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

Serial communications specifications
Applicable Fieldbus protocols
CC-Link
DeviceNet
PROFIBUS DP

RS-232C specification to serial communications is standardized.

Compact/lightweight (Integrated communication parts)

Weight: 350 g Note 1) (ITV1000)
Power consumption: 4 W Note 1) or less

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

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

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

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

Note 2) ITV1000. Dimensions in parentheses ( ) are for the CC-Link or PROFIBUS DP.

Built-in communication board, so no converter needed.

RoHS
IP65
**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.

<table>
<thead>
<tr>
<th>Model</th>
<th>Pressure range</th>
<th>Power supply voltage</th>
<th>Input signal</th>
<th>Output signal</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITV001</td>
<td>0.1 MPa</td>
<td>24 VDC</td>
<td>4 to 20 mA DC</td>
<td>Analog output</td>
<td>• Cable connectors Straight type</td>
</tr>
<tr>
<td>ITV003</td>
<td>0.5 MPa</td>
<td>12 VDC</td>
<td>0 to 20 mA DC</td>
<td>1 to 5 VDC</td>
<td>Right angle type</td>
</tr>
<tr>
<td>ITV005</td>
<td>0.9 MPa</td>
<td></td>
<td>0 to 5 VDC</td>
<td></td>
<td>Flat brackets</td>
</tr>
<tr>
<td>ITV009</td>
<td>-100 kPa</td>
<td></td>
<td>0 to 10 VDC</td>
<td></td>
<td>L-bracket</td>
</tr>
</tbody>
</table>

- **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.

---

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

**Electronic Vacuum Regulator ITV209 Series**

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

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

- **Sensitivity:** 0.2% F.S. or less
- **Linearity:** ±1% F.S. or less
- **Hysteresis:** 0.5% F.S. or less
- **IP65**
- **Cable connections in 2 directions**
- **Grease-free specification (ITV1000 series)**

---

**Application examples**

- **Multi-stage control to analog control**
  - Solenoid valves
  - Pressure regulators
  - Electro-pneumatic regulator
  - Controller
  - Electro-pneumatic regulator
  - Controller
  - Electro-pneumatic regulator
  - Controller
  - Electro-pneumatic regulator

- **Electrostatic coating control**
  - Air filter
  - Electro-pneumatic regulator
  - Controller
  - Coating material

---

**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.
## Electro-Pneumatic Regulator
### Electronic Vacuum Regulator

**ITV Series**

- 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)</td>
<td>Metric size: ø4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ITV005</td>
<td>0.001 to 0.9 MPa</td>
<td>Voltage type: 0 to 5 VDC</td>
<td>Inch size: ø5/32</td>
<td></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)</td>
<td>1/8, 1/4</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)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ITV105</td>
<td>0.005 to 0.9 MPa</td>
<td>Voltage type: 0 to 5 VDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ITV2000 Series</td>
<td>ITV201</td>
<td>0.005 to 0.1 MPa</td>
<td>Preset input (4 points/16 points)</td>
<td>1/4, 3/8</td>
<td>904</td>
</tr>
<tr>
<td></td>
<td>ITV203</td>
<td>0.005 to 0.5 MPa</td>
<td>10 bit digital input</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ITV205</td>
<td>0.005 to 0.9 MPa</td>
<td>DeviceNet™ compatible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ITV3000 Series</td>
<td>ITV301</td>
<td>0.005 to 0.1 MPa</td>
<td>DeviceNet™ compatible</td>
<td>1/4, 3/8, 1/2</td>
<td>904</td>
</tr>
<tr>
<td></td>
<td>ITV303</td>
<td>0.005 to 0.5 MPa</td>
<td>PROFINET® compatible</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ITV305</td>
<td>0.005 to 0.9 MPa</td>
<td>RS-232C communication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ITV009 Series</td>
<td>ITV009</td>
<td>–1 to –100 kPa</td>
<td>Current type: 4 to 20 mA DC (Sink type)</td>
<td>Built-in One-touch fittings</td>
<td>928</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Current type: 0 to 20 mA DC (Sink type)</td>
<td>Metric size: ø4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Voltage type: 0 to 5 VDC</td>
<td>Inch size: ø5/32</td>
<td></td>
</tr>
<tr>
<td>ITV209 Series</td>
<td>ITV209</td>
<td>–1.3 to –80 kPa</td>
<td>Current type: 4 to 20 mA DC (Sink type)</td>
<td></td>
<td>935</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Current type: 0 to 20 mA DC (Sink type)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Voltage type: 0 to 5 VDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Preset input (4 points/16 points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>10 bit digital input CC-Link compatible</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>DeviceNet™ compatible</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PROFINET® compatible</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RS-232C communication</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Compact Electro-Pneumatic Regulator

ITV0000 Series

How to Order

For single unit and single unit for manifold

ITV00 1 0 - 0 N

**Pressure range**
1. 0.1 MPa
2. 0.5 MPa
3. 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

**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

**Built-in One-touch fittings type**
For single unit
Nil. Metric size (Light gray) φ4
U. Inch size (Orange) φ5/32

For manifold
Nil. Metric size (Light gray) φ6 φ4 φ6
U. Inch size (Orange) φ1/4" φ5/32" φ1/4"

**Manifold**
IITV00-02 n

**Stations**
02. 2 stations
03. 3 stations
10. 10 stations

**One-touch fitting size for supply/exhaust parts (End plate)**
Nil. φ6 (Light gray)
U. φ1/4" (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.

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.

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

The asterisk (*) specifies mounting. Add an asterisk (*) at the beginning of electro-pneumatic regulator part numbers to be mounted.
### 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>0.2 MPa</td>
<td>1.0 MPa</td>
</tr>
<tr>
<td>Maximum supply pressure</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>Set pressure range</td>
<td>Voltage 24 VDC ±10%, 12 to 15 VDC</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>
</tr>
<tr>
<td>Power supply Voltage</td>
<td>Current consumption</td>
<td>Power supply voltage 4 to 20 mA DC, 0 to 20 mA DC (Sink type)</td>
<td></td>
</tr>
<tr>
<td>Input signal Voltage type</td>
<td>0 to 5 VDC, 0 to 10 VDC</td>
<td>4 to 20 mA DC, 0 to 20 mA DC (Sink type)</td>
<td></td>
</tr>
<tr>
<td>Current type</td>
<td>0.2 kΩ</td>
<td>Approx. 10 kΩ</td>
<td></td>
</tr>
<tr>
<td>Input impedance Voltage type</td>
<td>10 kΩ</td>
<td>Approx. 250 Ω</td>
<td></td>
</tr>
<tr>
<td>Current type</td>
<td>Analog output 1 to 5 VDC</td>
<td>Output accuracy: ±6% F.S. or less</td>
<td></td>
</tr>
<tr>
<td>Output signal (Note 1)</td>
<td>Linearity ±1% F.S. or less</td>
<td>Hysteresis 0.5% F.S. or less</td>
<td></td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.5% F.S. or less</td>
<td>Sensitivity 0.2% F.S. or less</td>
<td></td>
</tr>
<tr>
<td>Sensitivity</td>
<td>±0.12% F.S./°C or less</td>
<td>Temperature characteristics</td>
<td></td>
</tr>
<tr>
<td>Temperature characteristics</td>
<td>±0.12% F.S./°C or less</td>
<td>Operating temperature range 0 to 50°C (No condensation)</td>
<td></td>
</tr>
<tr>
<td>Enclosure</td>
<td>Equivalent to IP65</td>
<td>Connection type Built-in One-touch fittings</td>
<td></td>
</tr>
<tr>
<td>Connection size For single unit</td>
<td>Metric size z, x, c: ø4</td>
<td>Inch size z, x, c: ø5/32</td>
<td></td>
</tr>
<tr>
<td>Connection size</td>
<td>Inch size z, x, c: ø5/32&quot;</td>
<td>Manifold Metric size z, x, c: ø6, 2: ø4</td>
<td></td>
</tr>
</tbody>
</table>
| Connection size | Inch size z, x, c: ø1/4", 2: ø5/32" | Weight (Note 1) 100 g or less (without option)

**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 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

#### 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 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.
Compact Electro-Pneumatic Regulator ITVO9000 Series

ITVO01 Series

Linearity, Hyteresis

Repeatability

Pressure Characteristics

Set pressure: 0.05 MPa

Flow Rate Characteristics

Supply pressure: 0.2 MPa

ITVO03 Series

Linearity, Hyteresis

Repeatability

Pressure Characteristics

Set pressure: 0.2 MPa

Flow Rate Characteristics

Supply pressure: 0.6 MPa
**ITV0000 Series**

**ITV005□ Series**

**Linearity, Hysteresis**

![Linearity, Hysteresis Diagram](image)

**Repeatability**

![Repeatability Diagram](image)

**Pressure Characteristics**

Set pressure: 0.45 MPa

![Pressure Characteristics Diagram](image)

**Flow Rate Characteristics**

Supply pressure: 1.0 MPa

![Flow Rate Characteristics Diagram](image)
For Single Unit

Dimensions

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) 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.)

Compact Electro-Pneumatic Regulator ITV0000 Series
**ITV0000 Series**

### Dimensions

**Single unit for manifold**

![Diagram of single unit for manifold]

- **M8 x 1**
  - Cable connection thread

**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**

Port Location

<table>
<thead>
<tr>
<th>No.</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ITV0003</strong></td>
<td>SUP</td>
<td>OUT</td>
<td>EXH</td>
</tr>
</tbody>
</table>

Note) Stations are counted starting from the D side.

- Dimensions in inch are noted in parentheses.
- Breathing hole (M3 x 0.5)
- OUT port
  - (ø4, ø5/32")
- EXH port
  - (ø6, ø1/4")
- SUP port
  - (ø6, ø1/4")

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

<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.)
Electro-Pneumatic Regulator

ITV1000/2000/3000 Series

How to Order

**Model**
- 1 1000 type
- 2 2000 type
- 3 3000 type

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

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

**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
- 40 4 points preset input
- 52 16 points preset input (Switch output/NPN output)
- 53 16 points preset input (Switch output/PNP output)
- 60 10 bit digital input

**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)
- Nil None

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

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

*Bracket is included.

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

Note) 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.

**Port size**
- 1 1/8 (1000 type)
- 2 1/4 (1000, 2000, 3000 type)
- 3 3/8 (2000, 3000 type)
- 4 1/2 (3000 type)

**Application**
<table>
<thead>
<tr>
<th>Communication cable part number</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC-Link compatibility</td>
<td>Dedicated Bus adapter supplied with the product.</td>
</tr>
<tr>
<td>DeviceNet™ compatibility</td>
<td>T-branch connector not supplied.</td>
</tr>
<tr>
<td>PROFIBUS DP compatibility</td>
<td>T-branch connector not supplied.</td>
</tr>
</tbody>
</table>

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.

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

### 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 1</td>
<td>Note 1</td>
<td>Note 1</td>
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<tr>
<td></td>
<td>Note 2</td>
<td>Note 2</td>
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<td>Note 3</td>
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<tr>
<td>Model</td>
<td>ITV201</td>
<td>ITV203</td>
<td>ITV205</td>
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<tr>
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<td>Note 4</td>
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</tr>
<tr>
<td>Model</td>
<td>ITV301</td>
<td>ITV303</td>
<td>ITV305</td>
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<tr>
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<td>Note 2</td>
<td>Note 2</td>
<td>Note 2</td>
</tr>
<tr>
<td></td>
<td>Note 3</td>
<td>Note 3</td>
<td>Note 3</td>
</tr>
<tr>
<td></td>
<td>Note 4</td>
<td>Note 4</td>
<td>Note 4</td>
</tr>
</tbody>
</table>

**Minimum supply pressure**
- Set pressure <0.1 MPa

**Maximum supply pressure**
- 0.2 MPa
- 1.0 MPa

**Set pressure range**
- 0.005 to 0.1 MPa
- 0.005 to 0.5 MPa
- 0.005 to 0.9 MPa

**Power supply**
- Voltage: 24 VDC ±10%, 12 to 15 VDC
- Current consumption: Power supply voltage 24 VDC type: 0.12 A or less
- Power supply voltage 12 VDC type: 0.18 A or less

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

**Input impedance**
- Current type: 250 Ω or less
- Voltage type: Approx. 6.5 kΩ
- Preset input: Power supply voltage 24 VDC type: Approx. 4.7 kΩ
- Power supply voltage 12 VDC type: Approx. 2.0 kΩ

**Output signal (monitor output)**
- Analog output: 1.5 VDC/0.1% (Output impedance: 1 kΩ)
- 4 to 20 mA DC (Sink type) (Output impedance: 250 Ω or less)
- Output accuracy ±6% F.S. or less

**Switch output**
- NPN open collector output: Max. 30 V, 80 mA
- PNP open collector output: Max. 80 mA

**Linearity**
- ±1% F.S. or less

**Hysteresis**
- ±0.5% F.S. or less

**Repeatability**
- ±0.5% F.S. or less

**Sensitivity**
- ±0.2% F.S. or less

**Temperature characteristics**
- ±0.12% F.S./°C or less

**Output pressure display**
- Accuracy: ±2% F.S. ±1 digit or less
- Minimum unit: MPa, 0.001, kgf/cm²: 0.01, bar: 0.01, psi: 0.1

**Ambient and fluid temperature**
- ±0.12% F.S./°C or less

**Enclosure**
- IP65

**Weight**
- ITV10: Approx. 250 g (without options)
- ITV20: Approx. 350 g (without options)
- ITV30: Approx. 645 g (without options)

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

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

**Protocol**
- CC-Link
- DeviceNet™
- PROFIBUS DP
- RS-232C

**Version**
- Ver 1.10
- Volume 1 (Edition 3.0)
- Volume 2 (Edition 3.0)

**Communication speed**
- 156 k/825 k
- 2.5 M/S M/10 M bps
- 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 M/6 M/12 M bps

**Configuration file**
- EDS
- GSD

**Occupancy area**
- 4 word/4 word, 32 bit/32 bit per station, remote device station
- 16 bit/16 bit
- 16 bit/16 bit

**Configuration data resolution**
- 12 bit (4096 resolution)
- 12 bit (4096 resolution)
- 10 bit (1024 resolution)

**Fail safe**
- HOLD
- CLEAR
- HOLD/CLEAR
- CLEAR

**Electric insulation**
- Insulation
- Insulation
- Non-insulation

**Terminating resistor**
- Built into the product (Switch setting)
- Built into the product (Switch setting)

**Current consumption**
- 0.16 A or less
- 0.14 A or less
- 0.16 A or less
- 0.12 A or less

**Weight**
- ITV1000: 330 g
- ITV2000: 430 g
- ITV3000: 730 g

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 NPN 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 within ±1% (full span) 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 0.1 psi.

Note 6) Value for the state with no over current circuit included. If an allowance is provided for an over current circuit, the maximum output pressure may fluctuate.

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 ITV1000 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.
### 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></td>
<td>ITV10□□</td>
<td></td>
<td></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></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>L-bracket assembly (including mounting screws)</td>
<td>P398010-601</td>
</tr>
</tbody>
</table>

### Accessories (Option)/Part No.

#### [Bracket]

<table>
<thead>
<tr>
<th>Applicable model</th>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITV10□□</td>
<td>Flat bracket assembly (including mounting screws)</td>
<td>P398010-600</td>
</tr>
<tr>
<td>ITV20□□, 30□□</td>
<td>L-bracket assembly (including mounting screws)</td>
<td>P398010-601</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></td>
</tr>
<tr>
<td>Voltage type</td>
<td>Straight type 3 m</td>
<td>P398020-500-3</td>
</tr>
<tr>
<td>4 points preset input</td>
<td>Right angle type 3 m</td>
<td>P398020-501-3</td>
</tr>
<tr>
<td>16 points preset input</td>
<td>Power cable (4 cores)</td>
<td></td>
</tr>
<tr>
<td></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 input</td>
<td>Signal cable (5 cores)</td>
<td></td>
</tr>
<tr>
<td></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>CC-Link PROFIBUS DP DeviceNet™</td>
<td>Power cable (4 cores)</td>
<td></td>
</tr>
<tr>
<td></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>RS-232C</td>
<td>Communication cables connector (5 cores)</td>
<td></td>
</tr>
<tr>
<td></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>
</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

<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

<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>
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.
ITV1000/2000/3000 Series

ITV101 Series

Linearity

Hysteresis

Repeatability

Pressure characteristics

Flow rate characteristics

Relief flow characteristics

ITV201 Series

Linearity

Hysteresis

Repeatability

Pressure characteristics

Flow rate characteristics

Relief flow characteristics

Set pressure: 0.05 MPa

Supply pressure: 0.2 MPa

Supply pressure: 0.2 MPa

Set point

Out

Return

Out

Return

Set point

Output deviation factor (% F.S.)

Input signal (% F.S.)

Output deviation factor (% F.S.)

Input signal (% F.S.)

Output deviation factor (% F.S.)

Repetition

Set pressure (MPa)

Flow rate (L/min (ANR))

Set pressure (MPa)

Flow rate (L/min (ANR))

Set pressure (MPa)

Flow rate (L/min (ANR))

Set pressure (MPa)

Flow rate (L/min (ANR))
Electro-Pneumatic Regulator \textit{ITV1000/2000/3000 Series}

\textbf{ITV301 Series}

\textbf{Linearity}

\begin{figure}[h]
\centering
\includegraphics[width=0.3\textwidth]{linearity_graph}
\caption{Linearity characteristics.}
\end{figure}

\textbf{Hysteresis}

\begin{figure}[h]
\centering
\includegraphics[width=0.3\textwidth]{hysteresis_graph}
\caption{Hysteresis characteristics.}
\end{figure}

\textbf{Repeatability}

\begin{figure}[h]
\centering
\includegraphics[width=0.3\textwidth]{repeatability_graph}
\caption{Repeatability characteristics.}
\end{figure}

\textbf{Pressure characteristics} \hspace{1cm} Set pressure: 0.05 MPa

\begin{figure}[h]
\centering
\includegraphics[width=0.3\textwidth]{pressure_characteristics}
\caption{Pressure characteristics.}
\end{figure}

\textbf{Flow rate characteristics} \hspace{1cm} Supply pressure: 0.2 MPa

\begin{figure}[h]
\centering
\includegraphics[width=0.3\textwidth]{flow_rate_characteristics}
\caption{Flow rate characteristics.}
\end{figure}

\textbf{Relief flow characteristics} \hspace{1cm} Supply pressure: 0.2 MPa

\begin{figure}[h]
\centering
\includegraphics[width=0.3\textwidth]{relief_flow_characteristics}
\caption{Relief flow characteristics.}
\end{figure}
**ITV1000/2000/3000 Series**

### ITV103 Series

#### Linearity

- Pressure characteristics
  - Set pressure: 0.2 MPa

- Flow rate characteristics
  - Supply pressure: 0.7 MPa

#### Hysteresis

- Relief flow characteristics
  - Supply pressure: 0.7 MPa

#### Repeatability

- Supply pressure: 0.7 MPa

### ITV203 Series

#### Linearity

- Pressure characteristics
  - Set pressure: 0.2 MPa

- Flow rate characteristics
  - Supply pressure: 0.7 MPa

#### Hysteresis

- Supply pressure: 0.7 MPa

#### Repeatability

- Supply pressure: 0.7 MPa
Electro-Pneumatic Regulator \textit{ITV1000/2000/3000} Series

\textbf{ITV303} Series

\begin{itemize}
\item \textbf{Linearity}
\item \textbf{Hysteresis}
\item \textbf{Repeatability}
\item \textbf{Pressure characteristics}
\item \textbf{Flow rate characteristics}
\item \textbf{Relief flow characteristics}
\end{itemize}

\begin{itemize}
\item \textbf{Set pressure: 0.2 MPa}
\item \textbf{Supply pressure: 0.7 MPa}
\item \textbf{Supply pressure: 0.7 MPa}
\end{itemize}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{chart}
\end{figure}

\textbf{ARJ} \hspace{1cm} \textbf{AR425 to 935} \hspace{1cm} \textbf{ARX} \hspace{1cm} \textbf{ARM} \hspace{1cm} \textbf{ARP} \hspace{1cm} \textbf{IR} \hspace{1cm} \textbf{IRV} \hspace{1cm} \textbf{VEX} \hspace{1cm} \textbf{SRH} \hspace{1cm} \textbf{SRP} \hspace{1cm} \textbf{SRF} \hspace{1cm} \textbf{ITV} \hspace{1cm} \textbf{IC} \hspace{1cm} \textbf{ITVH} \hspace{1cm} \textbf{ITVX} \hspace{1cm} \textbf{PVQ} \hspace{1cm} \textbf{VY1} \hspace{1cm} \textbf{VBA} \hspace{1cm} \textbf{VBAT} \hspace{1cm} \textbf{AP100}
ITV1000/2000/3000 Series

ITV105 Series

Linearity

![Linearity Graph](image)

Hysteresis

![Hysteresis Graph](image)

Repeatability

![Repeatability Graph](image)

Pressure characteristics

Set pressure: 0.4 MPa

Flow rate characteristics

Supply pressure: 1.0 MPa

Relief flow characteristics

Supply pressure: 1.0 MPa

ITV205 Series

Linearity

![Linearity Graph](image)

Hysteresis

![Hysteresis Graph](image)

Repeatability

![Repeatability Graph](image)

Pressure characteristics

Set pressure: 0.4 MPa

Flow rate characteristics

Supply pressure: 1.0 MPa

Relief flow characteristics

Supply pressure: 1.0 MPa
Electro-Pneumatic Regulator **ITV1000/2000/3000 Series**

**ITV305 Series**

**Linearity**

![Linearity Graph]

**Pressure characteristics**  Set pressure: 0.4 MPa

**Flow rate characteristics**  Supply pressure: 1.0 MPa

**Relief flow characteristics**  Supply pressure: 1.0 MPa

---

**Electro-Pneumatic Regulator**

- **ARJ**
- **AR425 to 935**
- **ARM**
- **ARP**
- **IR**
- **IRV**
- **VEX**
- **SRH**
- **SRP**
- **SRF**
- **ITV**
- **IC**
- **ITVH**
- **ITVX**
- **PVQ**
- **VY1**
- **VBA**
- **VBAT**
- **AP100**
### 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>NBR</td>
</tr>
<tr>
<td>6</td>
<td>Bowl assembly</td>
<td>Resin</td>
</tr>
<tr>
<td>7</td>
<td>Sub-plate</td>
<td>Silicone rubber</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>HNBR</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

<table>
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<tr>
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<th>Description</th>
<th>Material</th>
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</thead>
<tbody>
<tr>
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<td>Body</td>
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</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>
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<tr>
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<td>O-ring</td>
<td>NBR</td>
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<tr>
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<td>Cotter</td>
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<tr>
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<td>16</td>
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<tr>
<td>17</td>
<td>Sub-plate</td>
<td>Resin</td>
</tr>
<tr>
<td>18</td>
<td>Seal</td>
<td>NBR</td>
</tr>
<tr>
<td>19</td>
<td>Control circuit assembly</td>
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</tr>
<tr>
<td>20</td>
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<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 ◆.*
Electro-Pneumatic Regulator *ITV1000/2000/3000* Series

**Construction**

**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>7</td>
<td>Valve (Supply valve)</td>
<td>HNBR/Brass</td>
</tr>
<tr>
<td>8</td>
<td>Valve (Exhaust valve)</td>
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</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>NBR</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

**ITV10100/2000/3000 Series**

**Flat bracket**

<table>
<thead>
<tr>
<th>Setting part</th>
<th>EXH (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXH (3)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SUP OUT</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SUP OUT</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Digital pressure display</th>
<th>EXH (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3 x 0.5 Solenoid valve EXH</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>M12 x 1</th>
<th>Cable connection thread (Plug type)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.5</td>
<td>11</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flat bracket assembly</th>
<th>EXH (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P398010-600 (Option)</td>
<td></td>
</tr>
<tr>
<td>4 x M4 x 0.7 thread depth 6 mm</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>L-bracket assembly</th>
<th>EXH (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P398010-601 (Option)</td>
<td></td>
</tr>
</tbody>
</table>

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

---

**L-bracket**

<table>
<thead>
<tr>
<th>L-bracket assembly</th>
<th>EXH (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P398010-601 (Option)</td>
<td></td>
</tr>
</tbody>
</table>

**Digital pressure display** (33)

- Right angle type (4 cores)
- Straight type (4 cores)

**Solenoid valve**

- EXH
- M3 x 0.5
- M12 x 1

**Thread depth (Plug type)**

- 4 x M4 x 0.7 thread depth 6 mm

---

**Dimensions**

ITV10100/2000/3000 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)
  - 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 RP13A-12RB-13PA (71)**

#### CC-Link/ITV10□0-CC

- **OUT M12 x 1**
  - Communication cable connection thread (Socket type)
- **IN M12 x 1**
  - Communication cable connection thread (Plug type)

#### DeviceNet™/ITV10□0-DE

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

#### PROFIBUS DP/ITV10□0-PR

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

#### RS-232C/ITV10□0-RC

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

### 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**

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

Digital pressure display

Right angle type (4 cores)
Cable connector 3 m

Straight type (4 cores)
Cable connector 3 m

M12 x 1
Cable connection thread (Plug type)

Solenoid valve
EXH

Flat bracket assembly
P398020-600 (Option)

4 x M5 x 0.8 thread depth 6 mm

**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

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

<table>
<thead>
<tr>
<th>Component</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12 x 1 Power cable connection thread (Plug type)</td>
<td>20</td>
</tr>
<tr>
<td>Digital pressure display</td>
<td>8.5</td>
</tr>
<tr>
<td>M5 x 0.8 Solenoid valve EXH</td>
<td>10</td>
</tr>
<tr>
<td>SUP</td>
<td>20</td>
</tr>
<tr>
<td>OUT</td>
<td>120</td>
</tr>
<tr>
<td>EXH (3)</td>
<td></td>
</tr>
</tbody>
</table>

#### 10 bit digital input

<table>
<thead>
<tr>
<th>Component</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIROSE ELECTRIC CO., LTD. Made RP13A-12RB-13PA (71)</td>
<td></td>
</tr>
<tr>
<td>SUP</td>
<td>10</td>
</tr>
<tr>
<td>OUT</td>
<td>19</td>
</tr>
<tr>
<td>13.5</td>
<td></td>
</tr>
<tr>
<td>120</td>
<td>12</td>
</tr>
<tr>
<td>11</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

#### CC-Link/ITV20□0-CC

<table>
<thead>
<tr>
<th>Component</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12 x 1 Power cable connection thread (Plug type)</td>
<td>20</td>
</tr>
<tr>
<td>BUS adapter</td>
<td>8.5</td>
</tr>
<tr>
<td>M5 x 0.8 Solenoid valve EXH</td>
<td>10</td>
</tr>
<tr>
<td>SUP</td>
<td>20</td>
</tr>
<tr>
<td>OUT</td>
<td>120</td>
</tr>
<tr>
<td>EXH (3)</td>
<td></td>
</tr>
</tbody>
</table>

#### DeviceNet™/ITV20□0-DE

<table>
<thead>
<tr>
<th>Component</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12 x 1 Communication cable connection thread (Plug type)</td>
<td>20</td>
</tr>
<tr>
<td>BUS adapter</td>
<td>8.5</td>
</tr>
<tr>
<td>M5 x 0.8 Solenoid valve EXH</td>
<td>10</td>
</tr>
<tr>
<td>SUP</td>
<td>20</td>
</tr>
<tr>
<td>OUT</td>
<td>120</td>
</tr>
<tr>
<td>EXH (3)</td>
<td></td>
</tr>
</tbody>
</table>

#### PROFIBUS DP/ITV20□0-PR

<table>
<thead>
<tr>
<th>Component</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12 x 1 Communication cable connection thread (Socket type)</td>
<td>20</td>
</tr>
<tr>
<td>M12 x 1 Power cable connection thread (Plug type)</td>
<td>9.5</td>
</tr>
<tr>
<td>M5 x 0.8 Solenoid valve EXH</td>
<td>10.5</td>
</tr>
<tr>
<td>SUP</td>
<td>15.3</td>
</tr>
<tr>
<td>OUT</td>
<td>11.5</td>
</tr>
<tr>
<td>EXH (3)</td>
<td></td>
</tr>
</tbody>
</table>

#### RS-232C/ITV20□0-RC

<table>
<thead>
<tr>
<th>Component</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12 x 1 Communication cable connection thread (Plug type)</td>
<td>20</td>
</tr>
<tr>
<td>M12 x 1 Power cable connection thread (Plug type)</td>
<td>8.5</td>
</tr>
<tr>
<td>M5 x 0.8 Solenoid valve EXH</td>
<td>10</td>
</tr>
<tr>
<td>SUP</td>
<td>20</td>
</tr>
<tr>
<td>OUT</td>
<td>120</td>
</tr>
<tr>
<td>EXH (3)</td>
<td></td>
</tr>
</tbody>
</table>

* Dimensions not shown are same as on page 918.

### With power cable connector

#### ITV20□0□□□ common dimensions

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

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

**ITV30□□**

**Flat bracket**

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

**L-bracket**

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

Dimensions

- **SUP port, OUT port**
- **EXH port**
- **EXH (3)**
- **Digital pressure display**
- **Flat bracket assembly**
- **M12 x 1 Cable connection thread (Plug type)**
- **M5 x 0.8 Solenoid valve EXH**
- **4 x ø7 Mounting hole**
- **4 x 1/4, 3/8, 1/2 (Rc, NPT, NPTF, G)**
- **4 x M5 x 0.8 thread depth 6 mm**
- **L-bracket assembly**

*Option*

**Flat bracket assembly**

- P398020-600
- P398020-601

**L-bracket**

- ITV3000/2000/3000 Series
- SMC
Dimensions (16 points preset input, 10 bit digital input, CC-Link, DeviceNet™, PROFIBUS DP and RS-232C)

16 points preset input

<table>
<thead>
<tr>
<th>Component</th>
<th>Dimensions (mm)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital pressure display</td>
<td>15.5 x 22 x 44</td>
<td></td>
</tr>
<tr>
<td>M5 x 0.8 Solenoid valve EXH</td>
<td>15.5 x 22 x 44</td>
<td></td>
</tr>
</tbody>
</table>

10 bit digital input

<table>
<thead>
<tr>
<th>Component</th>
<th>Dimensions (mm)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital pressure display</td>
<td>15.5 x 22 x 44</td>
<td></td>
</tr>
<tr>
<td>M5 x 0.8 Solenoid valve EXH</td>
<td>15.5 x 22 x 44</td>
<td></td>
</tr>
</tbody>
</table>

CC-Link/ITV30□-CC

<table>
<thead>
<tr>
<th>Component</th>
<th>Dimensions (mm)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power cable connection thread (Plug type)</td>
<td>15.5 x 22 x 44</td>
<td></td>
</tr>
</tbody>
</table>

DeviceNet™/ITV30□-DE

<table>
<thead>
<tr>
<th>Component</th>
<th>Dimensions (mm)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power cable connection thread (Plug type)</td>
<td>15.5 x 22 x 44</td>
<td></td>
</tr>
</tbody>
</table>

PROFIBUS DP/ITV30□-PR

<table>
<thead>
<tr>
<th>Component</th>
<th>Dimensions (mm)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power cable connection thread (Plug type)</td>
<td>15.5 x 22 x 44</td>
<td></td>
</tr>
</tbody>
</table>

RS-232C/ITV30□-RC

<table>
<thead>
<tr>
<th>Component</th>
<th>Dimensions (mm)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power cable connection thread (Plug type)</td>
<td>15.5 x 22 x 44</td>
<td></td>
</tr>
</tbody>
</table>

With power cable connector

* ITV30□-CC 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.
1 Reverse Type

In compliance with input, inverse proportional pressure is displayed.

ITV10 [ ] — [ ] — [ ] — X102
ITV20 [ ] — [ ] — [ ] — X102
ITV30 [ ] — [ ] — [ ] — X102

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

ITV10 [ ] — [ ] — [ ] — X224
ITV20 [ ] — [ ] — [ ] — X224
ITV30 [ ] — [ ] — [ ] — 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 [ ] — [ ] — [ ] — X25
ITV20 [ ] — [ ] — [ ] — 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.

**Model**

- 1: 1000 type
- 2: 2000 type

**Pressure range**

- 1: 0.1 MPa
- 3: 0.5 MPa
- 5: 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
- Nc
- N
- NPT
- T
- NPTF
- F
- G

**Pressure display unit**

- Nil MPa
- 2° kgf/cm²
- 3° bar
- 4° psi
- 5° kPa

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

**Cable connector type**

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

**Bracket**

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

*Bracket is included.

**Port size**

- 1: 1/8 (1000 type)
- 2: 1/4 (1000, 2000 type)
- 3: 3/8 (2000 type)
5 Manifold Specifications (Except ITV3000 series)

2 through 8 station manifold.

How to Order Manifolds

```
ITV1000, 2000

IITV20 - 02 - 05

1) Stations
2 stations
8 stations

OUT port size
02 1/4
03 3/8

Connection thread type
Nil Rc
N NPT
F NPTF
```

IITV20-02-3: 1 set (3 station manifold part no.)
#ITV1030-311S-X26: 1 set (Electro-pneumatic regulator part no.)
#P398020-13: 1 set (Blanking plate assembly part no.)
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

```
IITV 1 0 — — — — — — — X26
IITV 2 0 — — — — — — — X26
```

Note 1) □ in part number is the same model no. for the standard products.
Note 2) For communication models, consult SMC for availability.
Note 3) The thread type is Rc only.
Note 4) For ITV1000 series, the port size is 1/8 only.
Note 5) For ITV2000 series, the port size is 1/4 only.
Note 6) The bracket accessory can not be selected.
Note 7) Not applicable to ITV3000 series

How to Order Manifold Assemblies

```
Example
Electro-pneumatic regulator
ITV1030-311S-X26
Blanking plate assembly
P398020-13
Electro-pneumatic regulator
ITV2050-212S-X26
```

```
ITV 1 0 — — — — — — — X26
ITV 2 0 — — — — — — — X26
```

Note Refer to the table below for possible mixed combination.

<table>
<thead>
<tr>
<th>Model</th>
<th>ITV101</th>
<th>ITV103</th>
<th>ITV105</th>
<th>ITV201</th>
<th>ITV203</th>
<th>ITV205</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITV101</td>
<td>●</td>
<td>—</td>
<td>●</td>
<td>—</td>
<td>●</td>
<td>—</td>
</tr>
<tr>
<td>ITV103</td>
<td>—</td>
<td>●</td>
<td>●</td>
<td>—</td>
<td>●</td>
<td>—</td>
</tr>
<tr>
<td>ITV105</td>
<td>—</td>
<td>●</td>
<td>●</td>
<td>—</td>
<td>●</td>
<td>—</td>
</tr>
<tr>
<td>ITV201</td>
<td>●</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>ITV203</td>
<td>—</td>
<td>●</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>ITV205</td>
<td>—</td>
<td>●</td>
<td>●</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

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.
### Specifications

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Minimum supply pressure</th>
<th>Maximum supply pressure</th>
<th>Proof pressure (Supply side)</th>
<th>Proof pressure (Output side)</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>Output pressure display</th>
<th>Linearity: ±0.5% F.S. or less</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
<td>Set pressure +0.1 MPa</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>Analog output: 1 to 5 VDC/4 to 20 mA DC, Switch output (NPN/PNP)</td>
<td>Analog output 4 to 20 mA DC (Sink type)</td>
<td>±0.5% F.S. or less</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Notes
- Under Japan’s new Measurement Act, this is only for overseas sales (SI units are to be used inside Japan).
- Cable connector type: S (Straight type 3 m), L (Right angle type 3 m) or N (Without cable connector)
- Thread type: Nil, Rc, N, NPT, T, NPTF, F, G
- Bracket: Nil (Without bracket), B (Flat bracket), C (Saddle bracket) or S (Bracket is included).

### Application examples
- Polishing equipment and peripheral equipment for wafers, LCD glasses, color filters, etc.

### Made to Order Specifications

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

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Air</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum supply pressure</td>
<td>1.0 MPa (Pressure range 0.1 MPa type: 0.2 MPa)</td>
</tr>
<tr>
<td>Maximum supply pressure</td>
<td>1.5 MPa (Pressure range 0.1 MPa type: 0.3 MPa)</td>
</tr>
<tr>
<td>Proof pressure</td>
<td>1 MPa (Pressure range 0.1 MPa type: 0.2 MPa)</td>
</tr>
<tr>
<td>(Supply side)</td>
<td>1: 0.005 to 0.1 MPa, 3: 0.005 to 0.5 MPa, 5: 0.005 to 0.9 MPa</td>
</tr>
<tr>
<td>(Output side)</td>
<td>0: 4 to 20 mA, 1: 0 to 20 mA, 2: 0 to 5 VDC, 3: 0 to 10 VDC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power supply voltage</th>
<th>0: 24 VDC ±10%, 1: 12 to 15 VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current consumption</td>
<td>0.12 A or less (24 VDC ±10% type)</td>
</tr>
<tr>
<td></td>
<td>0.18 A or less (12 to 15 VDC type)</td>
</tr>
<tr>
<td>Input signal</td>
<td>Voltage type: Approx. 6.5 kΩ, Current type: 250 Ω or less</td>
</tr>
<tr>
<td>Input impedance</td>
<td>Alarm output (NPN/PNP)</td>
</tr>
<tr>
<td>Output signal</td>
<td>Alarm output (NPN/PNP)</td>
</tr>
<tr>
<td>Linearite</td>
<td>±1.0% F.S. or less</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>0.5% F.S. or less</td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.5% F.S. or less</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>0.2% F.S. or less</td>
</tr>
<tr>
<td>Temperature characteristics</td>
<td>±0.12% F.S. /°C or less</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±2% F.S. ±1 digit or less</td>
</tr>
<tr>
<td>Minimum unit</td>
<td>MPa: 0.001 kgf/cm², 0.01 bar, 0.01 psi, 0.1 kPa</td>
</tr>
<tr>
<td>Ambient and fluid temperature</td>
<td>0 to 50°C (No condensation)</td>
</tr>
<tr>
<td>Enclosure</td>
<td>IP65</td>
</tr>
<tr>
<td>Weight</td>
<td>ITV10: Approx. 250 g, ITV20: Approx. 350 g, ITV30: 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**

**RoHS**

### 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**
    - Nil: Metric size (Light gray) ø4
    - U: Inch size (Orange) ø5/32"
  - **For manifold**
    - Nil: Metric size (Light gray) ø6 ø4 ø6
    - U: 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

#### Manifold

**IITV00-02-n**

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

- **One-touch fitting size for supply/exhaust parts (End plate):**
  - Nil: ø6 (Light gray)
  - U: ø1/4" (Orange)

#### 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.

**IITV00-03-01**

- **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) **ITV000-05-07**

- **For single unit only**
  - Nil: Without bracket
  - B: Flat Bracket
  - C: L-bracket

- **NiE**
  - For single unit
  - M: For manifolds

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><strong>ITV009 Series</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Minimum supply pressure</strong></td>
<td>Set pressure –1 kPa</td>
</tr>
<tr>
<td><strong>Maximum supply pressure</strong></td>
<td>–101 kPa</td>
</tr>
<tr>
<td><strong>Set pressure range</strong></td>
<td>–1 to –100 kPa</td>
</tr>
</tbody>
</table>

#### Power supply
- **Voltage:** 24 VDC ±10%, 12 to 15 VDC
- **Current consumption:**
  - Power supply voltage 24 VDC type: 0.12 A or less
  - Power supply voltage 12 to 15 VDC type: 0.18 A or less

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

#### Input impedance
- **Voltage type:** Approx. 10 kΩ
- **Current type:** Approx. 250 Ω

#### Output signal

<table>
<thead>
<tr>
<th><strong>Note 4)</strong></th>
<th><strong>Analogue output</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>1 to 5 VDC (Output impedance: Approx. 1 kΩ)</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>±0.5% F.S. or less</td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.2% F.S. or less</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>±0.12% F.S./°C or less</td>
</tr>
</tbody>
</table>

#### Temperature characteristics
- ±0.12% F.S./°C or less

#### Operating temperature range
- 0 to 50°C (No condensation)

#### Enclosure
- IP65 equivalent *

#### Connection type
- **For single unit**
  - **Metric size:** ø4
  - **Inch size:** ø5/32”
- **Manifold**
  - **Metric size:** ø6
  - **Inch size:** ø1/4”, ø5/32”

#### Weight
- 100 g or less (without option)

**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 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 (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.**
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.
Compact Vacuum Regulator ITV009 Series

**Linearity, Hysteresis**

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

**Pressure Characteristics**

- **Set pressure: –10 kPa**

**Flow Rate Characteristics**

- **Set pressure: –10 kPa**
- **Flow rate (L/min (ANR))**

**Repeatability**

- With 50% of signal input
**Dimensions**

**For Single Unit**

- **L-bracket** (Option)
- **Flat bracket** (Option)
- **M8 x 1** Cable connection thread
- **2 x M3 x 0.5 thread depth 3.5** Mounting thread

**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.)*
Compact Vacuum Regulator ITV009 Series

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.

Dimensions in inch are noted in parentheses.

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

<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>
<tr>
<td>Weight of DIN rail (g)</td>
<td>20</td>
<td>22</td>
<td>27</td>
<td>29</td>
<td>31</td>
<td>34</td>
<td>36</td>
<td>41</td>
<td>43</td>
</tr>
</tbody>
</table>

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.)
Electronic Vacuum Regulator
ITV2090/2091 Series

Input signal/Communication model

- Current type 4 to 20 mA DC (Sink type)
- Voltage type 0 to 5 VDC
- Voltage type 0 to 10 VDC
- 4 points preset input
- 16 points preset input (Switch output/NPN output)
- 16 points preset input (Switch output/PNP output)
- 10 bit digital input

Power supply voltage

- 24 VDC
- 12 to 15 VDC

Pressure range

-9 to 1.3 to -80 kPa

Monitor output

- Analog output 1 to 5 VDC
- Switch output/NPN output
- Switch output/PNP output
- Analog output 4 to 20 mA DC (Sink type)

Pressure display unit

- S 5 kPa

Cable connector type

- Straight type 3 m
- Right angle type 3 m
- Without cable connector

Bracket

- Without bracket
- Flat bracket
- L-bracket

Note) 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.

Note) For the communication models, CC, DE, PR and RC, only "Nil" is available as it does not have a pressure display.

Note) Communication models (CC, DE, PR, RC), 16 points preset input and 10 bit digital input are available only for 24 VDC.

Port size

- 2 1/4

Thread type

- NPT
- NPTF
- G

For communications 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.

<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-1557688 (Socket type)</td>
<td>T-branch connector not supplied.</td>
</tr>
</tbody>
</table>

Note) Dedicated Bus adapter supplied with the product.
Stepless control of vacuum pressure proportional to an electrical signal

Piping/Wiring Diagram

Vacuum pump, Ejector

Power supply and input signal (VDC, mA DC)

VAC ITV2090 OUT Tank

Set pressure (Vacuum)

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>Version Note 1)</td>
<td>Ver 1.10</td>
<td>Volume1 (Edition3.8), Volume3 (Edition1.5)</td>
</tr>
<tr>
<td>Communication speed</td>
<td>156 k/625 k</td>
<td>125 k/250 k/500 k</td>
</tr>
<tr>
<td></td>
<td>2.5 M/5 M/10 M bps</td>
<td></td>
</tr>
<tr>
<td>I/O occupation area (input/output data)</td>
<td>4 word/4 word, 32 bit/32 bit</td>
<td>16 bit/16 bit</td>
</tr>
<tr>
<td>Communication data resolution</td>
<td>12 bit (4096 resolution)</td>
<td>12 bit (4096 resolution)</td>
</tr>
<tr>
<td>Fail safe</td>
<td>HOLD Note 3)/CLEAR (Switch setting)</td>
<td>HOLD/CLEAR (Switch setting)</td>
</tr>
<tr>
<td>Electric insulation Note 4)</td>
<td>Insulation</td>
<td>Insulation</td>
</tr>
<tr>
<td>Terminating resistor</td>
<td>Built into the product (Switch setting)</td>
<td>Not built into the product</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>

Note 1) The minimum supply vacuum pressure should be 13.3 kPa less than the maximum vacuum pressure setting value.
Note 2) 4 to 20 mA DC 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 over 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.
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) Minimum display: 1
Note 6) The product characteristics are confined to the static state.
Note 7) Refer to the table below for communication specifications.
Note 8) Add 50 g for digital input type, 70 g for 16 points preset input type respectively.

Standard Specifications

<table>
<thead>
<tr>
<th>Power supply</th>
<th>Voltage</th>
<th>Current consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24 VDC ±10%</td>
<td>Power supply voltage 24 VDC type: 0.12 A or less Note 7)</td>
</tr>
<tr>
<td></td>
<td>12 to 15 VDC</td>
<td>Power supply voltage 12 to 15 VDC type: 0.18 A or less</td>
</tr>
</tbody>
</table>

Note 1) The insulation between the electrical signal of the communication system and ITV power supply.
Note 2) The output HOLD value when a CC-Link communications error occurs can be set based on the bit area data.
Note 3) The output HOLD value when a CC-Link communications error occurs can be set based on the bit area data.
Note 4) The insulation between the electrical signal of the communication system and ITV power supply.

Communication Specifications (ITV2090/2091 Series)

Model | ITV2090 | ITV2091 |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum supply vacuum pressure Note 1)</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>–1.3 to –80 kPa</td>
<td></td>
</tr>
</tbody>
</table>

Note 1) Note that version information is subject to change.
Note 2) Configuration files can be downloaded from the operation manual page on SMC’s website: http://www.smcworld.com
Note 3) Refer to the table below for communication specifications.
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 ④ 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** Set pressure: −20 kPa

**Hysteresis** Supply vacuum pressure: −100 kPa

**Repeatability**

**Flow rate characteristics**
- 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)
**ITV209 Series**

**Dimensions**

**ITV209 Series**

**Flat bracket**

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

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

**Digital pressure display**

- **M5 x 0.8**
  - Air introduction port

**Flat bracket assembly**

- P398020-600 (Option)

- 4 x M5 x 0.8 thread depth 6 mm

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

**L-bracket**

- **L-bracket assembly**
  - P398020-601 (Option)

- 2.3
Dimensions (16 points preset input, 10 bit digital input, CC-Link, DeviceNet™, PROFIBUS DP and RS-232C)

16 points preset input

```
<table>
<thead>
<tr>
<th>M12 x 1</th>
<th>M12 x 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital cable connection thread (Plug type)</td>
<td>Power cable connection thread (Plug type)</td>
</tr>
<tr>
<td>Digital pressure display</td>
<td>Air introduction port</td>
</tr>
</tbody>
</table>
```

10 bit digital input

```
<table>
<thead>
<tr>
<th>HIROSE ELECTRIC CO., LTD. Made</th>
</tr>
</thead>
<tbody>
<tr>
<td>RP13A-12RB-13PA (71)</td>
</tr>
</tbody>
</table>
```

CC-Link/ITV2090-CC

```
<table>
<thead>
<tr>
<th>IN M12 x 1</th>
<th>OUT M12 x 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication cable connection thread (Plug type)</td>
<td>Communication cable connection thread (Plug type)</td>
</tr>
<tr>
<td>M5 x 0.8</td>
<td>Air introduction port</td>
</tr>
<tr>
<td>Digital pressure display</td>
<td></td>
</tr>
</tbody>
</table>
```

DeviceNet™/ITV2090-DE

```
<table>
<thead>
<tr>
<th>IN M12 x 1</th>
<th>OUT M12 x 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication cable connection thread (Plug type)</td>
<td>Communication cable connection thread (Plug type)</td>
</tr>
<tr>
<td>M12 x 1</td>
<td>Power cable connection thread (Plug type)</td>
</tr>
<tr>
<td>Digital pressure display</td>
<td>Air introduction port</td>
</tr>
</tbody>
</table>
```

PROFIBUS DP/ITV2090-PR

```
<table>
<thead>
<tr>
<th>IN M12 x 1</th>
<th>OUT M12 x 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication cable connection thread (Plug type)</td>
<td>Communication cable connection thread (Plug type)</td>
</tr>
<tr>
<td>M12 x 1</td>
<td>Power cable connection thread (Plug type)</td>
</tr>
<tr>
<td>M5 x 0.8</td>
<td>Air introduction port</td>
</tr>
<tr>
<td>Digital pressure display</td>
<td></td>
</tr>
</tbody>
</table>
```

RS-232C/ITV2090-RC

```
<table>
<thead>
<tr>
<th>IN M12 x 1</th>
<th>OUT M12 x 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication cable connection thread (Plug type)</td>
<td>Communication cable connection thread (Plug type)</td>
</tr>
<tr>
<td>M12 x 1</td>
<td>Power cable connection thread (Plug type)</td>
</tr>
<tr>
<td>M5 x 0.8</td>
<td>Air introduction port</td>
</tr>
<tr>
<td>Digital pressure display</td>
<td></td>
</tr>
</tbody>
</table>
```

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.
## 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 Voltage type</td>
<td>Cable connector (4 cores)</td>
<td>P398020-500-3</td>
</tr>
<tr>
<td>4 points preset 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>16 points preset input</td>
<td>Power cable (4 cores)</td>
<td>Straight type 3 m</td>
</tr>
<tr>
<td></td>
<td>Straight type 3 m</td>
<td>P398020-500-3</td>
</tr>
<tr>
<td></td>
<td>Right angle type 3 m</td>
<td>P398020-503-3</td>
</tr>
<tr>
<td>10 bit digital input</td>
<td>Power cable (4 cores)</td>
<td>Straight type 3 m</td>
</tr>
<tr>
<td></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></td>
<td>Communication cables connector (5 cores)</td>
<td>Straight type 3 m</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

```
<table>
<thead>
<tr>
<th>Measurement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>52</td>
<td>40</td>
</tr>
<tr>
<td>84</td>
<td>4 x ø7</td>
</tr>
<tr>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
```

#### L-bracket

```
<table>
<thead>
<tr>
<th>Measurement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td></td>
</tr>
<tr>
<td>4 x R0.5</td>
<td></td>
</tr>
<tr>
<td>2.3</td>
<td></td>
</tr>
</tbody>
</table>
```

<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>
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”.

Wiring
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.

Caution
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.

Wiring Diagrams
Current signal type
Voltage signal type

Monitor output wiring diagram
Analog output, voltage type

Air Supply

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.
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.
Handling

**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.

**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.
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.

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.

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. 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.
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.

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 (EX 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.

Design and Selection

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</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.
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.

**Trademark Information**
DeviceNet™ is a trademark of ODVA.

### Wiring

#### Current Signal Type

**Voltage Signal Type**

- **Brown**: Power supply
- **White**: Input signal
- **Blue**: GND (COMMON)
- **Black**: Monitor output

#### Preset Input Type

- **Brown**: Power supply
- **White**: Input signal
- **Blue**: GND (COMMON)
- **Black**: Input signal

#### Power supply connector

- **Brown**: Vcc
- **White**: GND (COMMON)
- **Blue**: Input signal
- **Black**: Monitor output

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: 1557617, 1557620, 1557662, 1557701, 1557727)

Note 3) Perform the wiring so that no electric potential difference occurs between GND of the power supply and GND of the communication section. If any electric potential difference occurs, this may cause the internal parts to burn out.

#### Knock-down connectors

**DeviceNet™ compatibility**

- **Plug PCA-1557617**
- **Socket PCA-1557620**
- **Plug PCA-1557662**
- **Socket PCA-1557701**
- **Plug PCA-1557727**

**VCC**

- **Brown**: Power supply
- **Blue**: Input signal
- **Black**: GND (COMMON)
- **White**: Monitor output

**V–**

- **Brown**: Power supply
- **Blue**: Input signal
- **Black**: GND (COMMON)
- **White**: Monitor output

**Ground (GND)**

- **Brown**: Power supply
- **Blue**: Input signal
- **Black**: GND (COMMON)
- **White**: Monitor output

### 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

#### 4 points preset input type

- **Vs**: Power supply 24 VDC (Negative common)

#### 16 points preset input type

- **Vs**: Power supply 24 VDC (No polarity)

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

- **MPa**: kgf/cm², bar, psi, kPa
  - 0.001, 0.01, 0.1, 1

Note 1) This is 1 psi for 130 psi types.

#### 10 bit digital input type

- **Wire color**: Signal name
  - Pink-Black 2: Power supply (24 VDC)
  - Green-Black 2: Power supply (GND)
  - Blue: Signal Common (No Polarity)
  - Blue-Black 2: MSB 10 bit
  - Gray: 9 bit
  - Orange-Black 1: 8 bit
  - Orange-Black 1: 8 bit
  - Orange-Black 1: 8 bit
  - Orange: 3 bit
  - Green: 2 bit
  - Pink: LSB 1 bit

Note 1) The color wire is shown when an option cable is used.
**ITV0000/1000/2000/3000 Series**

Specific Product Precautions 5

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 Series Precautions**

### Wiring

#### Monitor output wiring diagram

- **Analog output: Voltage type**
  - **Brown**
  - **Blue**
  - **White**
  - **Black**

- **Monitor output voltage**
  - **Brown**
  - **Blue**
  - **White**
  - **Black**

- **Switch output: NPN type**
  - **Brown**
  - **Blue**
  - **White**
  - **Black**

- **Switch output: PNP type**
  - **Brown**
  - **Blue**
  - **White**
  - **Black**

*When 80 mA DC or more is applied, detecting device for overcurrent starts activating and then emits an error signal. (Error number “5”)*

### 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>Set pressure range</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPa</td>
<td>0.005 to 0.1, 0.005 to 0.5, 0.005 to 0.9, —</td>
</tr>
<tr>
<td>kgf/cm²</td>
<td>0.05 to 1, 0.05 to 5, 0.05 to 9, —</td>
</tr>
<tr>
<td>bar</td>
<td>0.7 to 15, 0.7 to 70, 0.7 to 130, —</td>
</tr>
<tr>
<td>psi</td>
<td>5 to 100, 5 to 500, 5 to 900, —</td>
</tr>
<tr>
<td>kPa</td>
<td>5 to 100, 5 to 500, 5 to 900, —</td>
</tr>
<tr>
<td>—</td>
<td>—</td>
</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.

### CE Marking

<table>
<thead>
<tr>
<th>Model</th>
<th>Ferrite core necessity</th>
<th>Recommended power supply cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITV0000-□-□-Q</td>
<td>Unnecessary</td>
<td>M8-4DSX3MG4 (Straight type) P398000-501-2 (Right angle type)</td>
</tr>
</tbody>
</table>

Note) Recommended power supply cable length is 3 m. (P398000-501-2 is 2 m.) If any other length is desired, please consult with SMC.

### ITVO0000/1000/2000/3000 Series

#### Monitoring output wiring diagram

- **Brown**
- **Blue**
- **White**
- **Black**

#### Load

- **Brown**
- **Blue**
- **White**
- **Black**

#### Analog output: Voltage type

- **Power**
- **Signal**

#### Analog output: Current type

- **Current type (Sink type)**

#### Switch output: NPN type

- **Model Ferrite core necessity**
- **Recommended power supply cable**

#### Switch output: PNP type

- **Power**

### 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

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. Furthermore, if operated without setting the setting side pressure to the set value, it may be controlled, etc., while the port is still on “the internal solenoid valve” where the port is still on “the internal solenoid valve”.
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 vacuum side pressure that is higher than the set pressure. In this situation, use the appropriate measures to prevent this from occurring.
10. The setting side pressure cannot be completely released 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 designed for specific applications. Avoid contact with water, oil, or other substances that may cause corrosion.
12. The optional cable connector is a 4-port type. When the monitor output (analog output, switch output) is not being used, keep it from touching the other wires, as this can cause malfunction.
13. The optional cable connection is a 4-port type. When connecting the cables, ensure that the correct connections are made.
14. Take the following steps to avoid malfunction due to noise.
   1) Install a line filter, etc. in the AC power line to eliminate power supply noise during operation.
   2) Install this product and its wiring as far as possible from strong electric fields such as those of motors and power lines, etc.
   3) Take protective measures against load surge for an induction load (solenoid valves, relays, etc.).
15. Refer to the operation manual included with the product for details on its handling.

Caution

If you have any questions, please contact your SMC sales representative.

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. If approval is granted, the product will continue to be handled.

If you have any questions or concerns, please contact your SMC sales representative.