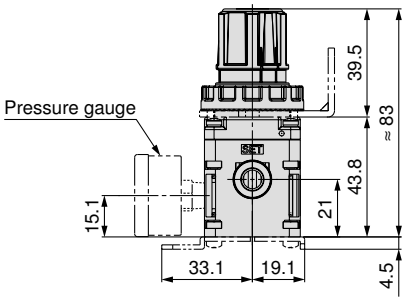




**Elbow fitting**




**Panel cut**
**Panel plate thickness: Max. 3**

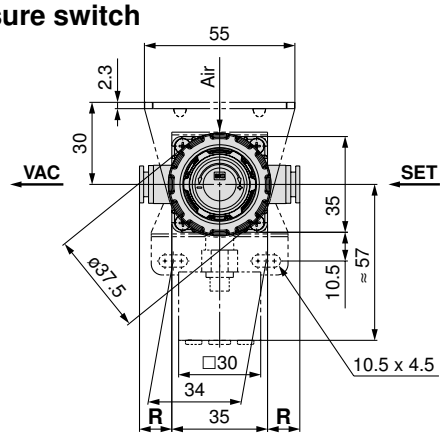


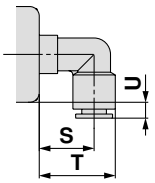




**Fitting Part Dimensions** (mm)

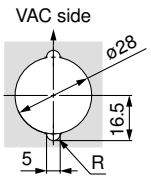
| Fitting size | VAC/SET | | | |
|---|---|---|---|---|
| | Straight | Elbow | Elbow | Elbow |
| | **R** | **S** | **T** | **U** |
| ø6, ø1/4" | 10 | 19 | 26 | 3 |
| ø8, ø5/16" | 12 | 20 | 28 | 6 |

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

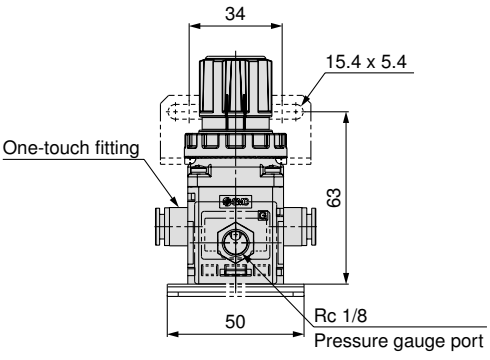


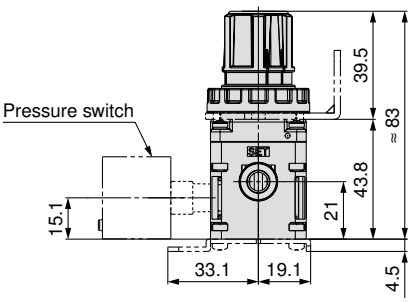




**Elbow fitting**




**Panel cut**
**Panel plate thickness: Max. 3**



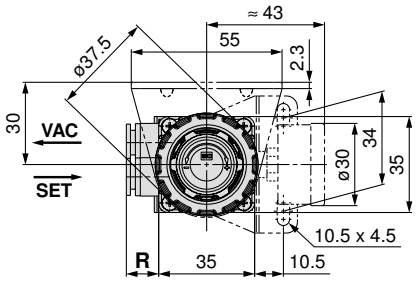



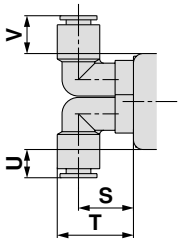

**Fitting Part Dimensions** (mm)

| Fitting size | VAC/SET | | | |
|---|---|---|---|---|
| | Straight | Elbow | Elbow | Elbow |
| | **R** | **S** | **T** | **U** |
| ø6, ø1/4" | 10 | 19 | 26 | 3 |
| ø8, ø5/16" | 12 | 20 | 28 | 6 |

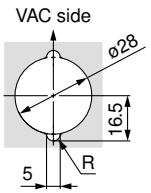
## Dimensions/IRV10A: Single Sided Connections

### IRV10A-□□□G: With pressure gauge

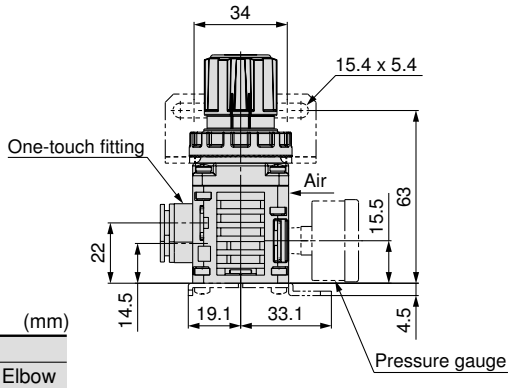


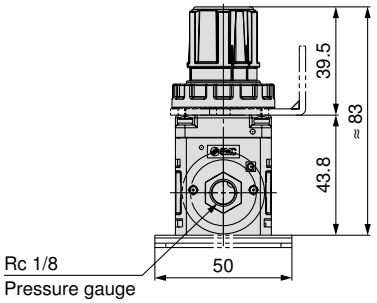




Elbow fitting




**Panel cut**
**Panel plate thickness: Max. 3**

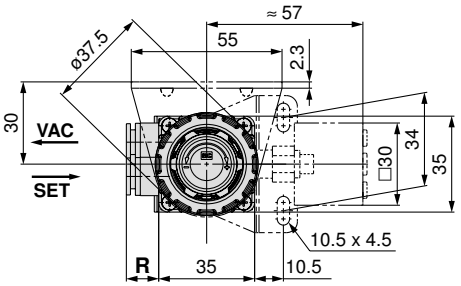


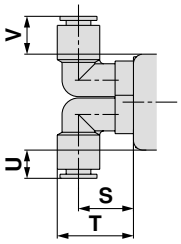




**Fitting Part Dimensions** (mm)

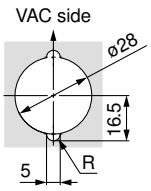
| Fitting size | VAC/SET | | | | |
|---|---|---|---|---|---|
| | Straight | Elbow | Elbow | Elbow | Elbow |
| | **R** | **S** | **T** | **U** | **V** |
| ø6, ø1/4" | 10 | 19 | 26 | 7.5 | 11 |
| ø8, ø5/16" | 12 | 20 | 28 | 10.5 | 14 |

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

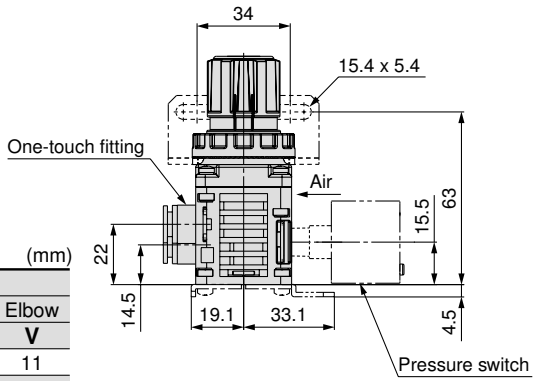


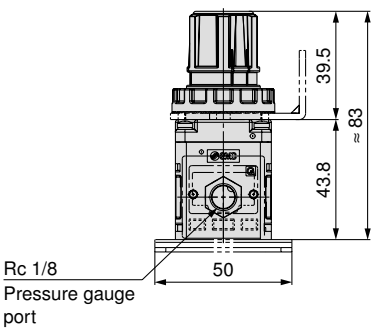




Elbow fitting




**Panel cut**
**Panel plate thickness: Max. 3**



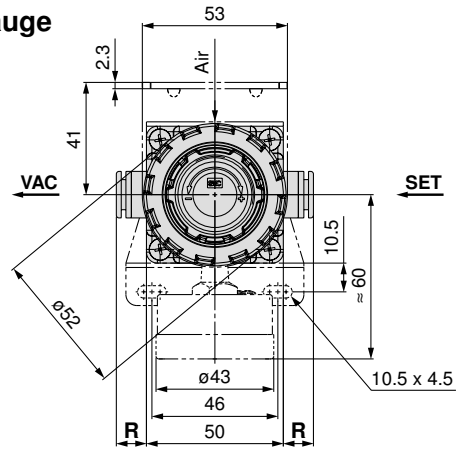



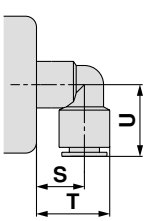

**Fitting Part Dimensions** (mm)

| Fitting size | VAC/SET | | | | |
|---|---|---|---|---|---|
| | Straight | Elbow | Elbow | Elbow | Elbow |
| | **R** | **S** | **T** | **U** | **V** |
| ø6, ø1/4" | 10 | 19 | 26 | 7.5 | 11 |
| ø8, ø5/16" | 12 | 20 | 28 | 10.5 | 14 |

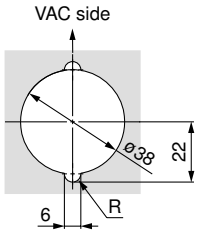
## Dimensions/IRV20: Standard Connections

### IRV20-□□□G: With pressure gauge

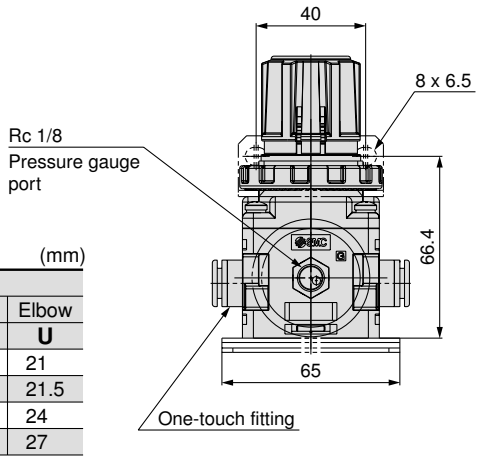


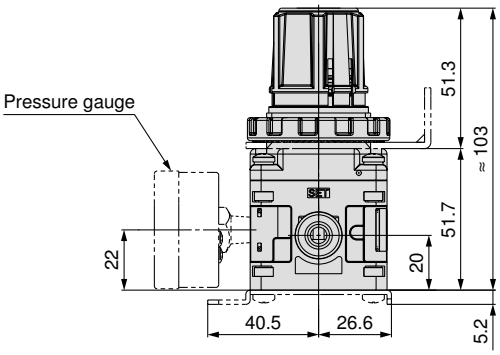




**Elbow fitting**




**Panel cut**
**Panel plate thickness: Max. 4**

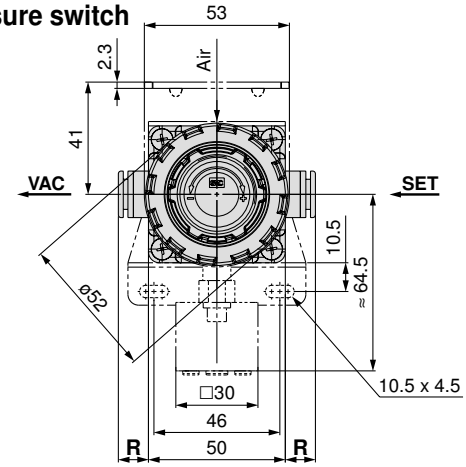


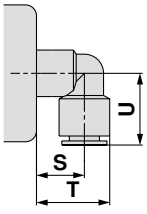




**Fitting Part Dimensions** (mm)

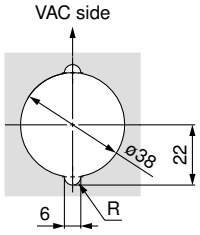
| Fitting size | VAC/SET | | | |
|---|---|---|---|---|
| | Straight | Elbow | Elbow | Elbow |
| | **R** | **S** | **T** | **U** |
| ø6 | 10.5 | 21 | 27.5 | 21 |
| ø1/4" | 10.5 | 21 | 27.5 | 21.5 |
| ø8, ø5/16" | 10.5 | 21 | 28.5 | 24 |
| ø10, ø3/8" | 11 | 21 | 30.5 | 27 |

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

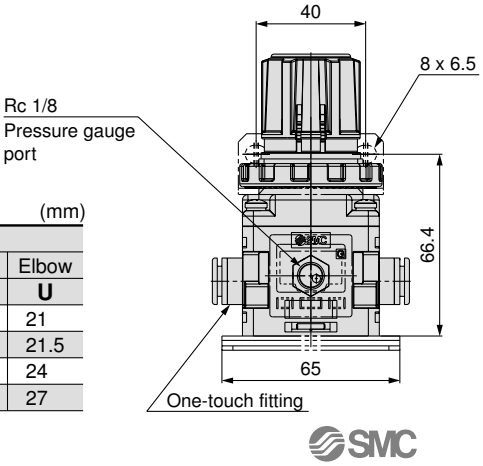


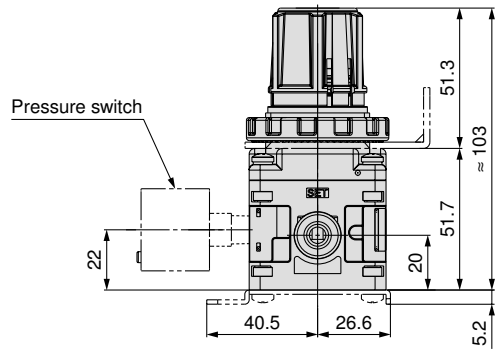




**Elbow fitting**




**Panel cut**
**Panel plate thickness: Max. 4**



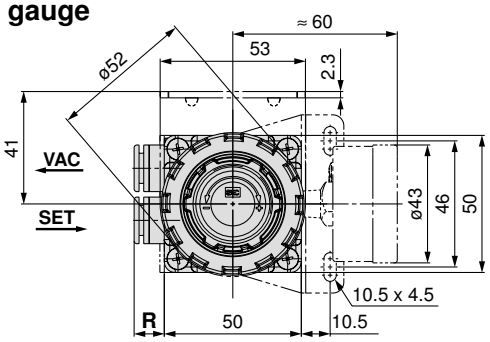



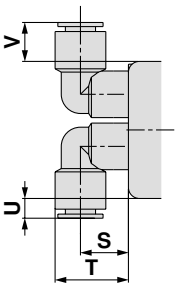

**Fitting Part Dimensions** (mm)

| Fitting size | VAC/SET | | | |
|---|---|---|---|---|
| | Straight | Elbow | Elbow | Elbow |
| | **R** | **S** | **T** | **U** |
| ø6 | 10.5 | 21 | 27.5 | 21 |
| ø1/4" | 10.5 | 21 | 27.5 | 21.5 |
| ø8, ø5/16" | 10.5 | 21 | 28.5 | 24 |
| ø10, ø3/8" | 11 | 21 | 30.5 | 27 |

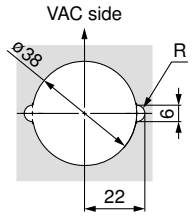
## Dimensions/IRV20A: Single Sided Connections

### IRV20A-□□□G: With pressure gauge

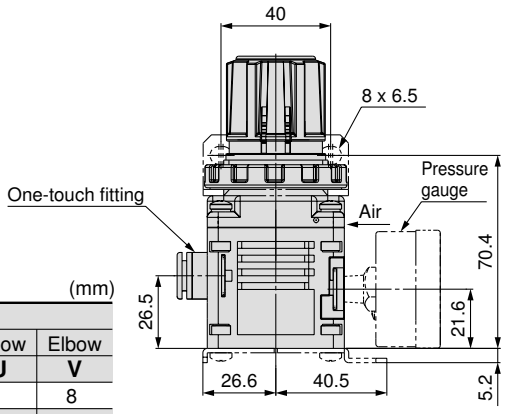


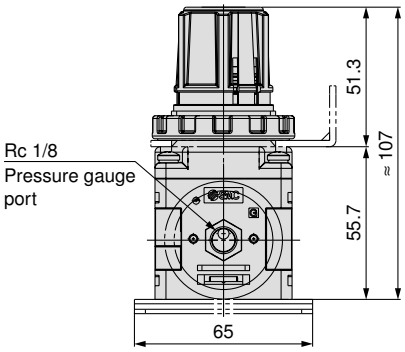




**Elbow fitting**




**Panel cut**
**Panel plate thickness: Max. 4**

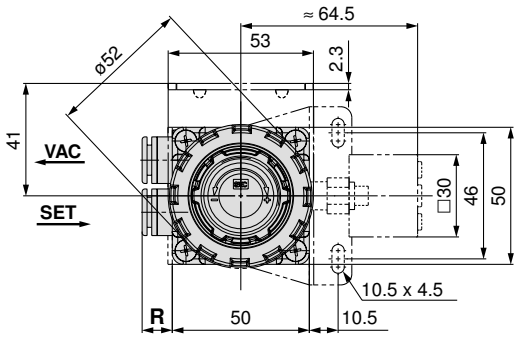


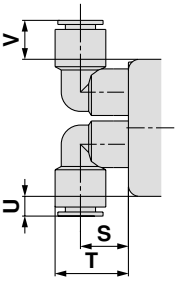




**Fitting Part Dimensions** (mm)

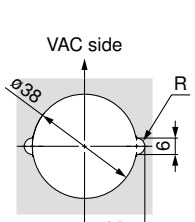
| Fitting size | VAC/SET | | | | |
|---|---|---|---|---|---|
| | Straight | Elbow | Elbow | Elbow | Elbow |
| | **R** | **S** | **T** | **U** | **V** |
| ø6 | 10.5 | 21 | 27.5 | 1 | 8 |
| ø1/4" | 10.5 | 21 | 27.5 | 1.5 | 8.5 |
| ø8, ø5/16" | 10.5 | 21 | 28.5 | 4 | 11 |
| ø10, ø3/8" | 11 | 21 | 30.5 | 7 | 14 |

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

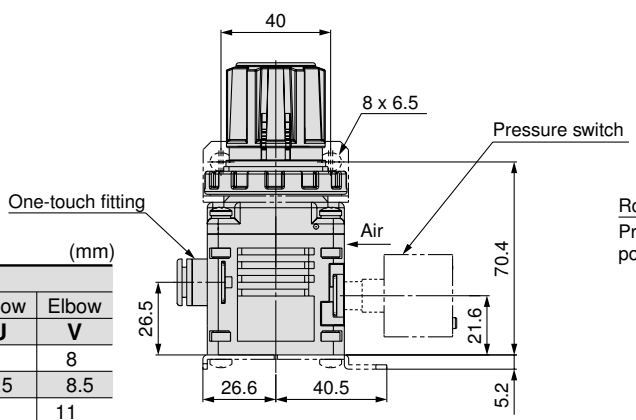


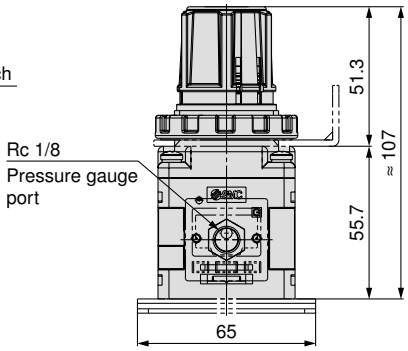




**Elbow fitting**




**Panel cut**
**Panel plate thickness: Max. 4**




**Fitting Part Dimensions** (mm)

| Fitting size | VAC/SET | | | | |
|---|---|---|---|---|---|
| | Straight | Elbow | Elbow | Elbow | Elbow |
| | **R** | **S** | **T** | **U** | **V** |
| ø6 | 10.5 | 21 | 27.5 | 1 | 8 |
| ø1/4" | 10.5 | 21 | 27.5 | 1.5 | 8.5 |
| ø8, ø5/16" | 10.5 | 21 | 28.5 | 4 | 11 |
| ø10, ø3/8" | 11 | 21 | 30.5 | 7 | 14 |

# Options

## One-touch Fittings for Vacuum Regulator



### One-touch fitting for IRV10(A)

**VVQ1000-51A-□C6**

**Fitting type**

| | |
|---|---|
| **Nil** | Straight |
| **L1** | Elbow |

**Fitting size**

| Symbol | Size |
|---|---|
| **C6** | ø6 |
| **C8** | ø8 |
| **N7** | ø1/4" |
| **N9** | ø5/16" |

### One-touch fitting for IRV20(A)

**VVQ2000-51A-□C6**

**Fitting type**

| | |
|---|---|
| **Nil** | Straight |
| **L1** | Elbow |

**Fitting size**

| Symbol | Size |
|---|---|
| **C6** | ø6 |
| **C8** | ø8 |
| **C10** | ø10 |
| **N7** | ø1/4" |
| **N9** | ø5/16" |
| **N11** | ø3/8" |

## Plug Nut Assembly

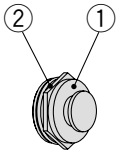


Plug unused pressure gauge port(s).

**P601010-11**

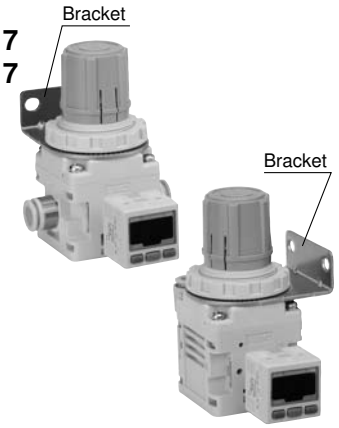
**Included Parts**

| No. | Description |
|---|---|
| **1** | **Plug nut** |
| **2** | **O-ring** |




## Bracket Assembly

**For IRV10(A) P601010-17**
**For IRV20(A) P601020-17**



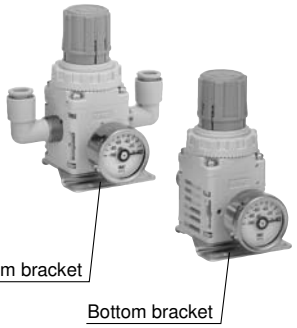

## Bottom Bracket Assembly

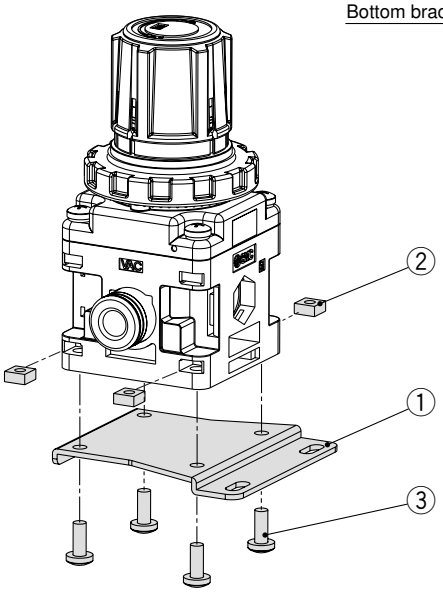
**For IRV10(A) P601010-14**
**For IRV20(A) P601020-14**

**Included Parts**

| No. | Description |
|---|---|
| **1** | **Bottom bracket** |
| **2** | **Square nut x 4** |
| **3** | **Phillips screw x 4** |

Note) No. 1 to 3 are shipped together.

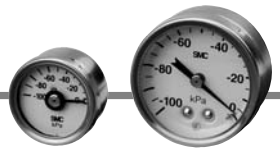



**Phillips Screw Tightening Torque**

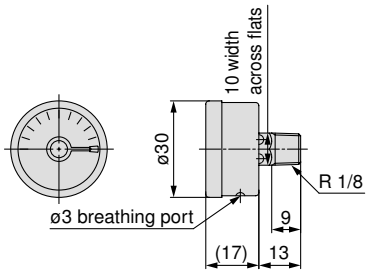
| | |
|---|---|
| **For IRV10(A): M3** | 0.32 ±0.03 N·m |
| **For IRV20(A): M4** | 0.76 ±0.05 N·m |

## Pressure Gauge for Vacuum



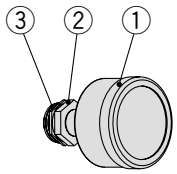
| Part no. | GZ33-K-01 | GZ43-K-01 |
|---|---|---|
| Applicable model | IRV10 | IRV20 |
| Indicated pressure range | –100 to 0 kPa | |
| Unit display | kPa | |
| Scale range | 180° | 270° |

### GZ33-K-01




### Pressure Gauge GZ33 Assembly

**P601010-12**

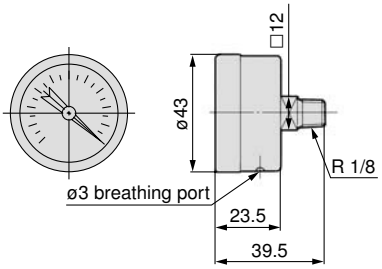



**Included Parts**

| No. | Description |
|---|---|
| **1** | **Pressure gauge** |
| **2** | **Gauge nut** |
| **3** | **O-ring** |

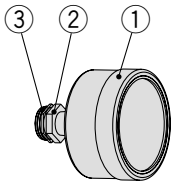
∗ 1 to 3 are assembled before shipment.

### GZ43-K-01




### Pressure Gauge GZ43 Assembly

**P601020-12**




**Included Parts**

| No. | Description |
|---|---|
| **1** | **Pressure gauge** |
| **2** | **Gauge nut** |
| **3** | **O-ring** |

∗ 1 to 3 are assembled before shipment.

## 2-Color Display High Precision Digital Pressure Switch



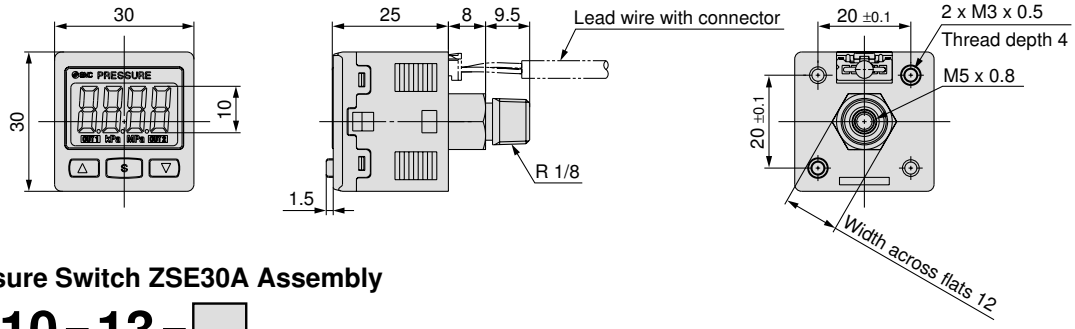
### Part No.

| Part no. | Applicable model |
|---|---|
| ZSE30A-01-N-ML (NPN open collector 1 output) | **IRV10 IRV20** |
| ZSE30A-01-P-ML (PNP open collector 1 output) | |
| ZSE30A-01-A-ML (NPN open collector 2 outputs) | |
| ZSE30A-01-B-ML (PNP open collector 2 outputs) | |

### Specifications

Refer to SMC catalog CAT.ES100-70 for details.

| Model | | **ZSE30A (Vacuum pressure)** |
|---|---|---|
| **Rated pressure range** | | 0.0 to –101.0 kPa |
| **Set pressure range** | | 10.0 to –105.0 kPa |
| **Proof pressure** | | 500 kPa |
| **Minimum unit setting** | | 0.1 kPa |
| **Applicable fluid** | | Air, Non-corrosive gas, Non-flammable gas |
| **Power supply voltage** | | 12 to 24 VDC ±10%, Ripple (p-p) 10% or less (With reverse connection protection) |
| **Current consumption** | | 40 mA or less |
| **Switch output** | | NPN or PNP open collector 1 output, NPN or PNP open collector 2 outputs (Selectable) |
| | **Max. load current** | 80 mA |
| | **Max. applied voltage** | 28 V (With NPN output) |
| | **Residual voltage** | 1 V or less (With load current of 80 mA) |
| | **Response time** | 2.5 ms or less (With anti-chattering function: 20, 100, 500, 1000, 2000 ms selectable) |
| | **Short circuit protection** | Yes |




### Digital Pressure Switch ZSE30A Assembly

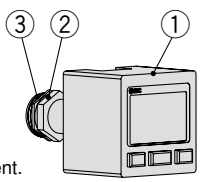
**P601010-13-□**

| Symbol | Digital pressure switch part no. | Digital pressure switch specifications |
|---|---|---|
| **1** | ZSE30A-01-N-ML | NPN open collector 1 output, Lead wire with connector (Length 2 m) |
| **2** | ZSE30A-01-P-ML | PNP open collector 1 output , Lead wire with connector (Length 2 m) |
| **3** | ZSE30A-01-A-ML | NPN open collector 2 outputs, Lead wire with connector (Length 2 m) |
| **4** | ZSE30A-01-B-ML | PNP open collector 2 outputs, Lead wire with connector (Length 2 m) |

**Included Parts**

| No. | Description |
|---|---|
| **1** | **Digital pressure switch** |
| **2** | **Gauge nut** |
| **3** | **O-ring** |

∗ 1 to 3 are assembled before shipment.



# Vacuum Regulator *Series IRV10/20*
# Made to Order

Made to Order

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

## Integrated Digital Pressure Switch for Panel Mounting — X1

### How to Order

**Single sided connections** **IRV 20 A – □ C08 □ – X1**

**Body size**

| | |
|---|---|
| 10 | Max. flow 140 ℓ/min (ANR) |
| 20 | Max. flow 240 ℓ/min (ANR) |

**Single sided connections**

| | |
|---|---|
| A | Single sided connections |

**Made to Order**

| | |
|---|---|
| X1 | Integrated digital pressure switch for panel mounting |

**Fittings**

| | |
|---|---|
| Nil | Straight |
| L | Elbow |

**Connection tubing O.D.**

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

**Digital pressure switch type** Note)

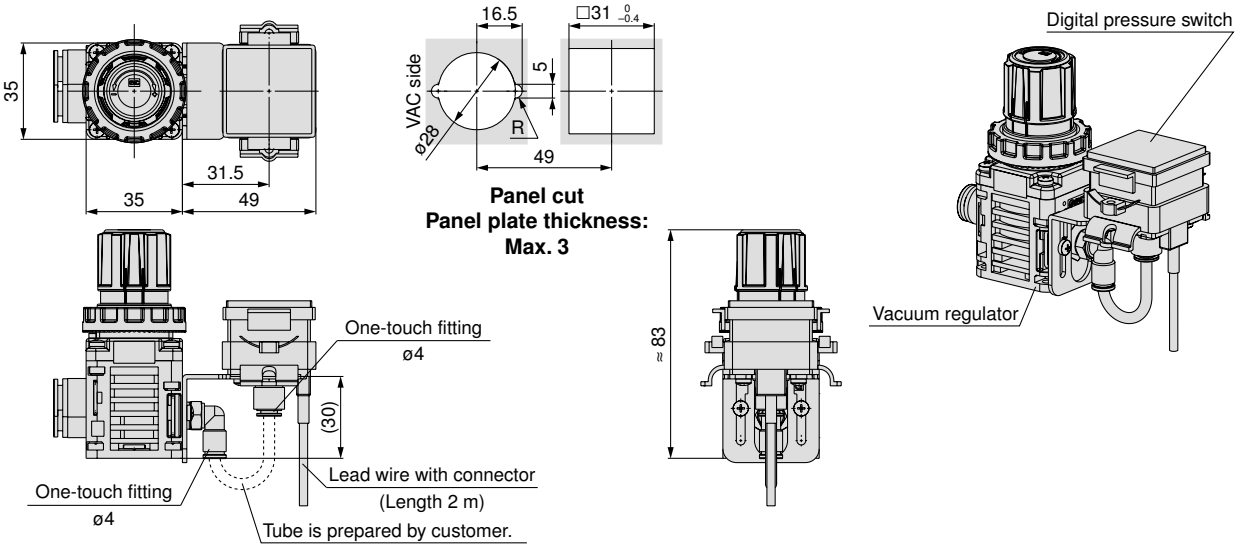
| Symbol | Output specifications | | Part no. |
|---|---|---|---|
| ZN | With digital pressure switch | NPN open collector 1 output | ZSE30A-C4H-N-MGD |
| ZP | | PNP open collector 1 output | ZSE30A-C4H-P-MGD |
| ZA | | NPN open collector 2 outputs | ZSE30A-C4H-A-MGD |
| ZB | | PNP open collector 2 outputs | ZSE30A-C4H-B-MGD |

Note) Gauge nut is included. Accessories are included in the same container.

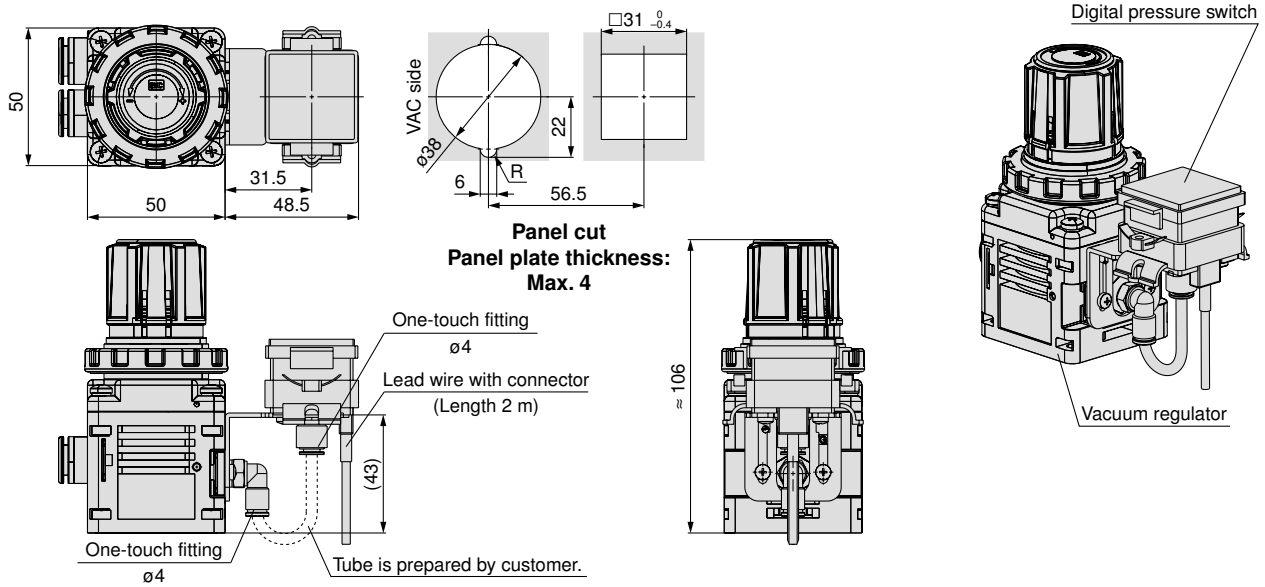
∗ Refer to the digital pressure switch specifications on page 9.

### Dimensions

**IRV10A**




**IRV20A**






SMC

# 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), Japan Industrial Standards (JIS)*1) and other safety regulations*2).

* 1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1992: Manipulating industrial robots -Safety.
JIS B 8370: General rules for pneumatic equipment.
JIS B 8361: General rules for hydraulic equipment.
JIS B 9960-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
JIS B 8433-1993: Manipulating industrial robots - Safety.
etc.
* 2) Labor Safety and Sanitation Law, etc.

**⚠ 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 possibility of serious injury or loss of life.

## ⚠ Warning

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

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

**2. Only personnel with appropriate training should operate machinery and equipment.**

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

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

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

**4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.**

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

# Safety Instructions

## ⚠ Caution

**The product is provided for use in manufacturing industries.**
The product herein described is basically provided for peaceful use in manufacturing industries.
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary. If anything is unclear, contact your nearest sales branch.

# Limited Warranty and Disclaimer/Compliance Requirements

The product used is subject to the following “Limited Warranty and Disclaimer” and “Compliance Requirements”. Read and accept them before using the product.

## Limited Warranty and Disclaimer

1. **The warranty period of the product is 1 year in service or 1.5 years after the product is delivered.**∗3)
   **Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.**
2. **For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.**
   **This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.**
3. **Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.**

∗ **3) Vacuum pads are excluded from this 1 year warranty.**
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

## Compliance Requirements

**When the product is exported, strictly follow the laws required by the Ministry of Economy, Trade and Industry (Foreign Exchange and Foreign Trade Control Law).**

# Series IRV10/20
# Specific Product Precautions 1

**Be sure to read this before handling.**
**Refer to back pages 1 and 2 for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) for Common Precautions.**

## 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.**

## ⚠Caution

**1. When installing a pressure gauge or pressure switch on an existing regulator, be sure to reduce the set pressure to 0 (atmospheric pressure) before removing the plug.**

1. Purchased with the pressure gauge or pressure switch

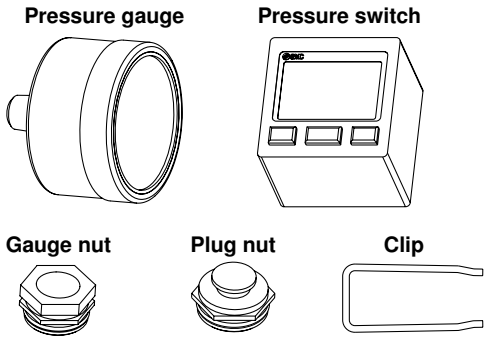
1-1. Accessories

- Pressure gauge or pressure switch ····· 1 pc.
- Gauge nut (with O-ring) ····· 1 pc.

Note) Gauge nut is mounted to the pressure gauge or pressure switch.

- Plug nut (with O-ring) ····· 1 pc.
- Clip ····· 2 pcs.

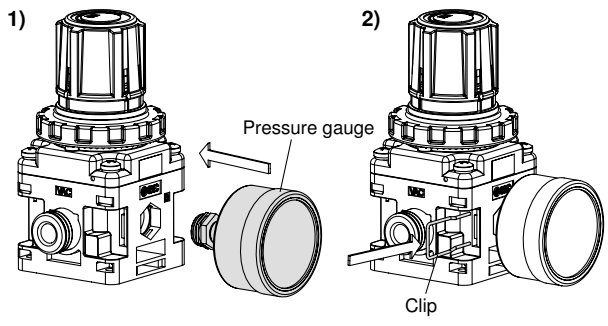
Note) One clip is included for single sided connections. Plug nut is not included.




1-2. Mounting of the pressure gauge or pressure switch

1) Confirm the direction of VAC side and SET side. Insert the pressure gauge to the gauge port sufficiently (until the gauge nut of the pressure gauge is level with the product surface.) Insert the pressure gauge to the end on the opposite side of the connecting port for single sided connections.

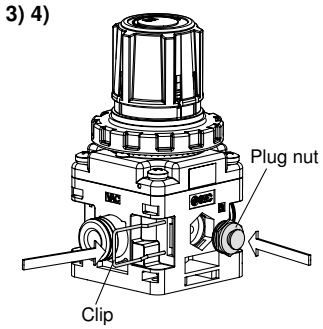
2) Insert the clip from the left side (viewed from the pressure gauge side, as shown in the drawing) until the top of the clip is level with the product surface. This completes the mounting procedure for single sided connections.




## ⚠Caution

3) Insert the plug nut to the gauge port on the opposite side of the pressure gauge until the top of the plug nut is level with the product surface.

4) Insert the clip from the left side (viewed from the plug nut side) to the end in the same way as 2).




Note) To remove the pressure gauge or pressure switch, remove the clip, then remove the pressure gauge or pressure switch straight out. Do not apply torque, as the body is made of resin.

**2. Do not remove the body screw while the vacuum 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.**

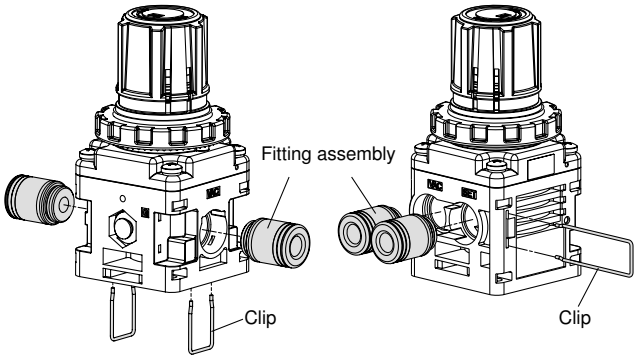
**4. For ease of replacement, one-touch fittings are installed as the cassette type. One-touch fittings are retained with clips inserted from the directions illustrated below. Remove the clips with a flat head screwdriver to replace the one-touch fittings. (Refer to "Procedure to remove the clip.") When installing, insert each one-touch fitting deeply to the end and reinsert the clip to the specified position.**

Note 1) Before replacement, confirm VAC/SET pressure is not applied and start operation after the internal pressure becomes atmospheric pressure. Operation with VAC/SET pressure is dangerous.

Note 2) To remove the clip, hold the clip with your fingers, then slowly pull out the clip. Do not pull out the clip by force. Otherwise, the clip may spring out and it is dangerous.

Note 3) Insert the clip to the end after confirming the replacement parts are inserted to the end. The clip may spring out if it is not inserted sufficiently.

Note 4) Hold the fitting in your hand when inserting the tube to elbow type one-touch fitting. Insertion of the tube without holding the fitting in your hand will apply excess force to blocks or one-touch fitting, which may lead to air leakage or breakage.




Back page 3

# Series IRV10/20
# Specific Product Precautions 2

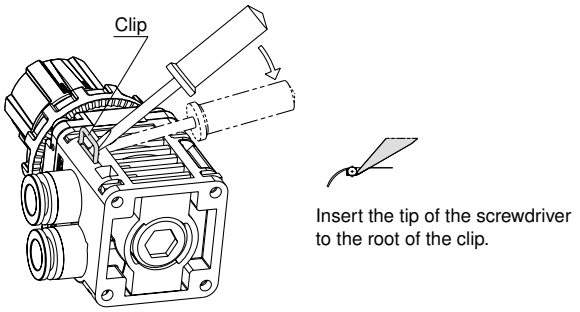
**Be sure to read this before handling.**
**Refer to back pages 1 and 2 for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) for Common Precautions.**

## Handling

### ⚠Caution

**Procedure to remove the clip**

Apply the tip of a flat head screwdriver to the inclined part where the clip is inserted. Lift the clip by moving the screwdriver as illustrated below.

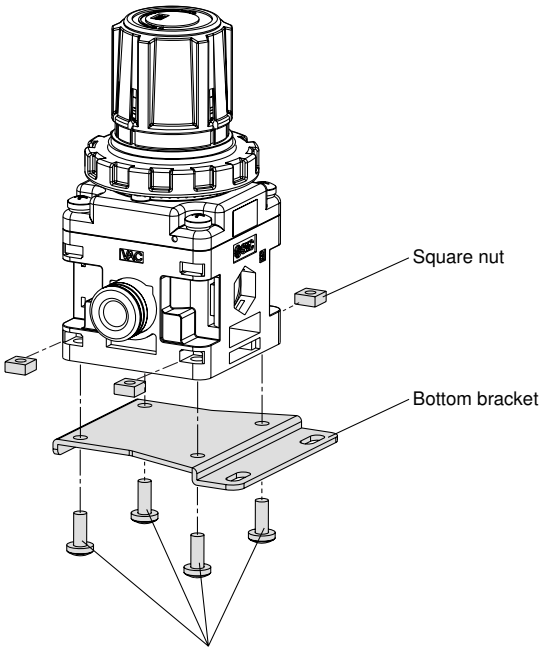



### ⚠Warning

**1. Observe the proper screw tightening torque.**

If torque is exceeded, damage to the mounting screw or main body may occur. Also, if the screws are not tightened enough, the screws may come loose during operation.

**Tightening torque of Phillips screw for mounting bottom bracket**




**Phillips Screw Tightening Torque**

| | |
|---|---|
| **For IRV10(A): M3** | 0.32 ±0.03 N·m |
| **For IRV20(A): M4** | 0.76 ±0.05 N·m |

## 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.**

# Series IRV10/20
# Specific Product Precautions 3

**Be sure to read this before handling.**
**Refer to back pages 1 and 2 for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) for Common Precautions.**

**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. Gravity will affect the zero point of the gauge which is why it needs to be positioned properly.**

**IRV10**

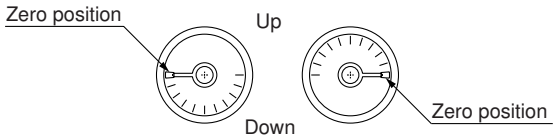



**Fig. 1** **Fig. 2**

**IRV20**

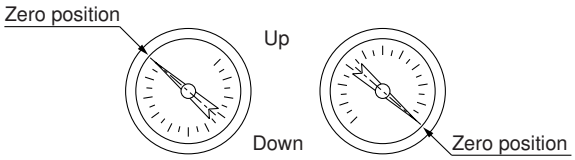
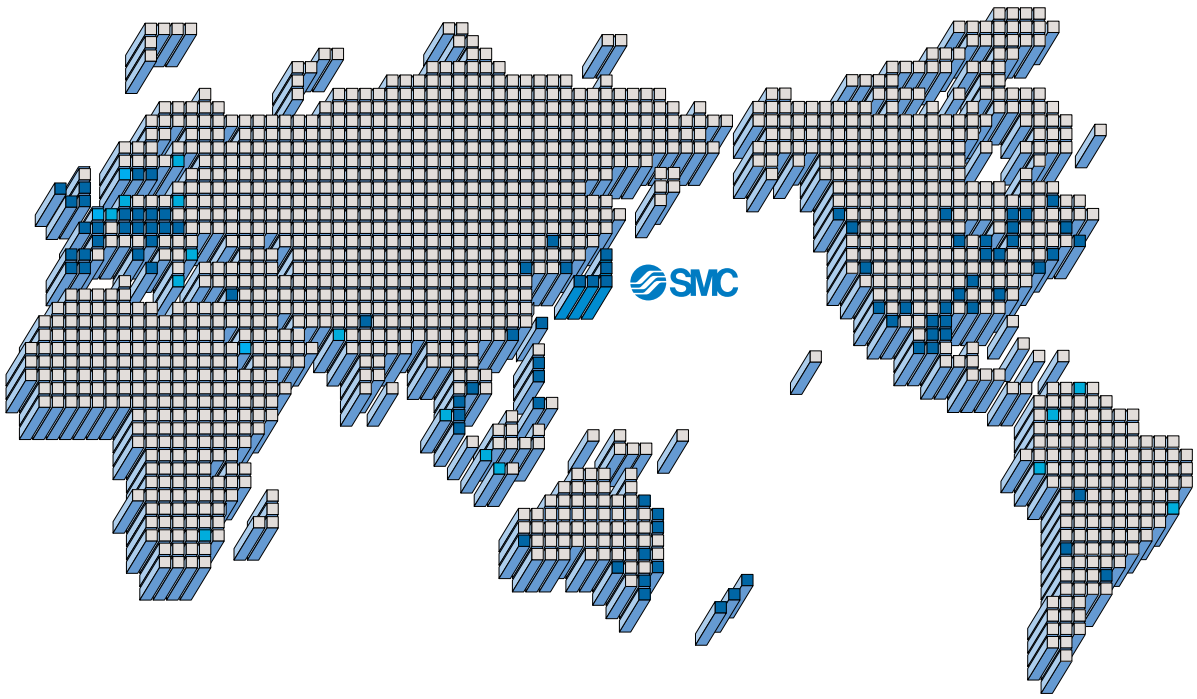



**Fig. 1** **Fig. 2**

# SMC'S GLOBAL MANUFACTURING, DISTRIBUTION AND SERVICE NETWORK




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**CZECH REPUBLIC**
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**NEW ZEALAND**
SMC Pneumatics (N.Z.) Ltd.

| ⚠ **Safety Instructions** | Be sure to read “Handling Precautions for SMC Products” (M-E03-3) before using. |
|---|---|


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