Electro-Pneumatic Regulator
Electronic Vacuum Regulator

- Stepless control of air pressure proportional to an electrical signal
- Added Fieldbus compliant specifications to Series ITV1000/2000/3000!
- Reduced wiring
  - Applicable Fieldbus protocols
  - CC-Link
  - DeviceNet
- Added RS-232C specification to serial communications!
- Compact/lightweight (Integrated communication parts)
- Weight: 350 g (Note 1) (ITV1000)
- Power consumption: 4 W or less (Note 1)

Note 1) Value for communications type (PROFIBUS DP)

Electro-Pneumatic Regulators

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

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

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

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

Electronic Vacuum Regulators

**Series ITV009**

**Series ITV209**

RoHS
IP65
New

Electro-Pneumatic Regulator
Electronic Vacuum Regulator

New

IP65
RoHS

Series ITV

New

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

Note 2) ITV1000. Dimensions in parentheses ( ) are for the CC-Link or PROFIBUS DP.
Compact Electro-Pneumatic Regulator Series ITV0000
Compact Vacuum Regulator Series ITV009

With a simplified high-density circuit board design, an extremely compact size has been achieved.

- 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.

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>Sensitivity</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITV000</td>
<td>0.1 MPa</td>
<td>within 0.2%</td>
<td>Cable connectors,</td>
</tr>
<tr>
<td>ITV003</td>
<td>0.5 MPa</td>
<td>within 0.2%</td>
<td>Straight type</td>
</tr>
<tr>
<td>ITV009</td>
<td>1 to 5 VDC</td>
<td>within 0.5%</td>
<td>Right angle type</td>
</tr>
</tbody>
</table>

- Equivalent to IP65
- Linearity: Within ±1% (F.S.)
- Hysteresis: Within 0.5% (F.S.)
- Repeatability: Within ±0.5% (F.S.)
- High-speed response time: 0.1 sec (Without load)
- High stability
  Sensitivity within 0.2% (F.S.)

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

- Added Fieldbus compliant specifications to Series ITV1000/2000/3000!
- Reduced wiring
  Applicable Fieldbus protocols

- New
- Added RS-232C specification to serial communications!

- Sensitivity: Within 0.2% (F.S.)
- Linearity: Within ±1% (F.S.)
- Hysteresis: Within 0.5% (F.S.)
- IP65
- Cable connections in 2 directions
  Straight type and right angle type

- Grease-free specification (Series ITV1000)

Features 1

- Multi-stage control to analog control
- Electrostatic coating control

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
## Electro-Pneumatic Regulator

### Electronic Vacuum Regulator

### Series ITV

- **Stepless control of air pressure proportional to an electrical signal.**

### Table

<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><strong>Series ITV0000</strong></td>
<td>ITV001</td>
<td>0.001 to 0.1 MPa</td>
<td>Current type: 4 to 20 mA DC Current type: 0 to 20 mA DC Voltage type: 0 to 6 VDC Voltage type: 0 to 10 VDC</td>
<td>Built-in One-touch fittings Metric size: ø4 Inch size: ø5/32</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>ITV003</td>
<td>0.001 to 0.5 MPa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ITV005</td>
<td>0.001 to 0.9 MPa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Series ITV1000</strong></td>
<td>ITV101</td>
<td>0.005 to 0.1 MPa</td>
<td>Current type: 4 to 20 mA DC (Sink type) Current type: 0 to 20 mA DC (Sink type) Voltage type: 0 to 6 VDC Voltage type: 0 to 10 VDC Preset input</td>
<td>1/8, 1/4</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>ITV103</td>
<td>0.005 to 0.5 MPa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ITV105</td>
<td>0.005 to 0.9 MPa</td>
<td></td>
<td></td>
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<tr>
<td><strong>Series ITV2000</strong></td>
<td>ITV201</td>
<td>0.005 to 0.1 MPa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ITV203</td>
<td>0.005 to 0.5 MPa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ITV205</td>
<td>0.005 to 0.9 MPa</td>
<td>New CC-Link compatible New DeviceNet™ compatible New PROFIBUS DP compatible New RS-232C communication</td>
<td>1/4, 3/8</td>
<td>9</td>
</tr>
<tr>
<td><strong>Series ITV3000</strong></td>
<td>ITV301</td>
<td>0.005 to 0.1 MPa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ITV303</td>
<td>0.005 to 0.5 MPa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ITV305</td>
<td>0.005 to 0.9 MPa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Series ITV009</strong></td>
<td>ITV009</td>
<td>–1 to –100 kPa</td>
<td>Current type: 4 to 20 mA DC (Sink type) Current type: 0 to 20 mA DC Voltage type: 0 to 5 VDC Voltage type: 0 to 10 VDC Preset input New CC-Link compatible New DeviceNet™ compatible New PROFIBUS DP compatible New RS-232C communication</td>
<td>Built-in One-touch fittings Metric size: ø4 Inch size: ø5/32</td>
<td>27</td>
</tr>
<tr>
<td><strong>Series ITV209</strong></td>
<td>ITV209</td>
<td>–1.3 to –80 kPa</td>
<td>Current type: 4 to 20 mA DC (Sink type) Current type: 0 to 20 mA DC Voltage type: 0 to 5 VDC Voltage type: 0 to 10 VDC Preset input</td>
<td>1/4</td>
<td>34</td>
</tr>
</tbody>
</table>

### Features

- New CC-Link compatible
- New DeviceNet™ compatible
- New PROFIBUS DP compatible
- New RS-232C communication

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Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
Compact Electro-Pneumatic Regulator
Series ITV0000

How to Order

For single unit and single unit for manifold

ITV00 1 0 3 N

Pressure range
1 0.1 MPa
3 0.5 MPa
5 0.9 MPa

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

Input signal
0 Current type 4 to 20 mA DC
1 Current type 0 to 20 mA DC
2 Voltage type 0 to 5 VDC
3 Voltage type 0 to 10 VDC

Built-in One-touch fittings type
For single unit
- Metric size (Light gray)
  ø4
- Inch size (Orange)
  ø5/32"

For manifold
- Metric size (Light gray)
  ø6 ø4 ø6
- Inch size (Orange)
  ø1/4" ø5/32" ø1/4"

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

Bracket/Option for single unit only
- Nil Without bracket
- B Flat Bracket
- C L-bracket

Base type
- Nil For single unit
- M For manifolds

CE compliant
- Nil
- CE CE compliant

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 ø8 (Light gray)
- U ø1/4" (Orange)

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

How to Order Manifold Assembly (Example)

Indicate part numbers of electro-pneumatic regulators and options to be mounted below the manifold part number.
Example)
Due to the common supply/exhaust feature, note that different pressure range combinations are not available.

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

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

### Compact Electro-Pneumatic Regulator  Series ITV0000

<table>
<thead>
<tr>
<th>Specifications</th>
<th>ITV001</th>
<th>ITV003</th>
<th>ITV005</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Minimum supply pressure</strong></td>
<td>0.2 MPa</td>
<td>0.001 to 0.1 MPa</td>
<td>0.001 to 0.9 MPa</td>
</tr>
<tr>
<td><strong>Maximum supply pressure</strong></td>
<td>1.0 MPa</td>
<td>0.001 to 0.5 MPa</td>
<td>0.001 to 0.9 MPa</td>
</tr>
<tr>
<td><strong>Set pressure range</strong></td>
<td>3.5 l/min (ANR)</td>
<td>6 l/min (ANR)</td>
<td>6 l/min (ANR)</td>
</tr>
<tr>
<td><strong>Maximum flow rate</strong></td>
<td>Supply pressure: 0.2 MPa</td>
<td>Supply pressure: 3.6 MPa</td>
<td>Supply pressure: 0.6 MPa</td>
</tr>
<tr>
<td><strong>Power supply</strong></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><strong>Current consumption</strong></td>
<td>0 to 5 VDC, 0 to 10 VDC</td>
<td>Power supply voltage: 12 to 15 VDC type: 0.18 A or less</td>
<td></td>
</tr>
<tr>
<td><strong>Input signal</strong></td>
<td>Voltage type: 4 to 20 mA DC, 0 to 20 mA DC</td>
<td>Approximately 10 kΩ</td>
<td>Approximately 250 Ω</td>
</tr>
<tr>
<td><strong>Input impedance</strong></td>
<td>Current type: 4 to 20 mA DC</td>
<td>0 to 5 VDC, 0 to 10 VDC</td>
<td></td>
</tr>
</tbody>
</table>
| **Output signal**                   | Voltage type: 1 to 5 VDC (Load impedance: 1 kΩ)

| **Linearity**                       | Within ±1% (Full span) |
| **Hysteresis**                      | Within 0.5% (Full span) |
| **Repeatability**                   | Within ±0.5% (Full span) |
| **Sensitivity**                     | Within ±2% (Full span) |
| **Temperature characteristics**     | Within ±0.12% (Full span) |
| **Operating temperature range**     | 0 to 50°C (No condensation) |
| **Enclosure**                       | Equivalent to IP65 |

| **Connection type**                 | Built-in One-touch fittings |
| **Connection size**                 | For single unit: Metric size: 1, 2, 3, 4; Inch size: 1/4, 5/32, 3/32 |
| **Manifold**                        | Metric size: 1, 2, 3, 4; Inch size: 1/4, 5/32 |
| **Weight**                          | 100 g or less (without option) |

**Note 1)** Indicates the weight of a single unit. **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. *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 back page 2)"

### 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 ELWIKA-KV4408 PVC025 2M

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Series ITV0000

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 **Series ITV0000**

**Series ITV001**

**Linearity, Hyteresis**

![Graph showing linearity and hysteresis](image)

**Pressure Characteristics**

<table>
<thead>
<tr>
<th>Supply pressure (MPa)</th>
<th>Output deviation factor (% F.S.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2</td>
<td>0.0</td>
</tr>
<tr>
<td>0.3</td>
<td>0.0</td>
</tr>
<tr>
<td>0.4</td>
<td>0.0</td>
</tr>
<tr>
<td>0.5</td>
<td>0.0</td>
</tr>
<tr>
<td>0.6</td>
<td>0.0</td>
</tr>
<tr>
<td>0.7</td>
<td>0.0</td>
</tr>
<tr>
<td>0.8</td>
<td>0.0</td>
</tr>
<tr>
<td>0.9</td>
<td>0.0</td>
</tr>
<tr>
<td>1.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Set pressure: 0.05 MPa

**Flow Characteristics**

<table>
<thead>
<tr>
<th>Flow rate (l/min (ANR))</th>
<th>Set pressure (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>50 kPa</td>
</tr>
<tr>
<td>20</td>
<td>100 kPa</td>
</tr>
<tr>
<td>30</td>
<td>150 kPa</td>
</tr>
<tr>
<td>40</td>
<td>200 kPa</td>
</tr>
<tr>
<td>50</td>
<td>250 kPa</td>
</tr>
<tr>
<td>60</td>
<td>300 kPa</td>
</tr>
<tr>
<td>70</td>
<td>350 kPa</td>
</tr>
<tr>
<td>80</td>
<td>400 kPa</td>
</tr>
</tbody>
</table>

Supply pressure: 0.2 MPa

**Series ITV003**

**Linearity, Hyteresis**

![Graph showing linearity and hysteresis](image)

**Pressure Characteristics**

<table>
<thead>
<tr>
<th>Supply pressure (MPa)</th>
<th>Output deviation factor (% F.S.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2</td>
<td>0.0</td>
</tr>
<tr>
<td>0.3</td>
<td>0.0</td>
</tr>
<tr>
<td>0.4</td>
<td>0.0</td>
</tr>
<tr>
<td>0.5</td>
<td>0.0</td>
</tr>
<tr>
<td>0.6</td>
<td>0.0</td>
</tr>
<tr>
<td>0.7</td>
<td>0.0</td>
</tr>
<tr>
<td>0.8</td>
<td>0.0</td>
</tr>
<tr>
<td>0.9</td>
<td>0.0</td>
</tr>
<tr>
<td>1.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Set pressure: 0.25 MPa

**Flow Characteristics**

<table>
<thead>
<tr>
<th>Flow rate (l/min (ANR))</th>
<th>Set pressure (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>50 kPa</td>
</tr>
<tr>
<td>20</td>
<td>100 kPa</td>
</tr>
<tr>
<td>30</td>
<td>150 kPa</td>
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<tr>
<td>40</td>
<td>200 kPa</td>
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<tr>
<td>50</td>
<td>250 kPa</td>
</tr>
<tr>
<td>60</td>
<td>300 kPa</td>
</tr>
<tr>
<td>70</td>
<td>350 kPa</td>
</tr>
<tr>
<td>80</td>
<td>400 kPa</td>
</tr>
</tbody>
</table>

Supply pressure: 0.6 MPa

Approved
Series ITVO000

Series ITVO005

Linearity, Hysteresis

Repeatability

Pressure Characteristics

With 50% of signal input

Flow Characteristics

Set pressure: 0.45 MPa

Supply pressure: 1.0 MPa
Compact Electro-Pneumatic Regulator Series ITV0000

Dimensions

For Single Unit

- **L-bracket** (Option)
- **M8 x 1** Cable connection thread
- **Flat bracket** (Option)
- **Sup port** (ø 4, ø 5/32)
- **Exh port** (ø 4, ø 5/32)

**Port Location**

<table>
<thead>
<tr>
<th>No.</th>
<th>1</th>
<th>3</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITV0000</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 back page)

**Breathing hole** (M3 x 0.5)

**Cable connector (4-wire)**
- Straight type (Option)
- Right angle type (Option)

**Cable connector (4-wire)**

**Minimum bending radius**: 80
Series ITV0000

Dimensions

Single unit for manifold

Note) For dimensions of the cable connector, refer to single unit on page 6.
Compact Electro-Pneumatic Regulator *Series ITV0000*

**Dimensions**

**Manifold**

![Diagram of Manifold](image)

<table>
<thead>
<tr>
<th>Port Location</th>
<th>No.</th>
<th>SUP</th>
<th>OUT</th>
<th>EXH</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITV003</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

Note: Stations are counted starting from the D side.

Note) For dimensions of the cable connector, refer to single unit on page 6.

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

Weight of DIN rail (g):

<table>
<thead>
<tr>
<th>Stations</th>
<th>20</th>
<th>22</th>
<th>24</th>
<th>27</th>
<th>29</th>
<th>31</th>
<th>34</th>
<th>36</th>
<th>41</th>
<th>43</th>
</tr>
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<td>L1</td>
<td>20</td>
<td>22</td>
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<td>31</td>
<td>34</td>
<td>36</td>
<td>41</td>
<td>43</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>
<td></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 back page 2).

Note: Breathing hole (M3 x 0.5 x 1/2")

Dimensions in inch are noted in parentheses.

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 back page 2).

Weight of DIN rail (g):

<table>
<thead>
<tr>
<th>Stations</th>
<th>20</th>
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<td>31</td>
<td>34</td>
<td>36</td>
<td>41</td>
<td>43</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>
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<td>223</td>
<td>235.5</td>
<td></td>
</tr>
</tbody>
</table>
**Electro-Pneumatic Regulator**

**Series ITV1000/2000/3000**

**How to Order**

**ITV 3 0 1 0 - 0 1 2 0**

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

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

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

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

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

- **Thread type**
  - Nil
  - Rc
  - N
  - PT
  - F
  - G

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

- **Made to Order Specifications**
  - Refer to pages 11, 25, and 26 for details.

- **Pressure display unit**
  - Nil
  - 2: kPa
  - 3: bar
  - 4: psi
  - 5: MPa

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

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

**Application**

- **Communication cable part number**
  - CC-Link compatibility: PCA-1567720 (Socket type), PCA-1567717 (Plug type)
  - DeviceNet™ compatibility: PCA-1557633 (Socket type), PCA-1557646 (Plug type)
  - PROFIBUS DP compatibility: PCA-1557688 (Socket type), PCA-1557691 (Plug type)

**Remarks**

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

**Note)** Communication models (CC, DN, PR, RC) are available only for 24 VDC.

**Note)** Under Japan's new Measurement Act, this is only for overseas sales (SI units are to be used inside Japan). For the communication models, CC, DN, PR, and RC, only "Nil" is available as it does not have a pressure display.

**Note)** Order communication cable (other than RS-232C) separately.

**Note)** For detailed information on models for CE, refer to SMC's website.

**Note)** For communication cables, use the parts listed below (refer to the catalog [M8/M12 Connector] CAT.ES100-73 for details) or order the product certified for the respective protocol (with M12 connector) separately.

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Standard Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>ITV101</th>
<th>ITV103</th>
<th>ITV105</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>0.005 to 0.1 MPa</td>
<td>0.005 to 0.5 MPa</td>
<td>0.005 to 0.9 MPa</td>
</tr>
<tr>
<td>Voltage</td>
<td>24 VDC ±10%</td>
<td>12 to 15 VDC</td>
<td></td>
</tr>
<tr>
<td>Current consumption</td>
<td>Power supply voltage 24 VDC: 0.12 A or less</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply voltage 12 to 15 VDC type: 0.18 A or less</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input signal</td>
<td>Core type: 4 to 20 mA DC, 0 to 20 mA DC (Sink type)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage type</td>
<td>0 to 5 VDC, 0 to 10 VDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preset input</td>
<td>4 points (Negative common)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current type</td>
<td>250 Ω or less</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage type</td>
<td>Approx. 6.5 kΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preset input</td>
<td>Power supply voltage 24 VDC type: Approx. 4.7 kΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply voltage 12 VDC type: Approx. 2.0 kΩ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input impedance</td>
<td>1 to 5 VDC (Load impedance: 1 kΩ or more)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output signal</td>
<td>4 to 20 mA DC (Sink type) (Load impedance: 250 Ω or less)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog output</td>
<td>Output accuracy within ±6% (Full span)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switch output</td>
<td>NPN open collector output: Max. 30 V, 80 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PNP open collector output: Max. 80 mA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linearity</td>
<td>Within ±1% (Full span)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hysteresis</td>
<td>Within 0.5% (Full span)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeatability</td>
<td>Within ±0.5% (Full span)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensitivity</td>
<td>Within 0.2% (Full span)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature characteristics</td>
<td>Within ±0.12% (Full span) °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output pressure display</td>
<td>Accuracy: ±2% of ±1 digit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum unit</td>
<td>MPa: 0.001, kgf/cm²: 0.01, bar: 0.01, psi: 0.1 ft./in.², kPa: 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient and fluid temperature</td>
<td>0 to 50 °C (No condensation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enclosure</td>
<td>IP65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>ITV101: Approx. 350 g (without options)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ITV103: Approx. 350 g (without options)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ITV105: Approx. 465 g (without options)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Communication Specifications (CC, DN, PR, RC)

<table>
<thead>
<tr>
<th>Model</th>
<th>ITV...0..0-CC</th>
<th>ITV...0..0-DN</th>
<th>ITV...0..0-PR</th>
<th>ITV...0..0-RC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protocol</td>
<td>CC-Link</td>
<td>DeviceNet™</td>
<td>PROFIBUS DP</td>
<td>RS-232C</td>
</tr>
<tr>
<td>Version</td>
<td>1.10</td>
<td>Release 2.0</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Communication file</td>
<td>EDS</td>
<td>GSD</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>I/O occupation area (input/output data)</td>
<td>156 k/625 k or 2.5 M/5 M/10 M bps</td>
<td>125 k/250 k/500 k bps</td>
<td>9.6 k/19.2 k/45.4 k bps</td>
<td>9.6 kbps</td>
</tr>
<tr>
<td>Configuration file</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Communication speed</td>
<td>12 bit (4096 resolution)</td>
<td>12 bit (4096 resolution)</td>
<td>12 bit (4096 resolution)</td>
<td>10 bit (1024 resolution)</td>
</tr>
<tr>
<td>Fail safe</td>
<td>HOLD (Switch setting)</td>
<td>HOLD/CLEAR (Switch setting)</td>
<td>CLEAR</td>
<td>HOLD</td>
</tr>
<tr>
<td>Electric insulation</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Terminating resistor</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Note 1) Please refer to Figure 1 for the relationship between set pressure and input. Because the maximum set pressure differs for each pressure display, refer to back page 6.
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.
Note 4) When switch output is selected, select either NPN output or PNP output.
Note 5) Adjustment of numerical values such as the zero/span adjustment or preset input type is set based on the minimum units for pressure display (e.g. 0.01 to 0.05 MPa). Note that the unit cannot be changed.
Note 6) Value for the state with no over current circuit included. If an allowance is provided for an over current circuit,
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) For communication models, the maximum current consumption is 0.16 A or less.
Note 9) For communication models, add 20 g to the weight (100 g for the PROFIBUS DP).
Note 10) The ITV1000 series is a Grease-free specification (Wetted parts).

Figure 1. Input/output characteristics chart

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 back page 6.
Note 2) 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 back page 6.
Note 3) 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 back page 6.
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Note 10) 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 back page 6.
Combinations

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Symbol</th>
<th>ITV20</th>
<th>ITV30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set pressure max. 0.1 MPa</td>
<td>1</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Set pressure max. 0.5 MPa</td>
<td>3</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Set pressure max. 0.9 MPa</td>
<td>5</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Connection Rc 1/4</td>
<td>02</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Connection Rc 3/8</td>
<td>03</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Connection Rc 1/2</td>
<td>04</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Accessories (Option)/Part No.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flat bracket assembly</td>
<td>KT-ITV-F1</td>
</tr>
<tr>
<td></td>
<td>KT-ITV-F2</td>
</tr>
<tr>
<td>L-bracket assembly (including mounting screws)</td>
<td>KT-ITV-L1</td>
</tr>
<tr>
<td></td>
<td>KT-ITV-L2</td>
</tr>
<tr>
<td>Power cable connector</td>
<td></td>
</tr>
<tr>
<td>Straight type 3 m</td>
<td>P398020-500-3</td>
</tr>
<tr>
<td></td>
<td>P398020-501-3</td>
</tr>
<tr>
<td>Right angle type 3 m</td>
<td>P398020-504-3</td>
</tr>
<tr>
<td></td>
<td>P398020-505-3</td>
</tr>
<tr>
<td>Bus adapter (CC-Link model only)</td>
<td>EX9-ACY09-MU</td>
</tr>
</tbody>
</table>

Dimensions

Flat bracket

L-bracket

Accessibility

Made to Order
(Refer to pages 25 and 26 for details.)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Made to Order</th>
</tr>
</thead>
<tbody>
<tr>
<td>X81</td>
<td>☐</td>
</tr>
<tr>
<td>X156</td>
<td>☐</td>
</tr>
<tr>
<td>X93</td>
<td>☐</td>
</tr>
<tr>
<td>X102</td>
<td>☐</td>
</tr>
<tr>
<td>X321</td>
<td>☐</td>
</tr>
<tr>
<td>X224</td>
<td>☐</td>
</tr>
<tr>
<td>X322</td>
<td>☐</td>
</tr>
<tr>
<td>X25</td>
<td>☐</td>
</tr>
<tr>
<td>X323</td>
<td>☐</td>
</tr>
<tr>
<td>X68</td>
<td>☐</td>
</tr>
<tr>
<td>X154</td>
<td>☐</td>
</tr>
<tr>
<td>X26</td>
<td>☐</td>
</tr>
<tr>
<td>X153</td>
<td>☐</td>
</tr>
</tbody>
</table>

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

Series ITV1000/2000/3000
Working Principles

When the input signal rises, the air supply solenoid valve \( q \) turns ON, and the exhaust solenoid valve \( w \) turns OFF. Therefore, supply pressure passes through the air supply solenoid valve \( q \) and is applied to the pilot chamber \( e \). The pressure in the pilot chamber \( e \) increases and operates on the upper surface of the diaphragm \( r \). As a result, the air supply valve \( t \) linked to the diaphragm \( r \) opens, and a portion of the supply pressure becomes output pressure. This output pressure feeds back to the control circuit \( i \) via the pressure sensor \( u \). 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.
Series **ITV1000/2000/3000**

### Series ITV101

**Pressure characteristics**
- Set pressure: 0.05 MPa

**Flow characteristics**
- Supply pressure: 0.2 MPa

**Relief flow characteristics**
- Supply pressure: 0.2 MPa

### Series ITV201

**Pressure characteristics**
- Set pressure: 0.05 MPa

**Flow characteristics**
- Supply pressure: 0.2 MPa

**Relief flow characteristics**
- Supply pressure: 0.2 MPa

---

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

**Series ITV301**

### Linearity

- **Set pressure** (MPa):
  - 0.00
  - 0.05
  - 0.10
  - 0.15
  - 0.20
- **Input signal** (%F.S.):
  - 0
  - 25
  - 50
  - 75
  - 100

### Hysteresis

- **Output deviation factor** (%F.S.):
  - -1.0
  - -0.5
  - 0.0
  - 0.5
  - 1.0

### Repeatability

- **Output deviation factor** (%F.S.):
  - -1.0
  - -0.5
  - 0.0
  - 0.5
  - 1.0

### Pressure characteristics

- **Set pressure**: 0.05 MPa
- **Output deviation factor** (%F.S.):
  - -1.0
  - -0.5
  - 0.0
  - 0.5
  - 1.0
- **Supply pressure** (MPa):
  - 0.0
  - 0.1
  - 0.2
  - 0.3

### Flow characteristics

- **Set pressure**: 0.2 MPa
- **Flow rate** (l/min (ANR)):
  - 0.0
  - 100
  - 500
  - 1000
  - 2000
- **Output deviation factor** (%F.S.):
  - -1.0
  - -0.5
  - 0.0
  - 0.5
  - 1.0

### Relief flow characteristics

- **Supply pressure**: 0.2 MPa
- **Flow rate** (l/min (ANR)):
  - 0.0
  - 100
  - 500
  - 1000
  - 2000
- **Output deviation factor** (%F.S.):
  - -1.0
  - -0.5
  - 0.0
  - 0.5
  - 1.0

---

**Optional Notes and Remarks**

- Approved
- Approved

---

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Series ITV1000/2000/3000

Series ITV103

Linearity

Hysteresis

Repeatability

Pressure characteristics

Flow characteristics

Relief flow characteristics

Series ITV203

Linearity

Hysteresis

Repeatability

Pressure characteristics

Flow characteristics

Relief flow characteristics

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

**Series ITV303**

**Linearity**

Set pressure vs. Input signal (%F.S.)

**Hysteresis**

Output deviation factor (%F.S.) vs. Input signal (%F.S.)

**Repeatability**

Output deviation factor (%F.S.) vs. Repetition

**Pressure characteristics**
Set pressure: 0.2 MPa

**Flow characteristics**
Supply pressure: 0.7 MPa

**Relief flow characteristics**
Supply pressure: 0.7 MPa

Supply pressure: 0.7 MPa
Set pressure: 0.2 MPa

Set point

**Approved**

**Approved**
Series **ITV1000/2000/3000**

**Series ITV105**

### Linearity

- Supply pressure: 0.4 MPa

### Hysteresis

- Supply pressure: 1.0 MPa

### Repeatability

- Supply pressure: 1.0 MPa

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**Series ITV205**

### Linearity

- Supply pressure: 0.4 MPa

### Hysteresis

- Supply pressure: 1.0 MPa

### Repeatability

- Supply pressure: 1.0 MPa

---

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

**Series ITV305**

**Linearity**

- Set pressure: 0.4 MPa
- Supply pressure: 1.0 MPa

**Hysteresis**

- Output deviation factor (%F.S.)

**Pressure characteristics**

- Supply pressure: 0.4 MPa
- Set point

**Flow characteristics**

- Flow rate (l/min (ANR))

**Relief flow characteristics**

- Supply pressure: 1.0 MPa

**Repeatability**

- Output deviation factor (%F.S.)
- Repetition

**Set pressure (MPa)**

- Input signal (%F.S.)

---

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Series ITV1000/2000/3000

Dimensions

ITV10□□
Flat bracket

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

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

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

- Dimensions:
  - Solenoid valve
  - EXH

- SUP port, OUT port

- Setting part

- 4 x M4 x 0.7 thread depth 6 mm through

- M3 x 0.5
  - Solenoid valve
  - EXH

- M12 x 1
  - Connector (Plug type)

- 4 x ø7
  - Mounting holes

- L-bracket assembly
  - KT-ITV-L1 (Option)

- KT-ITV-F1 (Option)

- Approved

---

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Main Office: (650) 588-9200
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www.stevenengineering.com
Electro-Pneumatic Regulator  

title: Series ITV1000/2000/3000

dimensions (CC-Link, DeviceNet™, PROFINET DP and RS-232C)

CC-Link/ITV10□□□□-CC

DeviceNet™/ITV10□□□□-DN

PROFINET DP/ITV10□□□□-PR

RS-232C/ITV10□□□□-RC

with power cable connector = ITV10□□□□-□□ RC

common dimensions

Note: Order communication cable (other than RS-232C) separately. (Refer to page 5.)

straight type (4-wire) cable connector 3 m
	right angle type (4-wire) cable connector 3 m

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

Dimensions not shown are as on page 19.

Note) Order communication cable (other than RS-232C) separately. (Refer to page 9.)

Dimensions not shown are as on page 19.

Dimensions not shown are as on page 19.
**Series ITV1000/2000/3000**

**Dimensions**

**ITV20**

**Flat bracket**

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

**L-bracket**

- **M12 x 1 Connector (Plug type)**
- **M5 x 0.8 Solenoid valve EXH**
- **4 x M5 x 0.8 thread depth 6 mm through**
- **4 x ø7 Mounting hole**
- **2 x Rc 1/4, 3/8 SUP port, OUT port**
- **1.6 x 13.5 SUP (1)**
- **EXH (3)**
- **Solenoid valve EXH**
- **Flat bracket assembly KT-ITV-F2 (Option)**
- **L-bracket assembly KT-ITV-L2 (Option)**

---

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Dimensions (CC-Link, DeviceNet™, PROFIBUS DP and RS-232C)

**CC-Link/ITV20-0-CC**

- M12 x 1 Communication cable connection thread (Socket type)
- M12 x 1 Power cable connection thread (Plug type)
- M5 x 0.8 Solenoid valve EXH
- SUP (1) OUT (2)
- 2 x Rc 1/4, 3/8 SUP port, OUT port

**DeviceNet™/ITV20-0-DN**

- M12 x 1 Communication cable connection thread (Plug type)
- M12 x 1 Power cable connection thread (Plug type)
- M5 x 0.8 Solenoid valve EXH
- SUP (1) OUT (2)
- 2 x Rc 1/4, 3/8 SUP port, OUT port

**PROFIBUS DP/ITV20-0-PR**

- M12 x 1 Communication cable connection thread (Socket type)
- M12 x 1 Power cable connection thread (Plug type)
- M5 x 0.8 Solenoid valve EXH
- SUP (1) OUT (2)
- 2 x Rc 1/4, 3/8 SUP port, OUT port

**RS-232C/ITV20-0-RC**

- M12 x 1 Communication cable connection thread (Plug type)
- M12 x 1 Power cable connection thread (Plug type)
- M5 x 0.8 Solenoid valve EXH
- SUP (1) OUT (2)
- 2 x Rc 1/4, 3/8 SUP port, OUT port

With power cable connector - ITV20-0-RC common dimensions

- Dimensions not shown are as on page 21.
- Straight type (4-wire) Cable connector 3 m
- Right angle type (4-wire) Cable connector 3 m

---

Note) Order communication cable (other than RS-232C) separately. (Refer to page 9.)

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

**Dimensions**

**ITV30**

Flat bracket

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

![Diagram of ITV1000/2000/3000]

**L-bracket**

Solenoid valve EXH

M5 x 0.8

4 x M5 x 0.8 thread depth 3 mm through

SUP port, OUT port

L-bracket assembly KT-ITV-L2 (Option)

Approved

Approved

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-8200-Outside Local Area: (800) 258-8200-www.stevenengineering.com
**Dimensions (CC-Link, DeviceNet™, PROFIBUS DP and RS-232C)**

**CC-Link/TV30□-CC**
- M12 x 1 Communication cable connection thread (Plug type)
- M12 x 1 Power cable connection thread (Plug type)
- BUS adapter
- M5 x 0.8 Solenoid valve EXH
- SUP (1)
- OUT (2)
- 2 x Rc 1/4, 3/8, 1/4 SUP port, OUT port

**DeviceNet™/TV30□-DN**
- M12 x 1 Communication cable connection thread (Plug type)
- M12 x 1 Power cable connection thread (Plug type)
- SUP (1)
- OUT (2)
- 2 x Rc 1/4, 3/8, 1/4 SUP port, OUT port

**PROFIBUS DP/TV30□-PR**
- M12 x 1 Communication cable connection thread (Socket type)
- M12 x 1 Power cable connection thread (Plug type)
- SUP (1)
- OUT (2)
- 2 x Rc 1/4, 3/8, 1/4 SUP port, OUT port

**RS-232C/TV30□-RC**
- M12 x 1 Communication cable connection thread (Plug type)
- M12 x 1 Power cable connection thread (Plug type)
- SUP (1)
- OUT (2)
- 2 x Rc 1/4, 3/8, 1/4 SUP port, OUT port

**With power cable connector**
- TV30□-DN
- TV30□-RC
- common dimensions

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

**Dimensions not shown are as on page 23.**

---

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

---

*Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com*
Series ITV1000/2000/3000
Made to Order Specifications 1
Please contact SMC for detailed dimensions, specifications and lead times.

1 16 Points Preset Input Type
Able to control 16-point-pressure by 4 bit switching input

<table>
<thead>
<tr>
<th>Model</th>
<th>Setting</th>
<th>Digital Input Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITV10</td>
<td>0-4</td>
<td>X81</td>
</tr>
<tr>
<td>ITV20</td>
<td>0-4</td>
<td>X81</td>
</tr>
<tr>
<td>ITV30</td>
<td>0-4</td>
<td>X81</td>
</tr>
</tbody>
</table>

Note 1) [] in part number is the same model no. for the standard products.
Note 2) Monitor output is switch output type only. This cannot be selected for types without a monitor output or with analog output.
Note 3) Values can be adjusted starting from the minimum output pressure display units.

2 Digital Input Type
Parallel input type with digital 10 bit.

<table>
<thead>
<tr>
<th>Model</th>
<th>Setting</th>
<th>Digital Input Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITV10</td>
<td>0-4</td>
<td>X93</td>
</tr>
<tr>
<td>ITV20</td>
<td>0-4</td>
<td>X93</td>
</tr>
<tr>
<td>ITV30</td>
<td>0-4</td>
<td>X93</td>
</tr>
</tbody>
</table>

Note 1) [] in part number is the same model no. for the standard products.
Note 2) Right angle type cable connectors cannot be selected.

3 Reverse Type
In compliance with input, inverse proportional pressure is displayed.

<table>
<thead>
<tr>
<th>Model</th>
<th>Setting</th>
<th>Digital Input Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITV10</td>
<td>0-4</td>
<td>X102</td>
</tr>
<tr>
<td>ITV20</td>
<td>0-4</td>
<td>X102</td>
</tr>
<tr>
<td>ITV30</td>
<td>0-4</td>
<td>X102</td>
</tr>
</tbody>
</table>

Note 1) [] in part number is the same model no. for the standard products.
Note 2) Except for preset input type.

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

<table>
<thead>
<tr>
<th>Model</th>
<th>Setting</th>
<th>Digital Input Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITV10</td>
<td>5</td>
<td>X224</td>
</tr>
<tr>
<td>ITV20</td>
<td>5</td>
<td>X224</td>
</tr>
<tr>
<td>ITV30</td>
<td>5</td>
<td>X224</td>
</tr>
</tbody>
</table>

Note 1) [] in part number is the same model no. for the standard products.
Note 2) Except for preset input type.

5 Set Pressure Range 1 to 100 kPa

<table>
<thead>
<tr>
<th>Model</th>
<th>Setting</th>
<th>Digital Input Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITV10</td>
<td>1</td>
<td>X25</td>
</tr>
<tr>
<td>ITV20</td>
<td>1</td>
<td>X25</td>
</tr>
</tbody>
</table>

Note 1) [] in part number is the same model no. for the standard products.
Note 2) Except for preset input type.

MPa kgc/cm² bar psi kPa
0.01 0.01 0.01 0.1 1
> 150 psi type: 1 psi

Input/output characteristics chart

Note 1) [] in part number is the same model no. for the standard products.
Note 2) Monitor output is switch output type only. This cannot be selected for types without a monitor output or with analog output.
Note 3) Values can be adjusted starting from the minimum output pressure display units.

MPa kgf/cm² bar psi kPa
0.01 0.01 0.01 0.1 1
> 150 psi type: 1 psi

Made to Order Specifications 1
Series ITV1000/2000/3000
Please contact SMC for detailed dimensions, specifications and lead times.
**Series ITV1000/2000/3000**

**Made to Order Specifications 2**

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

### 6 High-Speed Response Time Type

Pressure response with no load is approx. 0.1 sec.

**ITV 2 0 1 0 - 0 1 2 S - X88**

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

- **Pressure range**
  - 1: 0.1 MPa
  - 2: 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

- **Thread type**
  - 0: Rc
  - 1: NPT
  - 2: NPTF
  - 3: G

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

- **Bracket**
  - 0: Without bracket
  - 1: Flat bracket
  - 2: L-bracket

- **Cable connector type**
  - 0: Straight type 3 m
  - 1: Right angle type 3 m
  - 2: Without cable connector

- **Pressure display unit**
  - 0: Not compliant
  - 1: Compliant

- **Symbol**
  - X88: CE-compliant

### 7 Manifold Specifications (Except Series ITV3000)

2 through 8 station manifold.

#### How to Order Manifolds

- **IITV20**
  - **02**
  - **05**

- **ITV1000, 2000**

- **OUT port size**
  - **02**: 1/4
  - **03**: 3/8

- **Connection thread type**
  - 0: Rc
  - 1: NPT
  - 2: NPTF

- **Notes**
  - Refer to the table below for possible mixed combination.
  - Note 1: Electro-pneumatic regulators are counted starting from station 1 on the left side with the OUT ports in front.
  - Note 2: The **#** symbol is for mounting. Add the **#** symbol at the beginning of part numbers for electro-pneumatic regulators, etc. to be mounted on the base.

#### How to Order Manifold Assemblies

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

- **Manifold base (3 stations)**
  - IITV20-02-3

##### Notes

- 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.
Compact Vacuum Regulator
Series ITV009

How to Order

For single unit and single unit for manifold

**ITV00 9 0**

- **Pressure range**
  - N: 0~100 kPa

- **Power supply voltage**
  - 0: 4 VDC ±10%
  - 1: 2 to 15 VDC

- **Input signal**
  - 0: Current type 4 to 20 mA DC
  - 1: Current type 0 to 20 mA DC
  - 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)
    - U: Inch size (Orange)
  - For manifold:
    - Nil: Metric size (Light gray)
    - U: Inch size (Orange)

- **CE compliant**
  - Nil: Non-compliant
  - Q: CE compliant

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

- **Bracket/Option for single unit only**
  - Nil: Without bracket
  - B: Bracket
  - C: L-bracket

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

**Manifold**

**IITV00**

- **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.

- **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 and options 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.

**ITV0090-3MS**

- 2 sets (Vacuum regulator part no. (1, 2 stations))
- 1 set (Vacuum regulator part no. (3 stations))

Indicate part numbers in order starting from the first station on the D side.

The asterisk (*) specifies mounting. Add an asterisk (*) at the beginning of electro-pneumatic regulator part numbers to be mounted.
Compact Vacuum Regulator  **Series ITV009**

### Specifications

| Model | ITV009:  
|---|---|
| Minimum supply pressure | Set pressure: -1 kPa  
| Maximum supply pressure | -101 kPa  
| Set pressure range | -1 to -100 kPa  
| Maximum flow rate | 2 l/min (ANR)  
| (Supply pressure: -101 kPa) | 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  
| Input impedance | Voltage type | Approximately 10 kΩ  
| | Current type | Approximately 250 Ω  
| Output signal | Analog output | 1 to 5 VDC (Load impedance: 1 kΩ or more)  
| | | Output accuracy: Within ±6% (Full span)  
| Linearity | Within ±1% (Full span)  
| Hysteresis | Within ±0.5% (Full span)  
| Repeatability | Within ±2% (Full span)  
| Sensitivity | Temperature characteristics | Within ±10.12% (Full span)/°C  
| Operating temperature range | 0 to 50°C (No condensation)  
| Enclosure | IP65 equivalent  
| Connection type | Built-in One-touch fittings  
| Connection size | For single unit | Metric size: 1", 2", 3", ø4  
| | | Inch size: 1", 2", 3", ø6/32"  
| | Manifold | Metric size: 1", 2", 3", ø4  
| | | Inch size: 1", 3", ø1/4", 2", ø6/32"  
| 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.  
× 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 back page 2)

### Accessories (Option)

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

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

Tightening torque when assembling is 0.3 N m.

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

- Right angle type  
ELWIIA-KV4408 PVC025 2M

Approved

Approved

---

For details, refer to "Specific Product Precautions 1" on back page 2.

| Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com |
**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.

---

**Diagram of working principle**

---

**Block diagram**
Compact Vacuum Regulator Series ITV009

Series ITV009

Linearity, Hysteresis

Repeatability

Pressure Characteristics

Flow Characteristics

Flow rate (l/min (ANR))

Set pressure (kPa)

Set pressure: –10 kPa

Supply pressure (kPa)

Output deviation factor (% F.S.)

Input signal (% F.S.)

Output deviation factor (% F.S.)

Count

Output deviation factor (% F.S.)

With 50% of signal input

Approved

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Series ITV009

Dimensions

For Single Unit

Port Location

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

Note: When using under the conditions equivalent to IP65, connect the fittings or tube to the breathing hole prior to use. (For details, refer to "Specific Product Precautions 1" on back page 2.)

Minimum bending radius 80 +50
Compact Vacuum Regulator Series ITV009

Dimensions

Single unit for manifold

Note) For dimensions of the cable connector, refer to single unit on page 31.

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 back page 2)
Series ITV009

Dimensions

Manifold

Port Location

Note) Stations are counted starting from the D side.

<table>
<thead>
<tr>
<th>No.</th>
<th>I</th>
<th>T</th>
<th>V</th>
<th>O</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITV009</td>
<td>VAC</td>
<td>OUT</td>
<td>ATM</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dimensions in inch are noted in parentheses.

- : VAC port (ø 4, ø 5/32")
- : ATM port (ø 6, ø 1/4")
- : OUT port (ø 4, ø 5/32")

Note) For dimensions of the cable connector, refer to single unit on page 31.

<table>
<thead>
<tr>
<th>Manifold stations</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 back page 2)
## Electronic Vacuum Regulator
### Series ITV2090/2091

#### How to Order

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

<table>
<thead>
<tr>
<th>Pressure range</th>
<th>Power supply voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>24 VDC</td>
</tr>
<tr>
<td>1</td>
<td>12 to 16 VDC</td>
</tr>
</tbody>
</table>

#### Input signal/Communication model

<table>
<thead>
<tr>
<th>Communication model</th>
<th>Monitor output</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1: Analog output 1 to 5 VDC</td>
</tr>
<tr>
<td>1</td>
<td>2: Switch output/NPN output</td>
</tr>
<tr>
<td>2</td>
<td>3: Switch output/PNP output</td>
</tr>
<tr>
<td>3</td>
<td>4: Analog output 4 to 20 mA DC (Sink type)</td>
</tr>
</tbody>
</table>

#### Output signal/Monitor output

<table>
<thead>
<tr>
<th>Monitor output</th>
<th>Pressure display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nil</td>
<td>CE compliant</td>
</tr>
</tbody>
</table>

#### Communication models available

- CC-Link
- DeviceNet™
- PROFIBUS DP
- RS-232C communication

#### Note:
- For the communication models, CC, DN, PR and RC, only “Nil” is available as it does not have a pressure display.
- Order communication cable (other than RS-232C) separately. See below.

#### Cable connector type

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

#### Bracket

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

#### Thread type

- Nil: Rc
- N: NPT
- T: NPTF
- F: G

#### Remarks

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

#### Remarks

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

#### Application

<table>
<thead>
<tr>
<th>Application</th>
<th>Communication cable part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC-Link compatibility</td>
<td>PCA-1567720 (Socket type)</td>
</tr>
<tr>
<td>DeviceNet™ compatibility</td>
<td>PCA-1557633 (Socket type)</td>
</tr>
<tr>
<td>PROFIBUS DP compatibility</td>
<td>PCA-1557688 (Socket type)</td>
</tr>
</tbody>
</table>

### Notes

- For communications cables, use the parts listed below (refer to the catalog [M8/M12 Connector] CAT.ES100-73 for details) or order the product certified for the respective protocol (with M12 connector) separately.

---

For communications cables, use the parts listed below (refer to the catalog [M8/M12 Connector] CAT.ES100-73 for details) or order the product certified for the respective protocol (with M12 connector) separately.
**Series ITV2090/2091**

**Stepless control of vacuum pressure in proportion to an electrical signal**

**Piping/Wiring Diagram**

- Power supply and input signal (VDC, mA DC)
- Vacuum pump, Ejector

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

<table>
<thead>
<tr>
<th>Model</th>
<th>ITV-00-0-CC</th>
<th>ITV-00-0-DN</th>
<th>ITV-00-0-PR</th>
<th>ITV-00-0-RC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protocol</td>
<td>CC-Link</td>
<td>DeviceNet™</td>
<td>PROFIBUS DP</td>
<td>RS-232C</td>
</tr>
<tr>
<td>Version</td>
<td>Ver 1.10</td>
<td>Release2.0</td>
<td>DP-V0</td>
<td>—</td>
</tr>
<tr>
<td>Communication speed</td>
<td>156 k/625 k</td>
<td>125 k/250 k/500 k bps</td>
<td>9.6 k/19.2 k/45.4 k bps</td>
<td>9.6 kbps</td>
</tr>
<tr>
<td>Configuration file</td>
<td>—</td>
<td>EDS</td>
<td>—</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>
<td>16 bit/16 bit</td>
<td>—</td>
</tr>
<tr>
<td>Communication data rate</td>
<td>12 bit (4096 resolution)</td>
<td>12 bit (4096 resolution)</td>
<td>12 bit (1024 resolution)</td>
<td>—</td>
</tr>
<tr>
<td>Fail safe</td>
<td>HOLD/CLEAR</td>
<td>HOLD/CLEAR</td>
<td>CLEAR</td>
<td>HOLD</td>
</tr>
<tr>
<td>Terminating resistor</td>
<td>—</td>
<td>—</td>
<td>Built into the product</td>
<td>—</td>
</tr>
</tbody>
</table>

Note 1) The minimum 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. An allowance is provided for an over current circuit. The input impedance varies depending on the input power supply. This is 350 Ω 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 or PNP output must also be selected. Use caution that the preset input type is not equipped with an output signal function.

Note 5) Please contact SMC regarding indication with other units of pressure.

Note 6) For communication models, the maximum current consumption is 0.16 A or less.

Note 7) For communication models, add roughly 80 g to the weight (100 g for the PROFIBUS DP).

**Standard Specifications**

<table>
<thead>
<tr>
<th>Model</th>
<th>ITV2090</th>
<th>ITV2091</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>24 VDC ±1%</td>
<td>12 to 15 VDC</td>
</tr>
<tr>
<td>Current consumption</td>
<td>Power supply voltage 24 VDC type: 0.12 A or less</td>
<td>Power supply voltage 12 to 15 VDC type: 0.18 A or less</td>
</tr>
<tr>
<td>Minimum supply vacuum pressure</td>
<td>Set pressure: -13.3 kPa</td>
<td></td>
</tr>
<tr>
<td>Maximum supply vacuum pressure</td>
<td>-101 kPa</td>
<td></td>
</tr>
<tr>
<td>Input signal</td>
<td>Current type</td>
<td>4 to 20 mA DC, 0 to 20 mA DC</td>
</tr>
<tr>
<td></td>
<td>Voltage type</td>
<td>0 to 5 VDC, 0 to 10 VDC</td>
</tr>
<tr>
<td></td>
<td>Preset input</td>
<td>4 points (Negative)</td>
</tr>
<tr>
<td>Input impedance</td>
<td>Current type</td>
<td>250 Ω or less</td>
</tr>
<tr>
<td></td>
<td>Voltage type</td>
<td>Approximately 6.5 kΩ</td>
</tr>
<tr>
<td></td>
<td>Preset input</td>
<td>Power supply voltage 24 VDC type: Approximately 4.7 kΩ</td>
</tr>
<tr>
<td>Output signal (Monitor output)</td>
<td>Analog output</td>
<td>1 to 5 VDC (Load impedance: 1 kΩ or more)</td>
</tr>
<tr>
<td></td>
<td>Switch output</td>
<td>NPN open collector output: Max. 30 V, 80 mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PNP open collector output: Max. 80 mA</td>
</tr>
<tr>
<td>Linearity</td>
<td>Within ±1% (Full span)</td>
<td></td>
</tr>
<tr>
<td>Hysteresis</td>
<td>Within 0.5% (Full span)</td>
<td></td>
</tr>
<tr>
<td>Repeatability</td>
<td>Within ±0.5% (Full span)</td>
<td></td>
</tr>
<tr>
<td>Sensitivity</td>
<td>Within ±5% (Full span)</td>
<td></td>
</tr>
<tr>
<td>Temperature characteristics</td>
<td>Within ±1.12% (Full span)/°C</td>
<td></td>
</tr>
<tr>
<td>Output pressure display</td>
<td>Accuracy</td>
<td>±2%FS, 1 digit</td>
</tr>
<tr>
<td></td>
<td>Units</td>
<td>kPa ±1% ±1%</td>
</tr>
<tr>
<td></td>
<td>Minimum display: 1</td>
<td></td>
</tr>
<tr>
<td>Ambient and fluid temperature</td>
<td>0 to 50°C (No condensation)</td>
<td></td>
</tr>
<tr>
<td>Enclosure</td>
<td>IP66</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>350 g</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 SMC’s website: http://www.smcworld.com

Note 3) The output HOLD value when a CC-Link communications error occurs can be set based on the bit area data.

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Working Principle

When the input signal increases, the vacuum pressure solenoid valve \( q \) turns ON, and the atmospheric pressure solenoid valve \( w \) turns OFF. Because of this, VAC. and the pilot chamber \( e \) are connected, the pressure in the pilot chamber \( e \) becomes negative and acts on the top of the diaphragm \( r \). As a result, the vacuum pressure valve \( t \) which is linked to the diaphragm \( r \) opens, VAC. and OUT. are connected, and the set pressure becomes negative. This negative pressure feeds back to the control circuit \( i \) via the pressure sensor \( u \). 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.

Block Diagram

Series ITV209

Linearity

Hysteresis

Repeatability

Pressure Characteristics

Flow Characteristics

Flow characteristics

measurement conditions

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

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Series ITV209

Dimensions

ITV209

Flat bracket

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

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

Straight type (4-wire)
Cable connector 3 m

M12 x 1
Connector (Plug type)

M5 x 0.8
Breathing hole

ATM.
(Atmospheric pressure)

OUT
(Set pressure)

Flat bracket assembly
KT-ITV-F2
(Option)

2 x Rc 1/4
ATM. port, OUT port

VAC. port
(Vacuum pressure)

4 x M5 x 0.8 thread depth 6 mm through

L-bracket

L-bracket assembly
KT-ITV-L2
(Option)

Approved

Approved

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Dimensions (CC-Link, DeviceNet™, PROFIBUS DP and RS-232C)

CC-Link/ITV2090-CC

- Dimensions not shown are as on page 37.

PROFIBUS DP/ITV2090-PR

- Dimensions not shown are as on page 37.

DeviceNet™/ITV2090-DN

- Dimensions not shown are as on page 37.

RS-232C/ITV2090-RC

- Dimensions not shown are as on page 37.

With power cable connector

- ITV2090- common dimensions

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

### Accessories (Option)/Part No.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flat bracket assembly</td>
<td>KT-ITV-F2</td>
</tr>
<tr>
<td>L-bracket assembly</td>
<td>KT-ITV-L2</td>
</tr>
<tr>
<td>Power cable connector</td>
<td></td>
</tr>
<tr>
<td>Straight type 3 m</td>
<td>P398020-500-3</td>
</tr>
<tr>
<td>Right angle type 3 m</td>
<td>P398020-501-3</td>
</tr>
<tr>
<td>Bus adapter (CC-Link model only)</td>
<td>EX9-ACY00-MJ</td>
</tr>
</tbody>
</table>

### Dimensions

**Flat bracket**

- 4 x ø7
- 8 x ø4.5
- 4 x ø5.5
- 60
- 25

**L-bracket**

- 100
- 8 x ø4.5
- 4 x ø5.5
- 32
- 22
- 40
- 84

---

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Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of "Caution," "Warning" or "Danger." They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)\(^1\), and other safety regulations.

Caution:  
Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

Warning:  
Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

Danger:  
Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

Safety Instructions

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

2. Only personnel with appropriate training should operate machinery and equipment.
   
   The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.
   
   Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

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

Caution

1. The product is provided for use in manufacturing industries.
   
   The product herein described is basically provided for peaceful use in manufacturing industries.

2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.

3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

Limited warranty and Disclaimer/Compliance Requirements

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

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered.\(^2\)
   
   Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.

3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

Compensation and Disclaimer

1. A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.\(^2\)
   
   A vacuum pad is a consumable part, so it is warranted for a year after it is delivered. Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.

2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.
### Series ITV0000/1000/2000/3000

#### Specific Product Precautions 1

Be sure to read before handling. Refer to back page 1 for Safety Instructions, “Handling Precautions for SMC Products” (M-E03-3) for Common Precautions.

---

### Air Supply

**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.

#### Wiring Diagrams

- **Current signal type**
  - Vs: Power Supply 24 VDC ±10% 12 to 15 VDC
  - A: Input signals 4 to 20 mA DC 0 to 20 mA DC

- **Voltage signal type**
  - Vs: Power Supply 24 VDC ±10% 12 to 15 VDC
  - Vin: Input signals 0 to 5 VDC 0 to 10 VDC

**Monitor output wiring diagram**

- **Analog output, voltage type**
  - Brown
  - Blue
  - White
  - Black

---

### Handling

**Caution**

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

However, this output pressure is held only temporarily and is not guaranteed. If exhausting of this pressure is desired, shut off the power after reducing the set pressure, and discharge the air using a residual pressure exhaust valve, etc.
3. If power to this product is cut off due to a power failure, etc., when it is in a controlled state, output pressure will be retained temporarily. Handle carefully when operating with output pressure released to the atmosphere, as air will continue to flow out.
4. If supply pressure to this product is interrupted while the power is still on, the internal solenoid valve will continue to operate and a humming noise may be generated.

Since the life of the product may be shortened, shut off the power supply also when supply pressure is shut off.
5. This product is adjusted for each specification at the time of shipment from the factory. Avoid careless disassembly or removal of parts, as this can lead to malfunction.
6. The optional cable connector is a 4 wire type. When the monitor output (analog output or switch output) is not being used, keep it from touching the other wires as this can cause malfunction.
7. Please note that the right angle cable does not rotate and is limited to only one entry direction.
8. Take the following steps to avoid malfunction due to noise.
   - 1) Remove power supply noise during operation by installing a line filter, etc. in the AC power line.
   - 2) For avoiding the influence of noise or static electricity, install this product and its wiring as far as possible from strong electric fields such as those of motors and power lines, etc.
   - 3) Be sure to implement protective measures against load surge for induction loads (solenoid valves, relays, etc.).
9. The product characteristics are confined to the static state. When air is consumed on the output side, and especially used in the system with large leakage, pressure cannot approach the set pressure and the service life is drastically shortened with a humming noise of the solenoid valve.
10. For details on the handling of this product, refer to the instruction 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 T3051m-nm tube recommended) onto the breathing hole and run the tube to a location not exposed to moisture or dust, etc.
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.

Back page 2
Specific Product Precautions 2

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

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

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

**Caution**
1. Preparation before piping
   Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.

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

<table>
<thead>
<tr>
<th>Connection thread</th>
<th>1/8</th>
<th>1/4</th>
<th>3/8</th>
<th>1/2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque</td>
<td>7 to 9</td>
<td>12 to 14</td>
<td>22 to 24</td>
<td>28 to 30</td>
</tr>
</tbody>
</table>

**Operating Environment**

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

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

**Air Supply**

**Warning**
1. Employ suitable protective measures in locations where there is contact with water droplets, oil or welding spatter, etc.
2. Consult with SMC when used in power plants, or if instrumentation related.

**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”.

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### Specific Product Precautions 3

**Series ITV0000/1000/2000/3000**

Be sure to read before handling. Refer to back page 1 for Safety Instructions, “Handling Precautions for SMC Products” (M-E03-3) for Common Precautions.

#### Series ITV1000/2000/3000/209 Precautions

<table>
<thead>
<tr>
<th>Handle</th>
<th>Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caution</td>
<td>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.</td>
</tr>
<tr>
<td>Caution</td>
<td>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.</td>
</tr>
<tr>
<td>Caution</td>
<td>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.</td>
</tr>
<tr>
<td>Caution</td>
<td>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.</td>
</tr>
<tr>
<td>Caution</td>
<td>5. In this product, the output side pressure cannot be completely relieved within the range of 0.005 MPa or less. If it is desired to reduce the pressure completely to 0 MPa, install a 3 way valve or other device on the output side to exhaust the pressure.</td>
</tr>
<tr>
<td>Caution</td>
<td>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.</td>
</tr>
<tr>
<td>Caution</td>
<td>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.</td>
</tr>
<tr>
<td>Caution</td>
<td>8. Please note that the right angle cable does not rotate and is limited to only one entry direction.</td>
</tr>
<tr>
<td>Caution</td>
<td>9. Take the following steps to avoid malfunction due to noise.</td>
</tr>
<tr>
<td>Caution</td>
<td>10. 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 Series AN200 or AN400) on the exhaust port (EXH port). The port sizes are Rc 1/8, Rc 1/4 and Rc 1/2.</td>
</tr>
<tr>
<td>Caution</td>
<td>11. Specifications on page 10 is in case of static environment. Pressure may fluctuate when air is consumed at the output side.</td>
</tr>
<tr>
<td>Caution</td>
<td>12. For details on the handling of this product, refer to the instruction manual which is included with the product.</td>
</tr>
</tbody>
</table>

#### Design and Selection

<table>
<thead>
<tr>
<th>Design and Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caution</td>
</tr>
<tr>
<td>Caution</td>
</tr>
<tr>
<td>Caution</td>
</tr>
<tr>
<td>Caution</td>
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<tr>
<td>Caution</td>
</tr>
<tr>
<td>Caution</td>
</tr>
<tr>
<td>Caution</td>
</tr>
</tbody>
</table>

![Diagram](image)

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Specific Product Precautions 4

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

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

#### Note)

**Body**

**Wiring diagram**

**Current signal type**

- Analog output: Voltage type
- Switch output: NPN type
- Switch output: PNP type

**Vs**

**Vin**

**A**

: Input signal 4 to 20 mA DC

**Monitor output**

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

#### Preset input type

- **S1**
- **S2**

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

- For safety reasons, it is recommended that one of the preset pressures be set to 0 MPa.
- Preset pressures are set based on the minimum unit for output display.

<table>
<thead>
<tr>
<th>Pressure (MPa)</th>
<th>0.001</th>
<th>0.01</th>
<th>0.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>bar</td>
<td>0.01</td>
<td>0.1</td>
<td>1</td>
</tr>
<tr>
<td>psi</td>
<td>0.1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>kPa</td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

#### Monitor output wiring diagram

**Analogue output: Voltage type**

**Analogue output: Current type (Sink type)**

**Switch output: NPN type**

**Switch output: PNP type**

- When 80 mA DC or more is applied, detecting device for overcurrent starts activating and then emits an error signal. (Error number 5)
Series ITV0000/1000/2000/3000
Specific Product Precautions

Set Pressure Range

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

<table>
<thead>
<tr>
<th>Unit</th>
<th>ITV0000</th>
<th>ITV0001</th>
<th>ITV0002</th>
<th>ITV0003</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPa</td>
<td>0.005 to 0.1</td>
<td>0.005 to 0.5</td>
<td>0.005 to 0.9</td>
<td>—</td>
</tr>
<tr>
<td>kgf/cm²</td>
<td>0.05 to 1</td>
<td>0.05 to 5</td>
<td>0.05 to 9</td>
<td>—</td>
</tr>
<tr>
<td>bar</td>
<td>0.05 to 1</td>
<td>0.05 to 5</td>
<td>0.05 to 9</td>
<td>—</td>
</tr>
<tr>
<td>psi</td>
<td>0.7 to 15</td>
<td>0.7 to 70</td>
<td>0.7 to 130</td>
<td>—</td>
</tr>
<tr>
<td>kPa</td>
<td>5 to 100</td>
<td>5 to 500</td>
<td>5 to 900</td>
<td>1.3 to 50</td>
</tr>
</tbody>
</table>

CE Marking

When using the power supply cable for the CE compliant product (including Made to Order), mount the ferrite core on the cable according to the following “Ferrite core necessity”.

• Series ITV0000

<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) ELWKA-KV4408 PVC025 2M (Right angle type)</td>
</tr>
</tbody>
</table>

• Series ITV1000/2000/3000

<table>
<thead>
<tr>
<th>Model</th>
<th>Ferrite core necessity</th>
<th>Recommended power supply cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITV209-Q</td>
<td>Necessary</td>
<td>P398010-12 (Straight type) P398010-13 (Right angle type)</td>
</tr>
<tr>
<td>ITV209-Q</td>
<td>Necessary</td>
<td>P398020-500-3 (Straight type) P398020-501-3 (Right angle type)</td>
</tr>
<tr>
<td>ITV209-Q</td>
<td>Necessary</td>
<td>P398020-504-3 (Straight type) P398020-505-3 (Right angle type)</td>
</tr>
<tr>
<td>ITV209-Q</td>
<td>Necessary</td>
<td>P398020-500-3 (Straight type) P398020-501-3 (Right angle type)</td>
</tr>
</tbody>
</table>

Note) Recommended power supply cable length is 3 m. (ELWKA-KV4408 PVC025 2M is 2 m.) If any other length is desired, please consult with SMC.
Series ITV0000/1000/2000/3000
Specific Product Precautions 6

Be sure to read before handling. Refer to back page 1 for Safety Instructions, “Handling Precautions for SMC Products” (M-E03-3) for Common Precautions.

Caution

1. Connect the vacuum pump to the port, which is labeled “VAC”.

2. Pressure adjustment changes from “atmospheric pressure to vacuum pressure” when the input signal is increased, and from “vacuum pressure to atmospheric pressure” when the input signal is decreased.

3. When adjusting the vacuum pressure, be careful not to block the atmospheric pressure inlet port labeled “ATM”.

4. Since this product is designed exclusively for use with negative pressure, be careful not to apply positive pressure in error.

5. In cases where the vacuum pump being used has a relatively small capacity, or the piping has a small inside diameter, etc., large variations in the set pressure (the range of pressure variation when changing from no flow to flow state) may appear. In this situation, the vacuum pump or the piping, etc. should be changed. In cases where it is not practical to change the vacuum pump, install a capacity tank (volume depending on the operating conditions) on the VAC side.

6. The vacuum pressure response time after a change in the input signal is influenced by the internal volume on the setting side (including piping). Since the capacity of the vacuum pump also influences the response time, give careful consideration to these points before operation.

7. If the electric power is shut off when in a control state, the pressure on the setting side will go into a holding condition. However, this setting side pressure will be held only temporarily and is not guaranteed. In addition, when atmospheric pressure is desired, shut off the power after reducing the set pressure, and then introduce atmospheric pressure by using a vacuum release valve, etc.

8. If the power for this product is cut off by a power failure, etc., when it is in a controlled state, the setting side pressure will be held temporarily. Further, if operated without sealing the setting side so that atmospheric air is sucked in, handle with care as air will continue to be sucked in.

9. If the VAC side pressure to this product is interrupted while the power is still on, the internal solenoid valve will continue to operate and may cause a humming noise. Since this may shorten the life of the product, be sure to shut off the power when the VAC side pressure is shut off.

10. The setting side pressure cannot be completely released from this product in the range below –1.3 kPa. In cases where the pressure needs to be reduced completely to 0 kPa, install a 3 port valve, etc. on the setting side to discharge the residual pressure.

11. This product is adjusted for each specification at the factory before shipment. Avoid careless disassembly or removal of parts, as this can cause failure.

12. The optional cable connector is a 4-wire 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. Use caution that the right angle cable does not rotate and is limited to only one entry direction.

14. Take the following steps to avoid malfunction due to noise.
   1) Eliminate 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) Make sure to take protective measures against load surge for an induction load (solenoid valves, relays, etc.).

15. Refer to the instruction manual included with the product for details on its handling.

Back page 7
Revision history

Edition B
- Addition of Series ITV1000.
- Number of pages from 16 to 20.

Edition C
- Addition of Series ITV0000/009.
- Addition of Fieldbus-compatible specifications CC-Link, DeviceNet™ and PROFINET®.
- Addition of RS-232C serial communication specification.
- Addition of CE [option] and UL.
- Number of pages from 20 to 52.

Edition D
- Change of enclosure for Series ITV209 to conform to IP65.

Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.

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D-DN 1st printing HX printing QZ 12450SZ Printed in Japan

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