Electro-Pneumatic Regulator/Electronic Vacuum Regulator

**ITV Series**

- Stepless control of air pressure proportional to an electrical signal
- **ITV1000/2000/3000 series** are compatible with various input specifications, including serial communications.

### Applicable Fieldbus protocols

- CC-Link
- DeviceNet
- PROFIBUS DP

### Serial communications specifications

- RS-232C specification to serial communications is standardized.
- **Compact/lightweight (Integrated communication parts)**
  - **Weight:** 350 g\(^{\text{Note 1)}}\) (**ITV1000**)
  - **Power consumption:** 4 W\(^{\text{Note 1)}}\) or less

\(^{\text{Note 1)}}\) Value for communications type. (PROFIBUS DP)

### Electro-Pneumatic Regulators

- **ITV0000 Series**
  - Maximum flow rate: 6 L/min (ANR)
  - Set pressure: 0.6 MPa
  - Supply pressure: 1.0 MPa

- **ITV2000 Series**
  - Maximum flow rate: 1500 L/min (ANR)
  - Set pressure: 0.6 MPa
  - Supply pressure: 1.0 MPa

- **ITV1000 Series**
  - Maximum flow rate: 200 L/min (ANR)
  - Set pressure: 0.6 MPa
  - Supply pressure: 1.0 MPa
  - Grease-free specification (wetted parts)

- **ITV3000 Series**
  - Maximum flow rate: 4000 L/min (ANR)
  - Set pressure: 0.6 MPa
  - Supply pressure: 1.0 MPa

### Electronic Vacuum Regulators

- **ITV009□ Series**
- **ITV209□ Series**
Compact Electro-Pneumatic Regulator **ITV0000** Series
Compact Vacuum Regulator **ITV009** Series

Realizes space-saving and reduction of weight for manifold use.
Stations can easily be increased or decreased due to DIN rail mount design.

**Cable connectors**
- Straight type and right angle type are available.

**Built-in One-touch fittings**
- With error indication LED
- Brackets
  - Flat and L-brackets are available.

**Equivalent to IP65**
- Linearity: \(\pm 1\% \text{ F.S. or less}\)
- Hysteresis: 0.5% F.S. or less
- Repeatability: 0.5% F.S. or less
- High-speed response time: 0.1 sec (Without load)
  Note: This is not a guaranteed value as it depends on the operating environment.

**High stability**
- Sensitivity 0.2% F.S. or less

**Applicable Fieldbus protocols**
- CC-Link
- DeviceNet
- PROFINET
- RS-232C specification to serial communications is standardized.

**Application examples**
- Multi-stage control to analog control
- Grease-free specification (ITV1000 series)
- Reduced wiring
- Electrostatic coating control

**Model** | **Pressure range** | **Power supply voltage** | **Input signal** | **Output signal** | **Option**
---|---|---|---|---|---
ITV001 | 0.1 MPa | 24 VDC | 4 to 20 mA DC | Analog output | • Cable connectors
ITV003 | 0.5 MPa | 12 VDC | 0 to 20 mA DC | 0 to 5 VDC | Straight type
ITV005 | 0.9 MPa | –100 kPa | 0 to 10 VDC | 1 to 5 VDC | Right angle type
ITV009 | \(-100 \text{ kPa}\) | | | | • Brackets

**ITV1000/2000/3000 Series**
Electronic Vacuum Regulator **ITV209** Series

Serial communications specifications to **ITV1000/2000/3000** series are standardized.

- Sensitivity: 0.2% F.S. or less
- Linearity: \(\pm 1\% \text{ F.S. or less}\)
- Hysteresis: 0.5% F.S. or less
- IP65
- Cable connections in 2 directions

**Electro-Pneumatic Regulator**
**ITV1000/2000/3000 Series**
Electronic Vacuum Regulator **ITV209** Series
# Electro-Pneumatic Regulator
## Electronic Vacuum Regulator

### Stepless control of air pressure proportional to an electrical signal.

<table>
<thead>
<tr>
<th>Series</th>
<th>Model</th>
<th>Set pressure range</th>
<th>Input signal</th>
<th>Port size</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITV0000 Series</td>
<td>ITV001</td>
<td>0.001 to 0.1 MPa</td>
<td>Current type: 4 to 20 mA DC (Sink type)</td>
<td>Built-in One-touch fittings</td>
<td>896</td>
</tr>
<tr>
<td></td>
<td>ITV003</td>
<td>0.001 to 0.5 MPa</td>
<td>Current type: 0 to 20 mA DC (Sink type) Voltage type: 0 to 5 VDC</td>
<td>One-touch fittings Metric size: ø4 Inch size: ø5/32</td>
<td>896</td>
</tr>
<tr>
<td></td>
<td>ITV005</td>
<td>0.001 to 0.9 MPa</td>
<td>Voltage type: 0 to 10 VDC</td>
<td>One-touch fittings Metric size: ø4 Inch size: ø5/32</td>
<td>896</td>
</tr>
<tr>
<td>ITV1000 Series</td>
<td>ITV101</td>
<td>0.005 to 0.1 MPa</td>
<td>Current type: 4 to 20 mA DC (Sink type) Voltage type: 0 to 10 VDC</td>
<td>One-touch fittings Metric size: ø4 Inch size: ø5/32</td>
<td>904</td>
</tr>
<tr>
<td></td>
<td>ITV103</td>
<td>0.005 to 0.5 MPa</td>
<td>Current type: 0 to 20 mA DC (Sink type) Voltage type: 0 to 10 VDC</td>
<td>One-touch fittings Metric size: ø4 Inch size: ø5/32</td>
<td>904</td>
</tr>
<tr>
<td></td>
<td>ITV105</td>
<td>0.005 to 0.9 MPa</td>
<td>Voltage type: 0 to 10 VDC</td>
<td>One-touch fittings Metric size: ø4 Inch size: ø5/32</td>
<td>904</td>
</tr>
<tr>
<td>ITV2000 Series</td>
<td>ITV201</td>
<td>0.005 to 0.1 MPa</td>
<td>Current type: 4 to 20 mA DC (Sink type) Voltage type: 0 to 10 VDC</td>
<td>One-touch fittings Metric size: ø4 Inch size: ø5/32</td>
<td>904</td>
</tr>
<tr>
<td></td>
<td>ITV203</td>
<td>0.005 to 0.5 MPa</td>
<td>Current type: 0 to 20 mA DC (Sink type) Voltage type: 0 to 10 VDC</td>
<td>One-touch fittings Metric size: ø4 Inch size: ø5/32</td>
<td>904</td>
</tr>
<tr>
<td></td>
<td>ITV205</td>
<td>0.005 to 0.9 MPa</td>
<td>Voltage type: 0 to 10 VDC</td>
<td>One-touch fittings Metric size: ø4 Inch size: ø5/32</td>
<td>904</td>
</tr>
<tr>
<td>ITV3000 Series</td>
<td>ITV301</td>
<td>0.005 to 0.1 MPa</td>
<td>Current type: 4 to 20 mA DC (Sink type) Voltage type: 0 to 10 VDC</td>
<td>One-touch fittings Metric size: ø4 Inch size: ø5/32</td>
<td>904</td>
</tr>
<tr>
<td></td>
<td>ITV303</td>
<td>0.005 to 0.5 MPa</td>
<td>Current type: 0 to 20 mA DC (Sink type) Voltage type: 0 to 10 VDC</td>
<td>One-touch fittings Metric size: ø4 Inch size: ø5/32</td>
<td>904</td>
</tr>
<tr>
<td></td>
<td>ITV305</td>
<td>0.005 to 0.9 MPa</td>
<td>Voltage type: 0 to 10 VDC</td>
<td>One-touch fittings Metric size: ø4 Inch size: ø5/32</td>
<td>904</td>
</tr>
</tbody>
</table>

### Current Type
- 4 to 20 mA DC (Sink type)
- 0 to 20 mA DC (Sink type)
- 0 to 10 VDC

### Voltage Type
- 0 to 5 VDC
- 0 to 10 VDC

### Preset Input
- 4 points/16 points
- 10 bit digital input
- CC-Link compatible
- DeviceNet™ compatible
- PROFIBUS DP compatible
- RS-232C communication
Compact Electro-Pneumatic Regulator

How to Order

For single unit and single unit for manifold

**ITV00** 1 0 - 0 N

- **Pressure range**
  - 1: 0.1 MPa
  - 3: 0.5 MPa
  - 5: 0.9 MPa

- **Power supply voltage**
  - 0: 24 VDC ±10%
  - 1: 12 to 15 VDC

- **Input signal**
  - 0: Current type 4 to 20 mA DC (Sink type)
  - 1: Current type 0 to 20 mA DC (Sink type)
  - 2: Voltage type 0 to 5 VDC
  - 3: Voltage type 0 to 10 VDC

- **Built-in One-touch fittings type**
  - **For single unit**
    - Symbol: Nil
    - Metric size (Light gray): ø4
    - Inch size (Orange): ø5/32"
  - **For manifold**
    - Symbol: Nil
    - Metric size (Light gray): ø6
    - Inch size (Orange): ø1/4" ø5/32" ø1/4"

- **Cable connector (Option)**
  - N: Without cable connector
  - S: Straight type 3 m
  - L: Right angle type 2 m

- **Bracket/Option for single unit only**
  - B: Flat Bracket
  - C: L-bracket

- **Base type**
  - Nil: For single unit
  - M: For manifolds

**ITV0000 Series**

How to Order Manifold Assembly (Example)

Indicate the part numbers of electro-pneumatic regulators to be mounted below the manifold part number.

**Example**

- Due to the common supply/exhaust feature, note that different pressure range combinations are not available.

  - **ITV00-03**—1 set (Manifold part no.)
  - **ITV0030-3MS**—2 sets (Electro-pneumatic regulator part no. (1, 2 stations))
  - **ITV0030-3ML**—1 set (Electro-pneumatic regulator part no. (3 stations))

- Indicate part numbers in order starting from the first station on the D side.
- The asterisk (*) specifies mounting. Add an asterisk (*) at the beginning of electro-pneumatic regulator part numbers to be mounted.

**Note**

- Combination with having different pressure ranges is not available due to common supply/exhaust features.

Manifold

**IITV00** 02 n

- **Stations**
  - 02: 2 stations
  - 03: 3 stations
  - 10: 10 stations

- **Option**
  - If a DIN rail longer than the specified stations is required, specify the applicable stations in two digits. (Maximum 10 stations) Example **ITV00-05-07**

One-touch fitting size for supply/exhaust parts (End plate)

- Nil: ø6 (Light gray)
- U: ø1/4" (Orange)

**Note**

- A DIN rail with the length specified by the number of stations is attached to the manifold. For dimensions of the DIN rail, refer to the external dimensions.
### Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>ITV001</th>
<th>ITV003</th>
<th>ITV005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum supply pressure</td>
<td>Set pressure +0.1 MPa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum supply pressure</td>
<td>0.2 MPa</td>
<td>1.0 MPa</td>
<td></td>
</tr>
<tr>
<td>Set pressure range</td>
<td>0.001 to 0.1 MPa</td>
<td>0.001 to 0.5 MPa</td>
<td>0.001 to 0.9 MPa</td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage</td>
<td>24 VDC ±10%, 12 to 15 VDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current consumption</td>
<td>Power supply voltage 24 VDC type: 0.12 A or less</td>
<td>Power supply voltage 12 to 15 VDC type: 0.18 A or less</td>
<td></td>
</tr>
<tr>
<td><strong>Input signal</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage type</td>
<td>0 to 5 VDC, 0 to 10 VDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current type</td>
<td>4 to 20 mA DC, 0 to 20 mA DC (Sink type)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Input impedance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage type</td>
<td>Approx. 10 kΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current type</td>
<td>Approx. 250 Ω</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Output signal</strong> (Note 4)</td>
<td>Analog output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage type</td>
<td>1 to 5 VDC (Output impedance: Approx. 1 kΩ)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output accuracy</td>
<td>Output accuracy: ±6% F.S. or less</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Linearity</strong></td>
<td>±1% F.S. or less</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hysteresis</strong></td>
<td>0.5% F.S. or less</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Repeatability</strong></td>
<td>±0.5% F.S. or less</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sensitivity</strong></td>
<td>0.2% F.S. or less</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Temperature characteristics</strong></td>
<td>±0.12% F.S./°C or less</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Operating temperature range</strong></td>
<td>0 to 50°C (No condensation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Enclosure</strong></td>
<td>Equivalent to IP65 *</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Connection type</strong></td>
<td>Built-in One-touch fittings</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Connection size</strong></td>
<td>For single unit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metric size</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inch size</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Manifold</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metric size</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inch size</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Weight</strong> (Note 1)</td>
<td>100 g or less (without option)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note 1)** Indicates the weight of a single unit.
For ITV00-n stations (n) x 100 + 130 (Weight of end block A, B assembly) + Weight (g) of DIN rail

**Note 2)** When there is a downstream flow consumption, pressure may become unstable depending on piping conditions.

**Note 3)** When the input signal is at 0%, the exhaust solenoid valve is controlled to reduce the outlet pressure to zero. For this reason, a noise may be generated. This noise is normal and does not indicate a fault.

**Note 4)** When measuring ITV analog output from 1 to 5 VDC, if the load impedance is less than 100 kΩ, the analog output monitor accuracy of ±6% F.S. or less may not be available. The product with the accuracy of within ±6% is supplied upon your request.

Output pressure remains unaffected.

* When using under the conditions equivalent to IP65, connect the fitting or tube to the breathing hole prior to use. (For details, refer to "Specific Product Precautions 1* on page 941.)

### Accessories (Option)

#### Bracket
- Flat bracket assembly (includes 2 mounting screws)  
  P39800022

- L-bracket assembly (includes 2 mounting screws)  
  P39800023

Tightening torque when assembling is 0.3 N-m.

#### Cable connector
- Straight type  
  M8-4DSX3MG4

- Right angle type  
  P398000-501-2

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**Accessories (Option)**

**Bracket**
- Flat bracket assembly (includes 2 mounting screws)  
  P39800022

- L-bracket assembly (includes 2 mounting screws)  
  P39800023

Tightening torque when assembling is 0.3 N-m.
ITV0000 Series

Working Principle

When the input signal rises, the air supply solenoid valve ① turns ON. Due to this, part of the supply pressure passes through the air supply solenoid valve ① and changes to output pressure. This output pressure feeds back to the control circuit ④ via the pressure sensor ③. Here, pressure corrections continue until output pressure becomes proportional to the input signal, enabling output pressure that is proportional to the input signal.

Working Principle Diagram

Block Diagram
### ITV001 Series

#### Linearity, Hyteresis

![Graph showing linearity and hysteresis for ITV001 Series]

#### Pressure Characteristics

- **Set pressure:** 0.05 MPa
- **Supply pressure (MPa):** 0.15, 0.16, 0.17, 0.18, 0.19, 0.20

#### Flow Rate Characteristics

- **Supply pressure:** 0.2 MPa
- **Set pressure (kPa):** 100kPa, 80kPa, 60kPa, 40kPa, 20kPa, 10kPa
- **Flow rate (L/min (ANR)):** 0, 100, 200, 300, 400, 500, 600

### ITV003 Series

#### Linearity, Hyteresis

![Graph showing linearity and hysteresis for ITV003 Series]

#### Pressure Characteristics

- **Set pressure:** 0.25 MPa
- **Supply pressure (MPa):** 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0

#### Flow Rate Characteristics

- **Supply pressure:** 0.6 MPa
- **Set pressure (kPa):** 500kPa, 400kPa, 300kPa, 200kPa, 100kPa, 50kPa
- **Flow rate (L/min (ANR)):** 0, 1, 2, 3, 4, 5, 6, 7
**ITV0000 Series**

**ITV005 Series**

**Linearity, Hyteresis**

<table>
<thead>
<tr>
<th>Input signal (% F.S.)</th>
<th>Output deviation factor (% F.S.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-1</td>
</tr>
<tr>
<td>25</td>
<td>-0.6</td>
</tr>
<tr>
<td>50</td>
<td>-0.8</td>
</tr>
<tr>
<td>75</td>
<td>-0.4</td>
</tr>
<tr>
<td>100</td>
<td>-0.2</td>
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</tbody>
</table>

**Repeatability**

With 50% of signal input

<table>
<thead>
<tr>
<th>Count</th>
<th>Output deviation factor (% F.S.)</th>
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<tbody>
<tr>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
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<tr>
<td>3</td>
<td>0</td>
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<tr>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
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</tbody>
</table>

**Pressure Characteristics**

Set pressure: 0.45 MPa

<table>
<thead>
<tr>
<th>Supply pressure (MPa)</th>
<th>Output deviation factor (% F.S.)</th>
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</thead>
<tbody>
<tr>
<td>0.4</td>
<td>-1</td>
</tr>
<tr>
<td>0.6</td>
<td>-0.5</td>
</tr>
<tr>
<td>0.8</td>
<td>0</td>
</tr>
<tr>
<td>1.0</td>
<td>0.5</td>
</tr>
<tr>
<td>1.2</td>
<td>1</td>
</tr>
</tbody>
</table>

**Flow Rate Characteristics**

Supply pressure: 1.0 MPa

<table>
<thead>
<tr>
<th>Set pressure (kPa)</th>
<th>Flow rate (L/min (ANR))</th>
</tr>
</thead>
<tbody>
<tr>
<td>900kPa</td>
<td>1000</td>
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<tr>
<td>800kPa</td>
<td>900</td>
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<tr>
<td>700kPa</td>
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<tr>
<td>50kPa</td>
<td>100</td>
</tr>
<tr>
<td>-50kPa</td>
<td>0</td>
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</table>
Compact Electro-Pneumatic Regulator *ITV0000 Series*

**Dimensions**

**For Single Unit**

![Diagram showing dimensions and port locations for a single unit of the Compact Electro-Pneumatic Regulator.](image)

**Port Location**

<table>
<thead>
<tr>
<th>No.</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ITV003</strong></td>
<td>SUP</td>
<td>OUT</td>
<td>EXH</td>
</tr>
</tbody>
</table>

Note: When using under the conditions equivalent to IP65, connect the fittings or tube to the breathing hole prior to use. (For details, refer to “Specific Product Precautions 1” on page 941.)

---

**Cable connector (4 cores)**

- **Straight type (Option)**
- **Right angle type (Option)**

Minimum bending radius 80

---

**Cable connector (4 cores)**

- **Straight type (Option)**
- **Right angle type (Option)**

Minimum bending radius 80

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**Supplementary Information**

- **L-bracket (Option)**
- **Flat bracket (Option)**
- **SUP port (ø4, ø5/32”)**
- **EXH port (ø4, ø5/32”)**

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**Other Information**

- **M8 x 1 Mounting hole**
- **2 x ø3.5 Mounting hole**
- **2 x M3 x 0.5 Mounting thread**
- **2 x ø3.5 Mounting hole**

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**Additional Technical Details**

- **Cable connection thread**
- **Breathing hole (M3 x 0.5)**
- **OUT port (ø4, ø5/32”)**
- **L-bracket (Option)**
- **Flat bracket (Option)**
- **Body**
- **L-bracket (Option)**
- **Flat bracket (Option)**

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**Product Code**

- **ITV0000 Series**
- **ARJ**
- **AR425 to 935**
- **ARX**
- **AMR**
- **ARM**
- **ARP**
- **IR**
- **IRV**
- **VEX**
- **SRH**
- **SRP**
- **SRF**
- **ITV**
- **IC**
- **ITVH**
- **ITVX**
- **PVQ**
- **VY1**
- **VBA**
- **VBAT**
- **AP100**

---

**Dimensions in mm**

- **Height:** 13.7
- **Width:** 5.8
- **Depth:** 5.8

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**Additional Notes**

- **Minimum bending radius 80**
- **3000° C**
- **Body**
- **L-bracket (Option)**
- **Flat bracket (Option)**
Dimensions

Single unit for manifold

Note) When using under the conditions equivalent to IP65, connect the fittings or tube to the breathing hole prior to use. (For details, refer to "Specific Product Precautions 1" on page 941.)

Note) For dimensions of the cable connector, refer to single unit on page 901.
Compact Electro-Pneumatic Regulator *ITV0000* Series

**Dimensions**

**Manifold**

![Manifold diagram with dimensions](image)

**Port Location**

<table>
<thead>
<tr>
<th>No.</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITV003□</td>
<td>SUP</td>
<td>OUT</td>
<td>EXH</td>
</tr>
</tbody>
</table>

Note: Stations are counted starting from the D side.

**Manifold stations n**

<table>
<thead>
<tr>
<th></th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>60</td>
<td>75</td>
<td>90</td>
<td>105</td>
<td>120</td>
<td>135</td>
<td>150</td>
<td>165</td>
<td>180</td>
</tr>
<tr>
<td>L2</td>
<td>110.5</td>
<td>123</td>
<td>148</td>
<td>160.5</td>
<td>173</td>
<td>185.5</td>
<td>198</td>
<td>223</td>
<td>235.5</td>
</tr>
</tbody>
</table>

**Weight of DIN rail (g)**

| | 2 | 22 | 27 | 29 | 31 | 34 | 36 | 41 | 43 |

Note: For dimensions of the cable connector, refer to single unit on page 901.

Note: When using under the conditions equivalent to IP65, connect the fittings or tubing to the breathing hole prior to use. (For details, refer to “Specific Product Precautions 1” on page 941.)
## Electro-Pneumatic Regulator

**ITV1000/2000/3000 Series**

### How to Order

<table>
<thead>
<tr>
<th>Model</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1000 type</td>
<td>2000 type</td>
<td>3000 type</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Voltage type</th>
<th>0 to 5 VDC</th>
<th>0 to 10 VDC</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Current type</th>
<th>4 to 20 mA DC (Sink type)</th>
<th>0 to 20 mA DC (Sink type)</th>
<th>0 to 5 VDC</th>
<th>0 to 10 VDC</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Pressure range</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.1 MPa</td>
<td>0.5 MPa</td>
<td>0.9 MPa</td>
<td>Nil</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power supply voltage</th>
<th>0</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24 VDC</td>
<td>12 to 15 VDC</td>
</tr>
</tbody>
</table>

### Input signal

<table>
<thead>
<tr>
<th>Communication model</th>
<th>CC-Link</th>
<th>DeviceNet™</th>
<th>PROFIBUS DP</th>
<th>RS-232C communication</th>
</tr>
</thead>
</table>

| Communication cable part number | PCA-1567720 (Socket type) | PCA-1567717 (Plug type) | PCA-1557633 (Socket type) | PCA-1557646 (Plug type) |

### Monitor output

<table>
<thead>
<tr>
<th>Monitor output</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Analog output 1 to 5 VDC</td>
<td>Switch output/NonP</td>
<td>Switch output/PNP output</td>
<td>Analog output 4 to 20 mA DC (Sink type)</td>
</tr>
</tbody>
</table>

### Thread type

<table>
<thead>
<tr>
<th>Thread type</th>
<th>Nil</th>
<th>Rc</th>
<th>N</th>
<th>PTP</th>
<th>T</th>
<th>NPTF</th>
<th>G</th>
</tr>
</thead>
</table>

### Bracket

<table>
<thead>
<tr>
<th>Bracket</th>
<th>Nil</th>
<th>Without bracket</th>
<th>B</th>
<th>Flat bracket</th>
<th>C</th>
<th>L-bracket</th>
</tr>
</thead>
</table>

### Cable connector type

<table>
<thead>
<tr>
<th>Cable connector type</th>
<th>S</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Straight type 3 m</td>
<td>Right angle type 3 m</td>
</tr>
</tbody>
</table>

### Pressure display unit

<table>
<thead>
<tr>
<th>Pressure display unit</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MPa</td>
<td>kgf/cm²</td>
<td>bar</td>
<td>psi</td>
</tr>
</tbody>
</table>

### Note

- Communication models (CC, DE, PR, RC) are available only for 24 VDC.
- For 10 bit digital input, right angle type cannot be selected.
- Under Japan's new Measurement Act, this is only for overseas sales (SI units are to be used inside Japan). For the communication models, CC, DE, PR and RC, only “Nil” is available as it does not have a pressure display.
- For communication cables, use the parts listed below (refer to M8/M12 connector in Best Pneumatics No.1-1 for details) or order the product certified for the respective protocol (with M12 connector) separately.

### Application

<table>
<thead>
<tr>
<th>Application</th>
<th>Communication cable part number</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC-Link compatibility</td>
<td>PCA-1567720 (Socket type)</td>
<td>Dedicated Bus adapter supplied with the product.</td>
</tr>
<tr>
<td>DeviceNet™ compatibility</td>
<td>PCA-1557633 (Socket type)</td>
<td>T-branch connector not supplied.</td>
</tr>
<tr>
<td>PROFIBUS DP compatibility</td>
<td>PCA-1557668 (Socket type)</td>
<td>T-branch connector not supplied.</td>
</tr>
</tbody>
</table>
Standard Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>ITV101</th>
<th>ITV103</th>
<th>ITV105</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Note 8)</td>
<td>(Note 8)</td>
<td>(Note 8)</td>
</tr>
<tr>
<td></td>
<td>(Note 8)</td>
<td>(Note 8)</td>
<td>(Note 8)</td>
</tr>
<tr>
<td>Minimum supply pressure</td>
<td>0.2 MPa</td>
<td>0.2 MPa</td>
<td>0.2 MPa</td>
</tr>
<tr>
<td>Maximum supply pressure</td>
<td>1.0 MPa</td>
<td>1.0 MPa</td>
<td>1.0 MPa</td>
</tr>
<tr>
<td>Set pressure range (Note 1)</td>
<td>0.005 to 0.1 MPa</td>
<td>0.005 to 0.5 MPa</td>
<td>0.005 to 0.9 MPa</td>
</tr>
</tbody>
</table>

Power supply

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Current consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 VDC</td>
<td>± 10% to 15 VDC</td>
</tr>
<tr>
<td>Current</td>
<td>Power supply voltage 24 VDC type: 0.12 A or less (Note 9)</td>
</tr>
<tr>
<td></td>
<td>Power supply voltage 12 VDC type: 0.18 A or less (Note 9)</td>
</tr>
</tbody>
</table>

Input signal

<table>
<thead>
<tr>
<th>Voltage type</th>
<th>Current type (Note 9)</th>
<th>Preset input</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 5 VDC</td>
<td>4 to 20 mA DC (Sink type)</td>
<td></td>
</tr>
<tr>
<td>0 to 5 VDC</td>
<td>0 to 20 mA DC (Sink type)</td>
<td></td>
</tr>
<tr>
<td>0 to 5 VDC</td>
<td>0 to 20 mA DC (Sink type)</td>
<td></td>
</tr>
</tbody>
</table>

Input impedance

<table>
<thead>
<tr>
<th>Current type</th>
<th>Voltage type</th>
<th>Preset input</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 Ω or less</td>
<td>Approx. 6.5 kΩ</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Output signal (monitor output)

<table>
<thead>
<tr>
<th>Analog output</th>
<th>Output impedance: Approx. 2.4 kΩ</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>± 0.5% F.S. or less</td>
</tr>
</tbody>
</table>

Communication

<table>
<thead>
<tr>
<th>Protocol</th>
<th>DeviceNet™</th>
<th>PROFIBUS DP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version</td>
<td>Ver 1.10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Volume 1</td>
<td>Volume 3</td>
</tr>
</tbody>
</table>

Protocols

<table>
<thead>
<tr>
<th>Protocol</th>
<th>DeviceNet™</th>
<th>PROFIBUS DP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Communication speed

| Communication speed | 156 k/825 k |
|                    | 2.5 M/S M/10 M bps |

| Communication speed | 125 k/250 k/500 k bps |
|                    | 9.6 k/19.2 k/45.45 k |
|                    | 93.75 k/187.5 k/500 k |
|                    | 1.5 M/3/6 M/12 M bps |

Cataloging file

<table>
<thead>
<tr>
<th>Cataloging file</th>
<th>EDS</th>
<th>GSD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Communication data resolution

<table>
<thead>
<tr>
<th>Communication data resolution</th>
<th>12 bit (4096 resolution)</th>
<th>12 bit (4096 resolution)</th>
<th>12 bit (4096 resolution)</th>
</tr>
</thead>
</table>

Fail safe

<table>
<thead>
<tr>
<th>Fail safe</th>
<th>HOLD</th>
<th>CLEAR</th>
<th>CLEAR</th>
<th>HOLD</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Fail safe</th>
<th>HOLD</th>
<th>CLEAR</th>
<th>CLEAR</th>
<th>HOLD</th>
</tr>
</thead>
</table>

Electric insulation

<table>
<thead>
<tr>
<th>Electric insulation</th>
<th>Insulation</th>
<th>Insulation</th>
<th>Insulation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-insulation</td>
<td>Non-insulation</td>
<td>Non-insulation</td>
</tr>
</tbody>
</table>

Terminating resistor

<table>
<thead>
<tr>
<th>Terminating resistor</th>
<th>Built into the product (Switch setting)</th>
<th>Built into the product (Switch setting)</th>
</tr>
</thead>
</table>

Current consumption

<table>
<thead>
<tr>
<th>Current consumption</th>
<th>0.16 A or less</th>
<th>0.14 A or less</th>
<th>0.16 A or less</th>
<th>0.12 A or less</th>
</tr>
</thead>
</table>

Weight

<table>
<thead>
<tr>
<th>Weight</th>
<th>ITV100</th>
<th>ITV200</th>
<th>ITV300</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>156 k</td>
<td>320 k</td>
<td>730 k</td>
</tr>
</tbody>
</table>

Note 1) Please refer to Figure 1 for the relationship between set pressure and input. Because the maximum set pressure differs for each pressure display, refer to page 945.

Note 2) 2-wire type 4 to 20 mA DC is not available. Power supply voltage (24 VDC or 12 to 15 VDC) is required.

Note 3) Select either analog output or switch output. Further, when switch output is selected, select either NPN output or PNP output. When measuring ITV analog output from 1 to 5 VDC, if the load impedance is less than 100 kΩ, the analog output monitor accuracy of ±0.2% F.S. (±0.05% F.S. at 1% Retain) may not be achieved. The product with the accuracy of within ±0.5% is supplied upon your request. Output pressure remains unaffected.

Note 4) Adjustment of numerical values such as the zero/span adjustment or preset input type is set based on the minimum units for output pressure display (e.g. 0.001 to 0.500 MPa). Note that the unit cannot be changed.

Note 5) The minimum unit for 0.9 MPa (130 psi) types is 1 psi.

Note 6) Value for the state with no over current circuit included. If an allowance is provided for an over current circuit, the input impedance varies depending on the input current. This is 350 Ω or less for an input current of 20 mA DC.

Note 7) The above characteristics are confined to the static state. When air is consumed on the output side, the pressure may fluctuate.

Note 8) The ITV100 series is a Grease-free specification (Wetted parts).

Note 9) Refer to the table below for communication specifications.

Note 10) Add 50 g for digital input type, 70 g for 16 points preset input type respectively.
ITV1000/2000/3000 Series

Modular Products and Accessory Combinations

<table>
<thead>
<tr>
<th>Applicable products and accessories</th>
<th>Applicable model</th>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Bracket]</td>
<td>ITV10</td>
<td>Flat bracket assembly (including mounting screws)</td>
<td>P398010-600</td>
</tr>
<tr>
<td></td>
<td>ITV20</td>
<td>Flat bracket assembly (including mounting screws)</td>
<td>P398010-600</td>
</tr>
<tr>
<td></td>
<td>ITV30</td>
<td>Flat bracket assembly (including mounting screws)</td>
<td>P398010-601</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cable connector</th>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current type</td>
<td>Straight type 3 m</td>
<td>P398020-500-3</td>
</tr>
<tr>
<td>Voltage type</td>
<td>Right angle type 3 m</td>
<td>P398020-501-3</td>
</tr>
<tr>
<td>4 points preset input</td>
<td>Straight type 3 m</td>
<td>P398020-500-3</td>
</tr>
<tr>
<td>16 points preset input</td>
<td>Right angle type 3 m</td>
<td>P398020-501-3</td>
</tr>
<tr>
<td>10 bit digital input</td>
<td>Cable connector (13 cores)</td>
<td>INI-398-0-59</td>
</tr>
<tr>
<td>CC-Link</td>
<td>Power cable (4 cores)</td>
<td>P398020-500-3</td>
</tr>
<tr>
<td>PROFIBUS DP</td>
<td>Right angle type 3 m</td>
<td>P398020-501-3</td>
</tr>
<tr>
<td>DeviceNet™</td>
<td>Communication cable (5 cores)</td>
<td>P398020-502-3</td>
</tr>
<tr>
<td>RS-232C</td>
<td>Communication cable (5 cores)</td>
<td>P398020-503-3</td>
</tr>
</tbody>
</table>

Note 1) For the 10-bit digital type, there is no right angle type cable connector.
Note 2) Even when “with cable connector” is selected the communication cable is not included in the communication model (CC, DE, PR). Please order separately.

<table>
<thead>
<tr>
<th>Bus adapter</th>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC-Link</td>
<td>Bus adapter (Bus adapter supplied with the product.)</td>
<td>EX9-ACY00-MJ</td>
</tr>
</tbody>
</table>

Dimensions

**Flat bracket**

<table>
<thead>
<tr>
<th>Model</th>
<th>Bracket tightening torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITV1000</td>
<td>0.76 ± 0.05 N·m</td>
</tr>
<tr>
<td>ITV2000/3000</td>
<td>1.5 ± 0.05 N·m</td>
</tr>
</tbody>
</table>

**L-bracket**

Note 1) Manifolds are compatible with 2 to 8 stations. Consult with SMC for 9 stations or more.
Note 2) Products without symbols are also compatible. Consult with SMC separately.
Note 3) Compliant with CE marking.

Made to Order

(Remove items marked with “X”)

Symbol Specifications

X102 Reverse type
X224 High pressure type (SUP 1.2 MPa, OUT 1.0 MPa)
X25 Set pressure range 1 to 100 kPa (Except ITV3000 series)
X88 High speed response type (Except ITV3000 series)
X26 For manifold mounting (Except ITV3000 series)
X410 Linearity: ±0.5% F.S. or less
X420 With alarm output

Note 1) Products without symbols are also compatible. Consult with SMC separately.
Note 2) Compliant with CE marking.

0.76 ± 0.05 N·m
**Working Principles**

When the input signal rises, the air supply solenoid valve ① turns ON, and the exhaust solenoid valve ② turns OFF. Therefore, supply pressure passes through the air supply solenoid valve ① and is applied to the pilot chamber ③. The pressure in the pilot chamber ③ increases and operates on the upper surface of the diaphragm ④.

As a result, the air supply valve ⑤ linked to the diaphragm ④ opens, and a portion of the supply pressure becomes output pressure.

This output pressure feeds back to the control circuit ⑧ via the pressure sensor ⑦. Here, a correct operation functions until the output pressure is proportional to the input signal, making it possible to always obtain output pressure proportional to the input signal.

---

**Working Principle Diagram**

---

**Block Diagram**

---

Electro-Pneumatic Regulator **ITV1000/2000/3000 Series**
ITV101 Series

**Linearity**

- Graph showing the linearity of the device with input signal (%F.S.) on the x-axis and output deviation factor (%F.S.) on the y-axis.

**Hysteresis**

- Graph showing the hysteresis of the device with input signal (%F.S.) on the x-axis and output deviation factor (%F.S.) on the y-axis.

**Repeatability**

- Graph showing the repeatability of the device with repetition on the x-axis and output deviation factor (%F.S.) on the y-axis.

**Pressure characteristics**

- Supply pressure: 0.05 MPa

**Flow rate characteristics**

- Supply pressure: 0.2 MPa

**Relief flow characteristics**

- Supply pressure: 0.2 MPa

---

ITV201 Series

**Linearity**

- Graph showing the linearity of the device with input signal (%F.S.) on the x-axis and output deviation factor (%F.S.) on the y-axis.

**Hysteresis**

- Graph showing the hysteresis of the device with input signal (%F.S.) on the x-axis and output deviation factor (%F.S.) on the y-axis.

**Repeatability**

- Graph showing the repeatability of the device with repetition on the x-axis and output deviation factor (%F.S.) on the y-axis.

**Pressure characteristics**

- Set pressure: 0.05 MPa

**Flow rate characteristics**

- Supply pressure: 0.2 MPa

**Relief flow characteristics**

- Supply pressure: 0.2 MPa
Electro-Pneumatic Regulator **ITV1000/2000/3000 Series**

**ITV301 Series**

**Linearity**

Pressure characteristics  
Set pressure: 0.05 MPa

Flow rate characteristics  
Supply pressure: 0.2 MPa

Relief flow characteristics  
Supply pressure: 0.2 MPa

**Hysteresis**

**Repeatability**

Set pressure  (MPa)

Input signal  (%F.S.)

Output deviation factor  (%F.S.)

Set point

Out

Return

Repetition

Supply pressure  (MPa)

Flow rate  (L/min (ANR))

Set pressure  (MPa)

Flow rate  (L/min (ANR))
**ITV1000/2000/3000 Series**

### ITV103 Series

**Linearity**
- Set pressure: 0.2 MPa
- Output deviation factor (%F.S.)

**Hysteresis**
- Input signal (%F.S.)
- Output deviation factor (%F.S.)

**Repeatability**
- Repetition

**Pressure characteristics**
- Supply pressure: 0.7 MPa
- Set pressure: 0.2 MPa
- Output deviation factor (%F.S.)

**Flow rate characteristics**
- Supply pressure: 0.7 MPa
- Flow rate (L/min (ANR))

**Relief flow characteristics**
- Supply pressure: 0.7 MPa
- Flow rate (L/min (ANR))

### ITV203 Series

**Linearity**
- Set pressure: 0.2 MPa
- Output deviation factor (%F.S.)

**Hysteresis**
- Input signal (%F.S.)
- Output deviation factor (%F.S.)

**Repeatability**
- Repetition

**Pressure characteristics**
- Supply pressure: 0.7 MPa
- Set pressure: 0.2 MPa
- Output deviation factor (%F.S.)

**Flow rate characteristics**
- Supply pressure: 0.7 MPa
- Flow rate (L/min (ANR))

**Relief flow characteristics**
- Supply pressure: 0.7 MPa
- Flow rate (L/min (ANR))

---

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Electro-Pneumatic Regulator *ITV1000/2000/3000 Series*

**ITV303 Series**

**Linearity**

![Linearity Graph]

**Hysteresis**

![Hysteresis Graph]

**Repeatability**

![Repeatability Graph]

**Pressure characteristics**

Set pressure: 0.2 MPa

![Pressure Characteristics Graph]

**Flow rate characteristics**

Supply pressure: 0.7 MPa

![Flow Rate Characteristics Graph]

**Relief flow characteristics**

Supply pressure: 0.7 MPa

![Relief Flow Characteristics Graph]
**ITV105 Series**

**Linearity**

![Graph showing linearity](image1)

**Hysteresis**

![Graph showing hysteresis](image2)

**Repeatability**

![Graph showing repeatability](image3)

**Pressure characteristics**

- Set pressure: 0.4 MPa

![Graph showing pressure characteristics](image4)

**Flow rate characteristics**

- Supply pressure: 1.0 MPa

![Graph showing flow rate characteristics](image5)

**Relief flow characteristics**

- Supply pressure: 1.0 MPa

![Graph showing relief flow characteristics](image6)

---

**ITV205 Series**

**Linearity**

![Graph showing linearity](image7)

**Hysteresis**

![Graph showing hysteresis](image8)

**Repeatability**

![Graph showing repeatability](image9)

**Pressure characteristics**

- Set pressure: 0.4 MPa

![Graph showing pressure characteristics](image10)

**Flow rate characteristics**

- Supply pressure: 1.0 MPa

![Graph showing flow rate characteristics](image11)

**Relief flow characteristics**

- Supply pressure: 1.0 MPa

![Graph showing relief flow characteristics](image12)
ITV305 Series

**Linearity**

Set pressure vs. input signal (% F.S.) graph showing a linear relationship.

**Hysteresis**

Output deviation vs. input signal (% F.S.) graph with hysteresis loops indicating non-linear behavior.

**Repeatability**

Output deviation vs. repetition graph showing consistency over multiple cycles.

**Pressure characteristics**

Set pressure: 0.4 MPa

**Flow rate characteristics**

Supply pressure: 1.0 MPa

**Relief flow characteristics**

Supply pressure: 1.0 MPa
## ITV1000/2000/3000 Series

### Construction

#### ITV1000

![Diagram of ITV1000]

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body</td>
<td>Aluminum alloy</td>
</tr>
<tr>
<td>2</td>
<td>Cover</td>
<td>Aluminum alloy</td>
</tr>
<tr>
<td>3</td>
<td>Valve guide</td>
<td>Resin</td>
</tr>
<tr>
<td>4</td>
<td>Diaphragm assembly</td>
<td>Aluminum alloy</td>
</tr>
<tr>
<td>5</td>
<td>Seal</td>
<td>Weather resistant NBR</td>
</tr>
<tr>
<td>6</td>
<td>Bowl assembly</td>
<td>Steel</td>
</tr>
<tr>
<td>7</td>
<td>Sub-plate</td>
<td>Resin</td>
</tr>
<tr>
<td>8</td>
<td>Seal</td>
<td>NBR</td>
</tr>
<tr>
<td>9</td>
<td>Control circuit assembly</td>
<td>NBR</td>
</tr>
<tr>
<td>10</td>
<td>Bumper</td>
<td>NBR</td>
</tr>
<tr>
<td>11</td>
<td>Valve</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>12</td>
<td>Guide retainer</td>
<td>Aluminum alloy</td>
</tr>
<tr>
<td>13</td>
<td>Solenoid valve</td>
<td>NBR</td>
</tr>
<tr>
<td>14</td>
<td>O-ring</td>
<td>HNBR</td>
</tr>
<tr>
<td>15</td>
<td>Round head phillips screw</td>
<td>Steel</td>
</tr>
<tr>
<td>16</td>
<td>Flat washer</td>
<td>Stainless steel</td>
</tr>
</tbody>
</table>

*Parts in contact with fluid are indicated with a mark.�.

#### ITV2000

![Diagram of ITV2000]

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body</td>
<td>Aluminum alloy</td>
</tr>
<tr>
<td>2</td>
<td>Intermediate body</td>
<td>Aluminum alloy</td>
</tr>
<tr>
<td>3</td>
<td>Cover</td>
<td>Aluminum alloy</td>
</tr>
<tr>
<td>4</td>
<td>Valve guide</td>
<td>Aluminum alloy</td>
</tr>
<tr>
<td>5</td>
<td>Valve (Supply valve)</td>
<td>HNBR/Brass</td>
</tr>
<tr>
<td>6</td>
<td>Valve (Exhaust valve)</td>
<td>HNBR/Brass</td>
</tr>
<tr>
<td>7</td>
<td>Valve spring</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>8</td>
<td>Valve spring</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>9</td>
<td>Diaphragm assembly</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>10</td>
<td>Seal</td>
<td>NBR</td>
</tr>
<tr>
<td>11</td>
<td>Bias spring</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>12</td>
<td>O-ring</td>
<td>NBR</td>
</tr>
<tr>
<td>13</td>
<td>Cotter</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>14</td>
<td>Wear ring</td>
<td>Resin</td>
</tr>
<tr>
<td>15</td>
<td>Seal</td>
<td>NBR</td>
</tr>
<tr>
<td>16</td>
<td>Bowl assembly</td>
<td>Resin</td>
</tr>
<tr>
<td>17</td>
<td>Sub-plate</td>
<td>Silicone rubber</td>
</tr>
<tr>
<td>18</td>
<td>Seal</td>
<td>NBR</td>
</tr>
<tr>
<td>19</td>
<td>Control circuit assembly</td>
<td>—</td>
</tr>
<tr>
<td>20</td>
<td>Solenoid valve</td>
<td>—</td>
</tr>
<tr>
<td>21</td>
<td>O-ring</td>
<td>NBR</td>
</tr>
<tr>
<td>22</td>
<td>O-ring</td>
<td>NBR</td>
</tr>
<tr>
<td>23</td>
<td>Round head phillips screw</td>
<td>Steel</td>
</tr>
</tbody>
</table>

*Parts in contact with fluid are indicated with a mark.�.
## Construction

### ITV3000

![Diagram of ITV3000]

#### Main Component Parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cover</td>
<td>Aluminum alloy</td>
</tr>
<tr>
<td>2</td>
<td>Body</td>
<td>Aluminum alloy</td>
</tr>
<tr>
<td>3</td>
<td>Valve guide</td>
<td>Aluminum alloy</td>
</tr>
<tr>
<td>4</td>
<td>Bias spring</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>5</td>
<td>Intermediate body</td>
<td>Aluminum alloy</td>
</tr>
<tr>
<td>6</td>
<td>Diaphragm assembly</td>
<td>Weather resistant NBR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rolled sheet steel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stainless steel</td>
</tr>
<tr>
<td>7</td>
<td>Valve (Supply valve)</td>
<td>Aluminum alloy</td>
</tr>
<tr>
<td>8</td>
<td>Valve (Exhaust valve)</td>
<td>HNBR/Brass</td>
</tr>
<tr>
<td>9</td>
<td>Valve spring</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>10</td>
<td>Seal</td>
<td>NBR</td>
</tr>
<tr>
<td>11</td>
<td>Seal</td>
<td>NBR</td>
</tr>
<tr>
<td>12</td>
<td>Rod guide</td>
<td>Brass</td>
</tr>
<tr>
<td>13</td>
<td>O-ring retainer</td>
<td>Aluminum alloy</td>
</tr>
<tr>
<td>14</td>
<td>Seal</td>
<td>NBR</td>
</tr>
<tr>
<td>15</td>
<td>Bowl assembly</td>
<td>Resin</td>
</tr>
<tr>
<td>16</td>
<td>Sub-plate</td>
<td>Silicone rubber</td>
</tr>
<tr>
<td>17</td>
<td>Seal</td>
<td>NBR</td>
</tr>
<tr>
<td>18</td>
<td>Control circuit assembly</td>
<td>—</td>
</tr>
<tr>
<td>19</td>
<td>Solenoid valve</td>
<td>—</td>
</tr>
<tr>
<td>20</td>
<td>O-ring</td>
<td>—</td>
</tr>
<tr>
<td>21</td>
<td>O-ring</td>
<td>NBR</td>
</tr>
<tr>
<td>22</td>
<td>O-ring</td>
<td>NBR</td>
</tr>
<tr>
<td>23</td>
<td>Round head Phillips screw</td>
<td>Steel</td>
</tr>
</tbody>
</table>

* Parts in contact with fluid are indicated with a mark ◆.
**Dimensions**

**ITV1000/2000/3000 Series**

**Flat bracket**

![Flat bracket diagram]

Note: Do not attempt to rotate, as the cable connector does not turn.

- Right angle type (4 cores)
  - Cable connector 3 m

- Straight type (4 cores)
  - Cable connector 3 m

**L-bracket**

![L-bracket diagram]
Dimensions (16 points preset input, 10 bit digital input, CC-Link, DeviceNet™, PROFIBUS DP and RS-232C)

**16 points preset input**
- M12 x 1 Signal cable connection thread (Plug type)
- M12 x 1 Power cable connection thread (Plug type)
- Digital pressure display
- M3 x 0.5 Solenoid valve EXH

**10 bit digital input**
- HIROSE ELECTRIC CO., LTD. Made RP1SA-12RB-13PA (71)
- Digital pressure display
- M3 x 0.5 Solenoid valve EXH

**CC-Link/ITV10□0-CC**
- OUT M12 x 1 Communication cable connection thread (Socket type)
- M12 x 1 Power cable connection thread (Plug type)
- M3 x 0.5 Solenoid valve EXH

**DeviceNet™/ITV10□0-DE**
- IN M12 x 1 Communication cable connection thread (Plug type)
- M12 x 1 Power cable connection thread (Plug type)
- BUS adapter

**PROFIBUS DP/ITV10□0-PR**
- M12 x 1 Communication cable connection thread (Socket type)
- M12 x 1 Power cable connection thread (Plug type)
- M3 x 0.5 Solenoid valve EXH

**RS-232C/ITV10□0-RC**
- M12 x 1 Communication cable connection thread (Plug type)
- M12 x 1 Power cable connection thread (Plug type)

*Dimensions not shown are same as on page 916.

**With power cable connector**
- *ITV10□□□□ common dimensions

Note) Order communication cable (other than 16 points, RS-232C) separately. (Refer to page 904.)

Note) Do not attempt to rotate, as the cable connector does not turn.
ITV1000/2000/3000 Series

Dimensions

ITV20□□

Flat bracket

Digital pressure display

M12 x 1
Cable connection thread (Plug type)

M5 x 0.8
Solenoid valve
EXH

Flat bracket assembly
P398020-600
(Option)

4 x M5 x 0.8 thread depth 6 mm

Right angle type (4 cores)
Cable connector 3 m

Straight type (4 cores)
Cable connector 3 m

Note) Do not attempt to rotate, as the cable connector does not turn.

L-bracket

Solenoid valve
EXH

1/4 (Rc, NPT, NPTF, G)
EXH port

2 x 1/4, 3/8 (Rc, NPT, NPTF, G)
SUP port, OUT port

Digital pressure display

L-bracket assembly
P398020-601
(Option)

L-bracket

Dimensions

L-bracket

Solenoid valve
EXH

1/4 (Rc, NPT, NPTF, G)

EXH port

2 x 1/4, 3/8 (Rc, NPT, NPTF, G)
SUP port, OUT port

L-bracket assembly
P398020-601
(Option)

L-bracket

Note) Do not attempt to rotate, as the cable connector does not turn.
Electro-Pneumatic Regulator *ITV1000/2000/3000 Series*

**Dimensions (16 points preset input, 10 bit digital input, CC-Link, DeviceNet™, PROFIBUS DP and RS-232C)**

### 16 points preset input

- **M12 x 1** Signal cable connection thread (Plug type)
- **M12 x 1** Power cable connection thread (Plug type)
- Digital pressure display
- **M5 x 0.8** Solenoid valve EXH

### 10 bit digital input

- HIROSE ELECTRIC CO., LTD. Made RP13A-12RB-13PA (71)
- Digital pressure display
- **M5 x 0.8** Solenoid valve EXH
- **ø14.3** (14)

### CC-Link/ITV20□0-CC

- **M12 x 1** Communication cable connection thread (Plug type)
- **M12 x 1** Power cable connection thread (Plug type)

### DeviceNet™/ITV20□0-DE

- **M12 x 1** Communication cable connection thread (Plug type)
- **M12 x 1** Power cable connection thread (Plug type)

### PROFIBUS DP/ITV20□0-PR

- **M12 x 1** Communication cable connection thread (Plug type)
- **M12 x 1** Power cable connection thread (Plug type)

### RS-232C/ITV20□0-RC

- **M12 x 1** Communication cable connection thread (Plug type)
- **M12 x 1** Power cable connection thread (Plug type)

* Dimensions not shown are same as on page 918.

**With power cable connector**

- **ITV20□0-**  Common dimensions

**Note** Order communication cable (other than 16 points, RS-232C) separately. (Refer to page 904.)

**Note** Do not attempt to rotate, as the cable connector does not turn.

919
Dimensions

ITV30 □□
Flat bracket

Note: Do not attempt to rotate, as the cable connector does not turn.

Digital pressure display

M12 x 1
Cable connection thread (Plug type)

Solenoid valve EXH

4 x Ø7
Mounting hole

Right angle type (4 cores)
Cable connector 3 m

Straight type (4 cores)
Cable connector 3 m

L-bracket assembly
P398020-600
(Option)

4 x M5 x 0.8 thread depth 6 mm

L-bracket assembly
P398020-601
(Option)

Digital pressure display

Flat bracket assembly
P398020-600
(Option)

M5 x 0.8
Solenoid valve EXH

Solenoid valve EXH

4 x M5 x 0.8 thread depth 6 mm

Note: Do not attempt to rotate, as the cable connector does not turn.

L-bracket

M12 x 1
Cable connection thread (Plug type)

Solenoid valve EXH

4 x Ø7
Mounting hole

Right angle type (4 cores)
Cable connector 3 m

Straight type (4 cores)
Cable connector 3 m

L-bracket assembly
P398020-601
(Option)
**Electro-Pneumatic Regulator**  
**ITV1000/2000/3000 Series**

### 16 points preset input

- **Signal cable connection thread (Plug type)**: M12 x 1
- **Power cable connection thread (Plug type)**: M12 x 1

### 10 bit digital input

HIROSE ELECTRIC CO., LTD. Made
RP13A-12RB-13PA (71)

### CC-Link/ITV30□-CC

- **Power cable connection thread (Plug type)**: M12 x 1

### DeviceNet™/ITV30□-DE

- **Power cable connection thread (Plug type)**: M12 x 1

### PROFIBUS DP/ITV30□-PR

- **Communication cable connection thread (Socket type)**: M12 x 1

### RS-232C/ITV30□-RC

- **Communication cable connection thread (Plug type)**: M12 x 1

### With power cable connector

- **ITV30□-CC common dimensions**

Note) Order communication cable (other than 16 points, RS-232C) separately. (Refer to page 904.)
**1 Reverse Type**

In compliance with input, inverse proportional pressure is displayed.

- ITV10 - X102
- ITV20 - X102
- ITV30 - X102

**Input/output characteristics chart**

Note 1) In part number is the same model no. for the standard products.
Note 2) Except for preset input type and digital input type.
Note 3) For communication models, consult SMC for availability.

**2 High Pressure Type (SUP 1.2 MPa, OUT 1.0 MPa)**

- ITV10 5 - X224
- ITV20 5 - X224
- ITV30 5 - X224

Note 1) For preset input type, digital input type and communication models, consult SMC for availability.

**3 Set Pressure Range 1 to 100 kPa**

- ITV10 1 - X25
- ITV20 1 - X25

Note 1) For preset input type, digital input type and communication models, consult SMC for availability.
## 4 High-Speed Response Time Type

Pressure response with no load is approx. 0.1 sec.

Note 1) This is not a guaranteed value as it depends on the operating environment.

Note 2) When the input signal is at 0%, the exhaust solenoid valve is controlled to reduce the outlet pressure to zero. For this reason, a noise may be generated. This noise is normal and does not indicate a fault.

Note 3) If the desired output pressure values cannot be reached due to fluctuations in the operating conditions, etc., conduct an “Initialize” operation as described in the operation manual.

### Model
- 1: 1000 type
- 2: 2000 type

### Pressure range
- 1: 0.1 MPa
- 2: 0.5 MPa
- 3: 0.9 MPa

### Power supply voltage
- 0: 24 VDC
- 1: 12 to 15 VDC

### Input signal
- 0: Current type 4 to 20 mA DC (Sink type)
- 1: Current type 0 to 20 mA DC (Sink type)
- 2: Voltage type 0 to 5 VDC
- 3: Voltage type 0 to 10 VDC

### Monitor output
- 1: Analog output 1 to 5 VDC
- 2: Switch output/NPN output
- 3: Switch output/PNP output
- 4: Analog output 4 to 20 mA DC (Sink type)

### Thread type
- Nil
- Rc
- N
- NPT
- T
- NPTF
- F
- G

### Cable connector type
- S: Straight type 3 m
- L: Right angle type 3 m
- N: Without cable connector

### Bracket
- Nil: Without bracket
- B: Flat bracket
- C: L-bracket

### Port size
- 1: 1/8 (1000 type)
- 2: 1/4 (1000, 2000 type)
- 3: 3/8 (2000 type)

### Pressure display unit
- Nil
- 2*: MPa
- 3: kgf/cm²
- 4*: bar
- 5: psi

* Under Japan’s new Measurement Act, this is only for overseas sales (SI units are to be used inside Japan).
5 Manifold Specifications (Except ITV3000 series)

2 through 8 station manifold.

How to Order Manifolds

<table>
<thead>
<tr>
<th>Model</th>
<th>Stations</th>
<th>OUT port size</th>
<th>Connection thread type</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITV100, 2000</td>
<td>2 stations</td>
<td>1/4</td>
<td>Rc</td>
</tr>
<tr>
<td>ITV20-02</td>
<td>8 stations</td>
<td>3/8</td>
<td>Rc</td>
</tr>
</tbody>
</table>

Example

Electro-pneumatic regulator

ITV1030-311S-X26

Blanking plate assembly

P398020-13

Electro-pneumatic regulator

ITV2050-212S-X26

Note 1) Electro-pneumatic regulators are counted starting from station 1 on the left side with the OUT ports in front.

Note 2) The port size for mounted electro-pneumatic regulators is Rc 1/8 (ITV1000), Rc 1/4 (ITV2000) only.

Note 3) When there is a large number of stations, use piping with the largest possible inside diameter for the supply side, such as steel piping.

Note 4) The use of the straight type cable connector is recommended. To mount right angle type, be certain to check that no possible interference occurs.

Note 5) When mounting a blanking plate and the regulator with different pressure set, please inform SMC of the order of a manifold station beside a purchase order.

How to Order for Manifold Mounted

ITV1030-311S-X26

ITV2050-212S-X26

ITV1030-311S-X26

ITV2050-212S-X26

ITV1000/2000/3000 Series

Made to Order Specifications 3

Please contact SMC for detailed dimensions, specifications and lead times.
### Specifications

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Minimum supply pressure</th>
<th>Air</th>
<th>Set pressure +0.1 MPa</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maximum supply pressure</td>
<td>1.0 MPa (Pressure range 0.1 MPa type: 0.2 MPa)</td>
<td></td>
</tr>
<tr>
<td>Proof pressure</td>
<td>(Supply side)</td>
<td>0.5 MPa (Pressure range 0.1 MPa type: 0.2 MPa)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Output side)</td>
<td>1.5 MPa (Pressure range 0.1 MPa type: 0.3 MPa)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Set pressure range</td>
<td>1.0 MPa (Pressure range 0.1 MPa type: 0.2 MPa)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0: 0.005 to 0.1 MPa, 3: 0.005 to 0.5 MPa, 5: 0.005 to 0.9 MPa</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Power supply voltage</td>
<td>0.12 A or less (24 VDC ≤10% type)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.18 A or less (12 to 15 VDC type)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Current consumption</td>
<td>0.4 to 20 mA, 1: 0 to 20 mA, 2: 0 to 5 VDC, 3: 0 to 10 VDC</td>
<td></td>
</tr>
<tr>
<td>Input signal</td>
<td>Voltage type: Approx. 6.5 kΩ, Current type: 250 Ω or less</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input impedance</td>
<td>Output signal</td>
<td>Analog output: 1 to 5 VDC/4 to 20 mA DC, Switch output (NPN/PNP)</td>
<td></td>
</tr>
<tr>
<td>Linearly</td>
<td>Hysteresis</td>
<td>±0.5% F.S. or less</td>
<td></td>
</tr>
<tr>
<td>Repeatability</td>
<td>Sensitivity</td>
<td>±0.5% F.S. or less</td>
<td></td>
</tr>
<tr>
<td>Temperature characteristics</td>
<td>Temperature characteristics</td>
<td>±0.1% F.S. / °C or ±0.1% F.S. / kPa</td>
<td></td>
</tr>
<tr>
<td>Output pressure display</td>
<td>Accuracy</td>
<td>±2% F.S. ±1 digit or less</td>
<td></td>
</tr>
<tr>
<td>Minimum unit</td>
<td>MPa: 0.001, kgf/cm²: 0.01, bar: 0.01, psi: 0.1, kPa: 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient and fluid temperature</td>
<td>Temperature</td>
<td>0 to 50 °C (No condensation)</td>
<td></td>
</tr>
<tr>
<td>Enclosure</td>
<td>Weight</td>
<td>ITV1000: Approx. 250 g, ITV2000: Approx. 350 g, ITV3000: Approx. 645 g (without brackets)</td>
<td></td>
</tr>
</tbody>
</table>

The above characteristics (specifications) are confined to the static state. When air is consumed on the output side, the pressure may fluctuate.
**ITV1000/2000/3000 Series**

Made to Order Specifications 5

Please contact SMC for detailed dimensions, specifications, and lead times.

---

### 7 With Alarm Output

Alarm is output if the set pressure is not reached or maintained for 5 seconds or more.

**Application examples:** Pressure management for thrust control, etc.

---

### Fluid Specifications

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Minimum supply pressure</th>
<th>Maximum supply pressure</th>
<th>Proof pressure</th>
<th>Set pressure range</th>
<th>Power supply voltage</th>
<th>Current consumption</th>
<th>Input signal</th>
<th>Input impedance</th>
<th>Output signal</th>
<th>Linearity</th>
<th>Hysteresis</th>
<th>Repeatability</th>
<th>Sensitivity</th>
<th>Temperature characteristics</th>
<th>Output pressure display</th>
<th>Enclosure</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
<td>1.0 MPa (Pressure range 0.1 MPa type: 0.2 MPa)</td>
<td>1.5 MPa (Pressure range 0.1 MPa type: 0.3 MPa)</td>
<td>1 MPa (Pressure range 0.1 MPa type: 0.2 MPa)</td>
<td>1: 0.005 to 0.1 MPa, 3: 0.005 to 0.5 MPa, 5: 0.005 to 0.9 MPa</td>
<td>0: 24 VDC ±10%, 1: 12 to 15 VDC</td>
<td>0.12 A or less (24 VDC ±10% type)</td>
<td>0: 4 to 20 mA, 1: 0 to 20 mA, 2: 0 to 5 VDC, 3: 0 to 10 VDC</td>
<td>Voltage type: Approx. 6.5 kΩ, Current type: 250 Ω or less</td>
<td>Alarm output (NPN/PNP)</td>
<td>±1.0% F.S. or less</td>
<td>0.5% F.S. or less</td>
<td>±0.5% F.S. or less</td>
<td>0.2% F.S. or less</td>
<td>±0.12% F.S./°C or less</td>
<td>±2% F.S. ±1 digit or less</td>
<td>IP65</td>
<td>ITV1000: Approx. 250 g, ITV2000: Approx. 350 g, ITV3000: Approx. 645 g (without brackets)</td>
</tr>
</tbody>
</table>

---

The above characteristics (specifications) are confined to the static state. When air is consumed on the output side, the pressure may fluctuate.
Compact Vacuum Regulator

**ITV009 Series**

### How to Order

**For single unit and single unit for manifold**

**ITV00 9 0 – 3 N**

**Pressure range**

9 ~100 kPa

**Power supply voltage**

0 24 VDC ±10%
1 12 to 15 VDC

**Input signal**

0 Current type 4 to 20 mA DC (Sink type)
1 Current type 0 to 20 mA DC (Sink type)
2 Voltage type 0 to 5 VDC
3 Voltage type 0 to 10 VDC

**Built-in One-touch fittings type**

**For single unit**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>VAC</th>
<th>OUT</th>
<th>ATM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nil</td>
<td>Metric size (Light gray)</td>
<td>ø4</td>
<td></td>
</tr>
<tr>
<td>U</td>
<td>Inch size (Orange)</td>
<td>ø5/32&quot;</td>
<td></td>
</tr>
</tbody>
</table>

**For manifold**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>VAC</th>
<th>OUT</th>
<th>ATM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nil</td>
<td>Metric size (Light gray)</td>
<td>ø6</td>
<td>ø4</td>
</tr>
<tr>
<td>U</td>
<td>Inch size (Orange)</td>
<td>ø1/4&quot;</td>
<td>ø5/32&quot;</td>
</tr>
</tbody>
</table>

**Cable connector (Option)**

N Without cable connector
S Straight type 3 m
L Right angle type 2 m

**Bracket/Option for single unit only**

B Flat Bracket
C L-bracket

**Base type**

Nil For single unit
M For manifolds

### How to Order Manifold Assembly (Example)

Indicate the part numbers of electro-pneumatic regulators to be mounted below the manifold part number.

**Example**

Due to the common supply/exhaust feature, note that different pressure range combinations are not available.

- **ITV00-03** — 1 set (Manifold part no.)
- **ITV00-03-02** — 2 sets (Vacuum regulator part no. (1, 2 stations))
- **ITV00-03-03** — 1 set (Vacuum regulator part no. (3 stations))

- Indicate part numbers in order starting from the first station on the D side.
- The asterisk (*) specifies mounting. Add an asterisk (*) at the beginning of electro-pneumatic regulator part numbers to be mounted.

- Note) Combination with having different pressure ranges is not available due to common supply/exhaust features.

**DIN rail**

**Manifold**

**IITV00-02 n**

**Stations**

| 02 | 2 stations |
| 03 | 3 stations |
| 10 | 10 stations |

**One-touch fitting size for supply/exhaust parts (End plate)**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>VAC</th>
<th>OUT</th>
<th>ATM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nil</td>
<td>ø6 (Light gray)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>U</td>
<td>ø1/4&quot; (Orange)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note**

A DIN rail with the length specified by the number of stations is attached to the manifold. For dimensions of the DIN rail, refer to the external dimensions.
## Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>ITV009-□ Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum supply pressure</td>
<td>Set pressure –1 kPa</td>
</tr>
<tr>
<td>Maximum supply pressure</td>
<td>–101 kPa</td>
</tr>
<tr>
<td>Set pressure range</td>
<td>–1 to –100 kPa</td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td><strong>Voltage</strong> 24 VDC ±10%, 12 to 15 VDC</td>
</tr>
<tr>
<td><strong>Input signal</strong></td>
<td><strong>Voltage type</strong> 0 to 5 VDC, 0 to 10 VDC</td>
</tr>
<tr>
<td><strong>Input impedance</strong></td>
<td><strong>Voltage type</strong> Approx. 10 kΩ</td>
</tr>
<tr>
<td><strong>Output signal</strong></td>
<td><strong>Analog output</strong> 1 to 5 VDC (Output impedance: Approx. 1 kΩ)</td>
</tr>
<tr>
<td><strong>Linearity</strong></td>
<td>±1% F.S. or less</td>
</tr>
<tr>
<td><strong>Hysteresis</strong></td>
<td>0.5% F.S. or less</td>
</tr>
<tr>
<td><strong>Repeatability</strong></td>
<td>±0.5% F.S. or less</td>
</tr>
<tr>
<td><strong>Sensitivity</strong></td>
<td>0.2% F.S. or less</td>
</tr>
<tr>
<td><strong>Temperature characteristics</strong></td>
<td>±0.12% F.S./°C or less</td>
</tr>
<tr>
<td><strong>Operating temperature range</strong></td>
<td>0 to 50°C (No condensation)</td>
</tr>
<tr>
<td><strong>Enclosure</strong></td>
<td>IP65 equivalent *</td>
</tr>
<tr>
<td><strong>Connection type</strong></td>
<td>Built-in One-touch fittings</td>
</tr>
<tr>
<td><strong>Connection size</strong></td>
<td><strong>For single unit</strong> Metric size 1, 2, 3: ø4</td>
</tr>
<tr>
<td></td>
<td><strong>Manifold</strong> Metric size 1, 2, 3: ø6, 4: ø4</td>
</tr>
<tr>
<td><strong>Weight (Note 1)</strong></td>
<td>100 g or less (without option)</td>
</tr>
</tbody>
</table>

**Note 1)** Indicates the weight of a single unit. For ITV00-n Total weight (g) Stations (n) x 100 + 130 (Weight of end block A, B assembly) + Weight (g) of DIN rail

**Note 2)** When there is a downstream flow consumption, pressure may become unstable depending on piping conditions.

**Note 3)** When the power is turned on, a noise may be generated. This noise is normal and does not indicate a fault.

**Note 4)** When measuring TV analog output from 1 to 5 VDC, if the load impedance is less than 100 kΩ, the analog output monitor accuracy of ±6% F.S. or less may not be available. The product with the accuracy of within ±6% is supplied upon your request. Output pressure remains unaffected.

* When using under the conditions equivalent to IP65, connect the fitting or tube to the breathing hole prior to use. (For details, refer to "Specific Product Precautions 1" on page 941.)

### Accessories (Option)

#### Bracket
- Flat bracket assembly (including 2 mounting screws) P39800022
- L-bracket assembly (including 2 mounting screws) P39800023

#### Cable connector
- Straight type M8-4DSX3MG4
- Right angle type P398000-501-2

Tightening torque when assembling is 0.3 N-m.
Working Principle

When the input signal rises, the vacuum pressure solenoid valve ① turns ON. Due to this, part of the vacuum pressure (VAC.) passes through the vacuum pressure solenoid valve ① and changes to a vacuum pressure. This vacuum pressure feeds back to the control circuit ④ via the pressure sensor ③. Here, the vacuum pressure solenoid valve and the atmospheric pressure solenoid valve work alternately to make continuous pressure corrections until vacuum pressure becomes proportional to the input signal, thus, supplying vacuum pressure that is consistently proportional to the input signal.

Working Principle Diagram

Block Diagram
Compact Vacuum Regulator ITV009 Series

**Linearity, Hysteresis**

With 50% of signal input

**Repeatability**

With 50% of signal input

**Pressure Characteristics**

Set pressure: –10 kPa

**Flow Rate Characteristics**

Set pressure: –10 kPa

---

ARJ
AR425 to 935
ARX
AMR
ARM
ARP
IR
IRV
VEX
SRH
SRP
SRF
ITV
IC
ITVH
ITVX
PVQ
VY1
VBAT
AP100
Dimensions

For Single Unit

Port Location

<table>
<thead>
<tr>
<th>No.</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITV009</td>
<td>VAC</td>
<td>OUT</td>
<td>ATM</td>
</tr>
</tbody>
</table>

Note) When using under the conditions equivalent to IP65, connect the fittings or tube to the breathing hole prior to use. (For details, refer to "Specific Product Precautions 1" on page 941.)
Dimensions

Single unit for manifold

Note) When using under the conditions equivalent to IP65, connect the fittings or tube to the breathing hole prior to use. (For details, refer to “Specific Product Precautions 1” on page 941.)

Note) For dimensions of the cable connector, refer to single unit on page 932.
### Dimensions

#### Manifold

#### Port Location

<table>
<thead>
<tr>
<th>No.</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITV009</td>
<td>VAC</td>
<td>OUT</td>
<td>ATM</td>
</tr>
</tbody>
</table>

Note: Stations are counted starting from the D side.

---

**Note:** For dimensions of the cable connector, refer to single unit on page 932.

### Manifold Stations

<table>
<thead>
<tr>
<th>Manifold stations n</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>60</td>
<td>75</td>
<td>90</td>
<td>105</td>
<td>120</td>
<td>135</td>
<td>150</td>
<td>165</td>
<td>180</td>
</tr>
<tr>
<td>L2</td>
<td>110.5</td>
<td>123</td>
<td>148</td>
<td>160.5</td>
<td>173</td>
<td>185.5</td>
<td>198</td>
<td>223</td>
<td>235.5</td>
</tr>
</tbody>
</table>

**Weight of DIN rail (g)**

| 20 | 22 | 27 | 29 | 31 | 34 | 36 | 41 | 43 |

---

**Note:** When using under the conditions equivalent to IP65, connect the fittings or tubing to the breathing hole prior to use.

(For details, refer to "Specific Product Precautions 1" on page 941.)

---

Dimensions in inch are noted in parentheses.
Electronic Vacuum Regulator

**ITV2090/2091 Series**

**Input signal/Communication model**
- 0: Current type 4 to 20 mA DC (Sink type)
- 1: Current type 0 to 20 mA DC (Sink type)
- 2: Voltage type 0 to 5 VDC
- 3: Voltage type 0 to 10 VDC

**Power supply voltage**
- 0: 24 VDC
- 1: 12 to 15 VDC

**Monitor output**
- 1: Analog output 1 to 5 VDC
- 2: Switch output (NPN output)
- 3: Switch output (PNP output)
- 4: Analog output 4 to 20 mA DC (Sink type)

**Pressure range**
- 1: -1.3 kPa
- 2: -80 kPa

**Pressure display unit**
- 5 kPa

**Cable connector type**
- S: Straight type 3 m
- L: Right angle type 3 m
- N: Without cable connector

**Bracket**
- Nil: Without bracket
- B: Flat bracket
- C: L-bracket

**Port size**
- 2: 1/4

**Thread type**
- Nil
- Rc
- N: NPT
- T: NPTF
- F: G

**Note**
- For the communication models, CC, DE, PR and RC, only "Nil" is available as it does not have a pressure display.
- Even when a cable connector is selected, communication cable is not included in the communication models, CC, DE and PR. Please order it separately. Refer to the below.
- For 10 bit digital input, right angle type cannot be selected.

**Application**
- CC-Link compatibility
- DeviceNet™ compatibility
- PROFINET compatibility

**Communication cable part number**
- PCA-1567720 (Socket type)
- PCA-1557633 (Socket type)
- PCA-1557646 (Plug type)
- PCA-1557688 (Socket type)
- PCA-1557691 (Plug type)

**Note**
- Dedicated Bus adapter supplied with the product.
- T-branch connector not supplied.

**For communications cables, use the parts listed below**
(refer to M8/M12 connector in Best Pneumatics No.1-1 for details)

---

**How to Order**

**ITV 209 0 0 1 2 S 5**

**Pressure range**
- 1: -1.3 kPa
- 2: -80 kPa

**Power supply voltage**
- 0: 24 VDC
- 1: 12 to 15 VDC

**Pressure display unit**
- 5 kPa

**Cable connector type**
- S: Straight type 3 m
- L: Right angle type 3 m
- N: Without cable connector

**Bracket**
- Nil: Without bracket
- B: Flat bracket
- C: L-bracket

**Port size**
- 2: 1/4

**Thread type**
- Nil
- Rc
- N: NPT
- T: NPTF
- F: G

---

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935
Stepless control of vacuum pressure proportional to an electrical signal

**Piping/Wiring Diagram**

- Power supply and input signal (VDC, mA DC)
- VAC
- ITV2090 OUT
- Tank
- Ejector

**Communication Specifications (CC, DE, PR, RC)**

<table>
<thead>
<tr>
<th>Model</th>
<th>ITV2090</th>
<th>ITV2091</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protocol</td>
<td>CC-Link</td>
<td>DeviceNet™</td>
</tr>
<tr>
<td>Communication speed</td>
<td>156 k/625 k 2.5 M/5 M/10 M bps</td>
<td>125 k/250 k/500 k bps</td>
</tr>
<tr>
<td>I/O occupation area</td>
<td>9.6 kbps</td>
<td></td>
</tr>
<tr>
<td>Configuration file</td>
<td>EDS</td>
<td>GSD</td>
</tr>
<tr>
<td>Communication data resolution</td>
<td>16 bit/16 bit</td>
<td>16 bit/16 bit</td>
</tr>
<tr>
<td>Fail safe</td>
<td>12 bit/12 bit (4.096 resolution)</td>
<td>12 bit/12 bit (4.096 resolution)</td>
</tr>
<tr>
<td>Electric insulation</td>
<td>HOLD/CLEAR</td>
<td>CLEAR</td>
</tr>
<tr>
<td>Terminating resistor</td>
<td>Built into the product (Switch setting)</td>
<td>Built into the product (Switch setting)</td>
</tr>
<tr>
<td>Current consumption</td>
<td>0.16 A or less</td>
<td>0.14 A or less</td>
</tr>
<tr>
<td>Weight</td>
<td>470</td>
<td>460</td>
</tr>
</tbody>
</table>

**Standard Specifications**

<table>
<thead>
<tr>
<th>Model</th>
<th>ITV2090</th>
<th>ITV2091</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum supply vacuum pressure</td>
<td>Set pressure –13.3 kPa</td>
<td></td>
</tr>
<tr>
<td>Maximum supply vacuum pressure</td>
<td>–101 kPa</td>
<td></td>
</tr>
<tr>
<td>Set pressure range</td>
<td>–13 kPa to –80 kPa</td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>Voltage 24 VDC ±10%</td>
<td>12 to 15 VDC</td>
</tr>
<tr>
<td>Current consumption</td>
<td>Power supply voltage 24 VDC type: 0.12 A or less</td>
<td>Power supply voltage 15 VDC type: 0.18 A or less</td>
</tr>
<tr>
<td>Input signal</td>
<td>Current type 4 to 20 mA DC, 0 to 20 mA DC (Sink type)</td>
<td></td>
</tr>
<tr>
<td>Voltage type</td>
<td>0 to 5 VDC, 0 to 10 VDC</td>
<td></td>
</tr>
<tr>
<td>Preset input</td>
<td>4 points (Negative common), 16 points (No common polarity)</td>
<td></td>
</tr>
<tr>
<td>Digital input</td>
<td>10 bit (Parallel)</td>
<td></td>
</tr>
<tr>
<td>Input impedance</td>
<td>Current type 250 V or less</td>
<td></td>
</tr>
<tr>
<td>Voltage type</td>
<td>Approx. 6.5 kΩ</td>
<td></td>
</tr>
<tr>
<td>Preset input</td>
<td>Power supply voltage 24 VDC type: Approx. 4.7 kΩ</td>
<td></td>
</tr>
<tr>
<td>Digital input</td>
<td>Approx. 4.7 kΩ</td>
<td></td>
</tr>
<tr>
<td>Output signal (Monitor output)</td>
<td>Analog output 1 to 5 VDC (Output impedance: Approx. 1 kΩ)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 to 20 mA DC (Sink type) (Output impedance: 250 Ω or less)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Output accuracy ± 6% F.S. or less</td>
<td></td>
</tr>
<tr>
<td>Switch output</td>
<td>NPN open collector output: Max. 30 V, 80 mA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PNP open collector output: Max. 80 mA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Power supply voltage 12 to 15 VDC type: 0.18 A or less</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Power supply voltage 24 VDC type: 0.12 A or less</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Power supply voltage 12 VDC type: Approx. 2.0 kΩ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Power supply voltage 24 VDC type: Approx. 4.7 kΩ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Temperature characteristics ± 0.12% F.S./°C or less</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Output pressure display Accuracy ± 2% F.S./± 1 digit or less</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Units kPa or ± 6% F.S./°C or less</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ambient and fluid temperature 0 to 50°C (No condensation)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enclosure</td>
<td>IP65</td>
</tr>
<tr>
<td></td>
<td>Weight</td>
<td>390 g</td>
</tr>
</tbody>
</table>

**Note 1:** The minimum supply vacuum pressure should be 13.3 kPa less than the maximum vacuum pressure setting value.
**Note 2:** The input output range is not possible with the 2-wire type. Power supply voltage (24 VDC or 12 to 15 VDC) is required.
**Note 3:** Value for the state with no occurrence of current circuit included. If an allowance is provided for an over current circuit, the input impedance varies depending on the input power supply. This is 350 Ω or less for an input current of 20 mA DC. When measuring ITV analog output from 1 to 5 VDC, if the load impedance is less than 100 kΩ, the accuracy of ±6% may not be available. The product with the accuracy of ±6% is supplied upon your request. Output pressure remains unaffected.
**Note 4:** Either analog output or switch output must be selected. Furthermore, when switch output is selected, either NPN output or PNP output must also be selected. Use caution that the preset input type is not equipped with an output signal function.
**Note 5:** Please contact SMC regarding indication with other units of pressure.
**Note 6:** The product characteristics are confined to the static state.
**Note 7:** Pressure may fluctuate when air is consumed at the output side.
**Note 8:** Add 50 g for digital input type, 70 g for 16 points preset input type respectively.
When the input signal increases, the vacuum pressure solenoid valve ① turns ON, and the atmospheric pressure solenoid valve ② turns OFF. Because of this, VAC. and the pilot chamber ③ are connected, the pressure in the pilot chamber ③ becomes negative and acts on the top of the diaphragm ④.

As a result, the vacuum pressure valve ⑤ which is linked to the diaphragm ④ opens, VAC. and OUT. are connected, and the set pressure becomes negative. This negative pressure feeds back to the control circuit ⑧ via the pressure sensor ⑦. Then, a correct operation works until a vacuum pressure proportional to the input signal is reached, and a vacuum pressure is obtained which is always proportional to the input signal.

**Linearity**

**Hysteresis**

**Repeatability**

**Flow Rate Characteristics**

Supply vacuum pressure: −100 kPa

Flow rate characteristics
measurement conditions:
- Exhaust flow rate of the vacuum pump used for measurement: 500 L/min (ANR)
- Inlet vacuum pressure: −100 kPa (When outlet flow rate is 0 L/min (ANR))
- Maximum flow rate: 132 L/min (ANR) (With inlet vacuum pressure at −39 kPa)
Dimensions

**ITV209 Series**

**Flat bracket**

Note: Do not attempt to rotate the cable connector, as it does not turn.

**L-bracket**
Dimensions (16 points preset input, 10 bit digital input, CC-Link, DeviceNet™, PROFIBUS DP and RS-232C)

16 points preset input

M12 x 1
Digital pressure display

M12 x 1
Power cable connection thread (Plug type)

M5 x 0.8
Air introduction port

10 bit digital input

HIROSE ELECTRIC CO., LTD. Made RP13A-12RB-13PA (71)

Digital pressure display

M5 x 0.8
Air introduction port

CC-Link/ITV2090-CC

IN M12 x 1
Communication cable connection thread (Plug type)

OUT M12 x 1
Communication cable connection thread (Socket type)

DeviceNet™/ITV2090-DE

IN M12 x 1
Communication cable connection thread (Plug type)

OUT M12 x 1
Communication cable connection thread (Socket type)

PROFIBUS DP/ITV2090-PR

IN M12 x 1
Communication cable connection thread (Plug type)

OUT M12 x 1
Communication cable connection thread (Socket type)

RS-232C/ITV2090-RC

IN M12 x 1
Communication cable connection thread (Plug type)

OUT M12 x 1
Communication cable connection thread (Socket type)

* Dimensions not shown are same as on page 938.

With power cable connector

- **ITV2090-** common dimensions

Note) Order communication cable (other than 16 points, RS-232C) separately. (Refer to page 904.)

Note) Do not attempt to rotate the cable connector, as it does not turn.
## ITV209 Series

### Accessories (Option)/Part No.

#### [Bracket]

<table>
<thead>
<tr>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flat bracket assembly (including mounting screws)</td>
<td>P398020-600</td>
</tr>
<tr>
<td>L-bracket assembly (including mounting screws)</td>
<td>P398020-601</td>
</tr>
</tbody>
</table>

#### [Cable connector]

<table>
<thead>
<tr>
<th>Applicable model</th>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current type</td>
<td>Cable connector (4 cores)</td>
<td>P398020-500-3</td>
</tr>
<tr>
<td>Voltage type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 points preset</td>
<td>Straight type 3 m</td>
<td>P398020-500-3</td>
</tr>
<tr>
<td>input</td>
<td>Right angle type 3 m</td>
<td>P398020-501-3</td>
</tr>
<tr>
<td>16 points preset</td>
<td>Power cable (4 cores)</td>
<td>P398020-500-3</td>
</tr>
<tr>
<td>input</td>
<td>Straight type 3 m</td>
<td>P398020-500-3</td>
</tr>
<tr>
<td></td>
<td>Right angle type 3 m</td>
<td>P398020-501-3</td>
</tr>
<tr>
<td>10 bit digital</td>
<td>Signal cable (5 cores)</td>
<td>P398020-502-3</td>
</tr>
<tr>
<td>input</td>
<td>Straight type 3 m</td>
<td>P398020-502-3</td>
</tr>
<tr>
<td></td>
<td>Right angle type 3 m</td>
<td>P398020-503-3</td>
</tr>
<tr>
<td>CC-Link</td>
<td>Cable connector (13 cores)</td>
<td>INI-398-0-59</td>
</tr>
<tr>
<td>PROFIBUS DP</td>
<td>Power cable (4 cores)</td>
<td>P398020-500-3</td>
</tr>
<tr>
<td>DeviceNet™</td>
<td>Straight type 3 m</td>
<td>P398020-500-3</td>
</tr>
<tr>
<td>RS-232C</td>
<td>Power cable (4 cores)</td>
<td>P398020-500-3</td>
</tr>
<tr>
<td></td>
<td>Communication cables connector (5</td>
<td>P398020-502-3</td>
</tr>
<tr>
<td></td>
<td>cores)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Straight type 3 m</td>
<td>P398020-502-3</td>
</tr>
<tr>
<td></td>
<td>Right angle type 3 m</td>
<td>P398020-503-3</td>
</tr>
</tbody>
</table>

Note 1) For the 10-bit digital type, there is no right angle type cable connector.

Note 2) Even when "with cable connector" is selected the communication cable is not included in the communication model (CC, DE, PR). Please order separately.

#### [Bus adapter]

<table>
<thead>
<tr>
<th>Applicable model</th>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC-Link</td>
<td>Bus adapter (Bus adapter supplied with the product.)</td>
<td>EX9-ACY00-MJ</td>
</tr>
</tbody>
</table>

### Dimensions

#### Flat bracket

- 52 x ø7
- 40 x 40 x 100

#### L-bracket

- 25 x ø9.5
- 10 x 10 x 50
- 33 x 33 x 8.5

#### Model | Bracket tightening torque
----------|-------------------------
ITV1000   | 0.76 ± 0.05 N·m
ITV2000/3000 | 1.5 ± 0.05 N·m

---

ITV209 □ Series
**ITV0000/1000/2000/3000 Series**

**Specific Product Precautions 1**

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 387 to 391 for Common Precautions.

---

### ITV0000/009\(^\text{\textregistered}\) Series Precautions

#### Air Supply

**Caution**

1. Install an air filter near this product on the supply side. Select a filtration degree of 5 \(\mu\text{m}\) or less.
2. Compressed air containing large amounts of drainage can cause malfunction of this product and other pneumatic equipment. As a countermeasure, install an aftercooler, air dryer or Drain Catch, etc.
3. If large amounts of carbon dust are generated by the compressor, it can accumulate inside this product and cause malfunction.

For details on the above compressed air quality, refer to SMC’s “Air Preparation Systems”.

#### Wiring

**Caution**

Connect the cable to the connector on the body with the wiring arranged as shown below. Proceed carefully, as incorrect wiring can cause damage.

Further, use DC power with sufficient capacity and a low ripple.

![Wiring Diagram](attachment:attachment.png)

- **Brown**: Lead wire color
- **Blue**: Terminal No.
- **White**: Wiring
- **Black**: Note

**Note:** A right angle type cable is also available. The entry direction for the right angle type connector is to downwards (SUP port side). Never turn the connector as it is not designed to turn. Using force to turn the connector will damage the connector coupling.

#### Handling

**Caution**

1. Do not use a lubricator on the supply side of this product, as this can cause malfunction. When lubrication of terminal equipment is necessary, connect a lubricator on the output side of this equipment.
2. If electric power is shut off while pressure is being applied, pressure will be retained on the output side.

However, this output pressure is held only temporarily and is not guaranteed. If exhausting of this pressure is desired, shut off the power after reducing the set pressure, and discharge the air using a residual pressure exhaust valve, etc.
3. If power to this product is cut off due to a power failure, etc. when it is in a controlled state, output pressure will be retained temporarily. Handle carefully when operating with output pressure released to the atmosphere, as air will continue to flow out.
4. If supply pressure to this product is interrupted while the power is still on, the internal solenoid valve will continue to operate and a humming noise may be generated. Since the life of the product may be shortened, shut off the power supply also when supply pressure is shut off.
5. This product is adjusted for each specification at the time of shipment from the factory. Avoid careless disassembly or removal of parts, as this can lead to malfunction.
6. The optional cable connector is a 4 wire type. When the monitor output (analog output or switch output) is not being used, keep it from touching the other wires as this can cause malfunction.
7. Please note that the right angle cable does not rotate and is limited to only one entry direction.
8. Take the following steps to avoid malfunction due to noise.
   1. Remove power supply noise during operation by installing a line filter, etc. in the AC power line.
   2. For avoiding the influence of noise or static electricity, install this product and its wiring as far as possible from strong electric fields such as those of motors and power lines, etc.
   3. Be sure to implement protective measures against load surge for induction loads (solenoid valves, relays, etc.).
9. The product characteristics are confined to the static state. When air is consumed on the output side, and especially used in the system with large leakage, pressure cannot approach the set pressure and the service life is drastically shortened with a humming noise of the solenoid valve.
10. For details on the handling of this product, refer to the operation manual which is included with the product.
11. In locations where the body is exposed to water, dust, etc., there is a possibility that moisture or dust could enter the body through the breathing hole. Mount a fitting and tube (M-3AU-3 fitting and TIU01m-mm tube recommended) onto the breathing hole and run the tube to a location not exposed to moisture or dust, etc.
**ITV0000/1000/2000/3000 Series**

Specific Product Precautions 1-1

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 387 to 391 for Common Precautions.

---

### Caution

12. If this product will be used in a sealed environment, such as inside an inspection box, a ventilation fan should be installed to ensure adequate ventilation as this product can generate heat in some operating conditions. When the power is turned on, a noise may be generated as a means of checking the operating condition of the solenoid valve. This noise is normal and does not indicate a fault.

13. Each product needs to be powered by one power supply unit.

   The wiring of this product has the same common between the GND for power and the signals; there is a possibility that a wrong current occurs and prevents a proper operation if one power supply unit controls multiple electro-pneumatic regulators.

14. This product does not have a shut-off valve function. If air pressure is supplied without electric power being applied, output pressure may increase to the pressure equivalent of the supply pressure. Operate the system to shut off the supply pressure when not operating the product.

15. For this product, by conducting the procedure described below (steps A to D), the parameters compatible with the power supply voltage and supply pressure in use can be obtained.

   If the desired output pressure values cannot be reached due to fluctuations in the operating conditions, etc., perform this operation.

   A) Change the power supply voltage in use by ±0.4 VDC or more.
   
   B) After inputting the supply pressure used on the inlet side of the ITV, adjust the input signal as described below.

   (0% → 100% → 0%) (Change it gradually, waiting 10 s or more between each adjustment.)

   * Please contact SMC if difficulty inputting signals occurs.

   C) Change the power supply voltage according to the operating conditions/requirements, and repeat step B.

   D) Input the power supply voltage and a 0% signal, and retain for 6 minutes or more. (Supply pressure is not required.)

   While conducting the procedure stated above, noise may be generated by the solenoid valve. However, this does not affect the obtainment of the parameters. In addition, be sure to conduct the procedure with the air sealed in the piping.

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### Warning

If the product to be returned is contaminated or is possibly contaminated with substances that are harmful to humans, for safety reasons, please contact SMC beforehand and then employ a specialist cleaning company to decontaminate the product. After the decontamination prescribed above has been carried out, submit a Product Return Request Sheet or the Detoxification/Decontamination Certificate to SMC and await SMC's approval and further instructions before attempting to return the item.

Please refer to the International Chemical Safety Cards (ICSC) for a list of harmful substances.

If you have any further questions, please don’t hesitate to contact your SMC sales representative.
ITV0000/1000/2000/3000 Series
Specific Product Precautions 2
Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 387 to 391 for Common Precautions.

<table>
<thead>
<tr>
<th>ITV1000/2000/3000/209 Series Precautions</th>
</tr>
</thead>
</table>

### Warning
1. Screw piping together with the recommended proper torque while holding the side that has female threads. Looseness or faulty sealing will occur if tightening torque is insufficient, while thread damage will result if the torque is excessive. Furthermore, if the side with the female threads is not held while tightening, excessive force will be applied directly to piping brackets, etc. causing damage or other problems.

<table>
<thead>
<tr>
<th>Connection thread</th>
<th>1/8</th>
<th>1/4</th>
<th>3/8</th>
<th>1/2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque</td>
<td>3 to 5</td>
<td>8 to 12</td>
<td>15 to 20</td>
<td>20 to 25</td>
</tr>
</tbody>
</table>

2. Do not allow twisting or bending moment to be applied other than the weight of the equipment itself. Provide separate support for external piping, as damage may otherwise occur.

3. Since excessive moment loads and the propagation of vibrations, etc. can easily result from inflexible piping made of materials such as steel, avoid these problems by using flexible tubing for intermediate connections.

### Caution
1. Preparation before piping
   Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe. If chips, sealing material or other debris enter into this product, the solenoid valve may buzz, or the outlet pressure may not be output normally.

2. Winding of sealant tape
   When screwing together pipes and fittings, etc., be certain that chips from the pipe threads and sealing material do not get inside the piping. Also, when sealant tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.

### Operating Environment

### Warning
1. Do not operate in locations having an atmosphere of corrosive gases, chemicals, sea water, or where there will be contact with the same.
2. Do not operate in locations where vibration or impact occurs.

### Caution
1. In locations where the body is exposed to water, steam, dust, etc., there is a possibility that moisture or dust could enter the body through the EXH (solenoid) ports, thereby causing problems.
2. To overcome this, simply install tubing to each port, using the fittings, and extend the tubing so that the other end is at a location where no water splash, etc. occurs. Make sure not to bend, or block the I.D. of the tubing as this will have a detrimental affect on the pressure control.
3. Do not operate in locations where vibration or impact occurs.
4. In locations which receive direct sunlight, provide a protective cover, etc.
5. In locations near heat sources, block off any radiated heat.
6. In locations where there is contact with spatter from water, oil or solder etc., implement suitable protective measures.

### Air Supply

### Warning
1. Type of fluids
   Please consult with SMC when using the product in applications other than compressed air.
2. Do not use compressed air that contains chemicals, synthetic oils including organic solvents, salt or corrosive gases, etc., as it can cause malfunction.

### Caution
1. Install an air filter near this product on the supply side. Select a filtration degree of 5 μm or less.
2. Compressed air containing large amounts of drainage can cause malfunction of this product and other pneumatic equipment. As a countermeasure, install an aftercooler, air dryer or Drain Catch, etc.
3. If large amounts of carbon dust are generated by the compressor, it can accumulate inside this product and cause malfunction. For details on the above compressed air quality, refer to SMC’s “Air Preparation Systems”.

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 387 to 391 for Common Precautions.
Specific Product Precautions 3

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 387 to 391 for Common Precautions.

ITV1000/2000/3000/209 Series Precautions

Handling

⚠️ Caution

1. Do not use a lubricator on the supply side of this product, as this can cause malfunction. When lubrication of terminal equipment is necessary, connect a lubricator on the output side of this equipment.

2. If electric power is shut off while pressure is being applied, pressure will be retained on the output side. However, this output pressure is held only temporarily and is not guaranteed. If exhausting of this pressure is desired, shut off the power after reducing the set pressure, and discharge the air using a residual pressure exhaust valve, etc.

3. If power to this product is cut off due to a power failure, etc. when it is in a controlled state, output pressure will be retained temporarily. Handle carefully when operating with output pressure released to the atmosphere, as air will continue to flow out.

4. If supply pressure to this product is interrupted while the power is still on, the internal solenoid valve will continue to operate and a humming noise may be generated. Since the life of the product may be shortened, shut off the power supply also when supply pressure is shut off.

5. The setting side pressure cannot be completely released from this product in the range below 0.005 MPa (or –1.3 kPa for Vacuum models). In cases where the pressure needs to be reduced completely to 0 MPa, install a 3 port valve, etc. on the setting side to discharge the residual pressure.

6. This product is adjusted for each specification at the time of shipment from the factory. Avoid careless disassembly or removal of parts, as this can lead to malfunction.

7. The optional cable connector is a 4-wire type. When the monitor output (analog output or switch output) is not being used, keep it from touching the other wires as this can cause malfunction.

8. When connecting the cable to this product, turn the lock ring of the cable. If a portion other than the lock ring of the cable is turned, it may damage the connector on the body. Turn the lock ring by hand without using a tool.

9. The right angle cable does not rotate and is limited to only one entry direction. If the right angle cable is rotated forcibly, the cable may be broken or damaged, or may damage the connector on the body.

10. Take the following steps to avoid malfunction due to noise.

   1) Remove power supply noise during operation by installing a line filter, etc. in the AC power line.
   2) For avoiding the influence of noise or static electricity, install this product and its wiring as far as possible from strong electric fields such as those of motors and power lines, etc.
   3) Be sure to implement protective measures against load surge for induction loads (solenoid valves, relays, etc.).

11. Due to the large volume of the output side, a loud exhaust noise will be produced when being used for the purpose of a relief function. Therefore, install a silencer (SMC AN20 or AN40 series) on the exhaust port (EXH port). The port sizes are Rc 1/8, Rc 1/4 and Rc 1/2.

12. Specifications on pages 905 and 936 is in case of static environment. Pressure may fluctuate when air is consumed at the output side.

13. For details on the handling of this product, refer to the operation manual which is included with the product.

14. This product does not have a shut-off valve function. If air pressure is supplied without electric power being applied, output pressure may increase to the pressure equivalent of the supply pressure. Operate the system to shut off the supply pressure when not operating the product.

15. The solenoid valves built into this product are consumables. Perform periodic maintenance in environments where the solenoid valves are operated at a high frequency. The parts can be replaced with a solenoid valve assembly. Please contact SMC for the part number.
Design and Selection

**Caution**

1. Use the following UL approved products for DC power supply combinations.

   (1) Limited voltage current circuit in accordance with UL 508.
   A circuit in which power is supplied by the secondary coil of a transformer that meets the following conditions.
   - Maximum voltage (with no load): 30 Vrms (42.4 V peak) or less
   - Maximum current:
     - (1) 8 A or less (including when short circuited)
     - (2) limited by circuit protector (such as fuse) with the following ratings.

<table>
<thead>
<tr>
<th>No load voltage (V peak)</th>
<th>Max. current rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 20 [V]</td>
<td>5.0</td>
</tr>
<tr>
<td>Over 20 and 30 or less [V]</td>
<td>100 Peak voltage</td>
</tr>
</tbody>
</table>

   (2) A circuit (class 2 circuit) with maximum 30 Vrms (42.4 V peak) or less, and a power supply consisting of a class 2 power supply unit confirming to UL1310, or a class 2 transformer confirming to UL1585.

2. Operate these products only within the specified voltage.
Using voltages beyond the specified levels could cause faults or malfunctions.

3. Use 0 V as the baseline for the power supplied to the unit for output, control and input.

4. Each product needs to be powered by one power supply unit.
The wiring of this product has the same common between the GND for power and the signals; there is a possibility that a wrong current occurs and prevents a proper operation if one power supply unit controls multiple electro-pneumatic regulators.

5. Consult SMC for the usage when the downstream side is released to atmosphere.
This product is a pressure controller. The downstream side being released to atmosphere makes the inlet valve full open, allowing a large amount of atmosphere flow into the body. Consult SMC for the appropriate usage when you use the product under such condition since the product may not meet the specification or the life of the product may be shortened.
ITV0000/1000/2000/3000 Series
Specific Product Precautions 4

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 387 to 391 for Common Precautions.

---

**Caution**

Connect the cable to the connector on the body with the wiring arranged as shown below. Proceed carefully, as incorrect wiring can cause damage. Further, use DC power with sufficient capacity and a low ripple.

![Wiring Diagram](image)

**Current Signal Type**

<table>
<thead>
<tr>
<th>Voltage Signal Type</th>
<th>Preset Input Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Brown: Power supply</td>
<td>1 Brown: Power supply</td>
</tr>
<tr>
<td>2 White: Input signal</td>
<td>2 White: Input signal</td>
</tr>
<tr>
<td>3 Blue: GND (COMMON)</td>
<td>3 Blue: GND (COMMON)</td>
</tr>
<tr>
<td>4 Black: Monitor output</td>
<td>4 Black: Monitor output</td>
</tr>
</tbody>
</table>

**DeviceNet™, RS-232C, 16 points preset**

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>CC-Link</th>
<th>DeviceNet™</th>
<th>RS-232C</th>
<th>16 points preset</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Brown)</td>
<td>Vcc</td>
<td>Vcc</td>
<td>Power</td>
<td>Input signal 1 (Brown)</td>
</tr>
<tr>
<td>2 (White)</td>
<td>FG</td>
<td>FG</td>
<td>No Connection</td>
<td>FG</td>
</tr>
<tr>
<td>3 (Blue)</td>
<td>GND</td>
<td>GND</td>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>4 (Black)</td>
<td>No Connection</td>
<td>No Connection</td>
<td>No Connection</td>
<td>FG</td>
</tr>
</tbody>
</table>

**Power supply connector**

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>CC-Link</th>
<th>DeviceNet™</th>
<th>RS-232C</th>
<th>16 points preset</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Brown)</td>
<td>Vcc</td>
<td>Vcc</td>
<td>Power</td>
<td>Input signal 1 (Brown)</td>
</tr>
<tr>
<td>2 (White)</td>
<td>FG</td>
<td>FG</td>
<td>Can not connect</td>
<td>FG</td>
</tr>
<tr>
<td>3 (Blue)</td>
<td>GND</td>
<td>GND</td>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>4 (Black)</td>
<td>No Connection</td>
<td>No Connection</td>
<td>No Connection</td>
<td>FG</td>
</tr>
</tbody>
</table>

Note 1) The indicated wire colors are when a cable connector made by SMC is used.
Note 2) The cable is also available in a right angle type. (Communication cable: straight type only)
A right angle type connector is attached facing left (towards the SUP port).
On communication models, the connector faces backwards (towards the EXH port). Do not attempt to rotate, as the connector does not turn.

**Knock-down connectors**

- Order separately.

**Wiring diagram**

- **Current signal type**
  - Vs : Power supply 24 VDC
  - A : Input signal 4 to 20 mA DC
  - Vin: Input signal 0 to 5 VDC

- **Voltage signal type**
  - Vs : Power supply 24 VDC
  - CAN_H [White]

- **4 points preset input type**
  - Vs : Power supply 24 VDC (No polarity)

- **16 points preset input type**
  - Vs : Power supply 24 VDC

One of the preset pressures P1 through P4 is selected by the ON/OFF combination of S1 and S2.

- **10 bit digital input type**
  - Wire color
  - Signal name
  - Power supply (24 VDC)

- **Trademark Information**
  - DeviceNet™ is a trademark of ODVA.
## Set Pressure Range

The set pressure range, by unit of standard measured pressure, is shown in the table below.

<table>
<thead>
<tr>
<th>Unit</th>
<th>ITV0000/1000/2000/3000/3000 Series</th>
<th>ITV0000/2000/3000 Series</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ITV0000 Series</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Model</td>
<td>Ferrite core necessity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ITV000-□□-Q</td>
<td>Unnecessary</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note 2)</td>
<td>Recommended power supply cable length is 3 m. (P398000-501-2 is 2 m.) If any other length is desired, please consult with SMC.</td>
<td></td>
</tr>
<tr>
<td><strong>ITV1000/2000/3000 Series</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Model</td>
<td>Ferrite core necessity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ITV□□-□□</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Power</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ITV□□-□□</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Power</td>
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<tr>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>ITV□□-□□</td>
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<td>Power</td>
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<td>Communication</td>
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<td>Power</td>
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<td>Communication</td>
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<td>Power</td>
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<td>Communication</td>
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<td>Power</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Communication</td>
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<td></td>
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</tr>
</tbody>
</table>

Note 1) Recommended power supply cable length is 3 m. If any other length is desired, please consult with SMC.
Note 2) Even when the "with cable connector" type is selected, the communication connector is not included. Refer to the catalog [M8/M12 Connector] CAT.ES100-73 for the details of the communication cable.
Note 3) For CC-Link compatible products, a dedicated Bus adapter is included with the product.
Note 4) For DeviceNet™ compatible products, and PROFIBUS DP compatible products, a T-branch connector is not included with the product.

## Return of Product

**Warning**

If the product to be returned is contaminated or is possibly contaminated with substances that are harmful to humans, for safety reasons, please contact SMC beforehand and then employ a specialist cleaning company to decontaminate the product. After the decontamination prescribed above has been carried out, submit a Product Return Request Sheet or the Detoxification/Decontamination Certificate to SMC and await SMC’s approval and further instructions before attempting to return the item. Please refer to the International Chemical Safety Cards (ICSC) for a list of harmful substances.

If you have any further questions, please don’t hesitate to contact your SMC sales representative.
Handling

**Caution**

1. Connect the vacuum pump to the port, which is labeled “VAC”.
2. Pressure adjustment changes from “atmospheric pressure to vacuum pressure” when the input signal is increased, and from “vacuum pressure to atmospheric pressure” when the input signal is decreased.
3. When adjusting the vacuum pressure, be careful not to block the atmospheric pressure inlet port labeled “ATM”.
4. Since this product is designed exclusively for use with negative pressure, be careful not to apply positive pressure in error.
5. In cases where the vacuum pump being used has a relatively small capacity, or the piping has a small inside diameter, etc., large variations in the set pressure (the range of pressure variation when changing from no flow to flow state) may appear. In this situation, the vacuum pump or the piping, etc. should be changed. In cases where it is not practical to change the vacuum pump, install a capacity tank (volume depending on the operating conditions) on the VAC side.
6. The vacuum pressure response time after a change in the input signal is influenced by the internal volume on the setting side (including piping). Since the capacity of the vacuum pump also influences the response time, give careful consideration to these points before operation.
7. If the electric power is shut off when in a control state, the pressure on the setting side will go into a holding condition. However, this setting side pressure will be held only temporarily and is not guaranteed. In addition, when atmospheric pressure is desired, shut off the power after reducing the set pressure, and then introduce atmospheric pressure by using a vacuum release valve, etc.
8. If the power for this product is cut off by a power failure, etc. when it is in a controlled state, the setting side pressure will be held temporarily. Further, if operated without sealing the setting side so that atmospheric air is sucked in, handle with care as air will continue to be sucked in.
9. If the VAC side pressure to this product is interrupted while the power is still on, the internal solenoid valve will continue to operate and may cause a humming noise. Since this may shorten the life of the product, be sure to shut off the power when the VAC side pressure is shut off.
10. The setting side pressure cannot be completely released from this product in the range below –1.3 kPa. In cases where the pressure needs to be reduced completely to 0 kPa, install a 3 port valve, etc. on the setting side to discharge the residual pressure.
11. This product is adjusted for each specification at the factory before shipment. Avoid careless disassembly or removal of parts, as this can cause failure.

**Warning**

If the product to be returned is contaminated or is possibly contaminated with substances that are harmful to humans, for safety reasons, please contact SMC beforehand and then employ a specialist cleaning company to decontaminate the product. After the decontamination prescribed above has been carried out, submit a Product Return Request Sheet or the Detoxification/Decontamination Certificate to SMC and await SMC’s approval and further instructions before attempting to return the item.

Please refer to the International Chemical Safety Cards (ICSC) for a list of harmful substances.

If you have any further questions, please don’t hesitate to contact your SMC sales representative.