## Electro-pneumatic Regulator

**ITV1000/2000/3000**

### 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>0.2 MPa</td>
<td>0.2 MPa</td>
<td>0.2 MPa</td>
</tr>
<tr>
<td>Maximum supply pressure</td>
<td>1.0 MPa</td>
<td>1.0 MPa</td>
<td>1.0 MPa</td>
</tr>
<tr>
<td>Set pressure range (Note 1)</td>
<td>0.005 to 0.1 MPa</td>
<td>0.005 to 0.5 MPa</td>
<td>0.005 to 0.9 MPa</td>
</tr>
</tbody>
</table>

### Power supply

- 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

- Current type (Note 2): 4 to 20 mA, 0 to 20 mA (Sink type)
- Voltage type: 0 to 5 VDC, 0 to 10 VDC
- Preset input: 4 points

### Input impedance

- Current type: 250 Ω or less
- Voltage type: Approx. 6.5 kΩ
- Preset input: Approx. 2.7 kΩ

### Output signal (monitor output)

- Analog output: 1 to 5 VDC (Load impedance: 1 kΩ or more)
- Switch output: 4 to 20 mA (Sink type) (Load impedance: 250 Ω or less)

### Output pressure display

- Accuracy: ±3% (full span)
- Minimum unit: MPa: 0.01, kgf/cm²: 0.01, bar: 0.01, PSI: 0.1, kPa: 1

### Ambient and fluid temperature

- Temperature: 0 to 50°C (with no condensation)

### Enclosure

- Weight: ITV101 Approx. 250 g (without options)
- Weight: ITV103 Approx. 350 g (without options)
- Weight: ITV105 Approx. 480 g (without options)

### Electro-pneumatic Regulator

**ITV1000/2000/3000**

1. **Rated pressure**: 0.005 MPa to 1 MPa
2. **Set pressure range (Note 1)**: 0.005 to 0.1 MPa, 0.005 to 0.5 MPa, 0.005 to 0.9 MPa
3. **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
4. **Input signal**: Current type (Note 2): 4 to 20 mA, 0 to 20 mA (Sink type), Voltage type: 0 to 5 VDC, 0 to 10 VDC, Preset input: 4 points
5. **Input impedance**: Current type: 250 Ω or less, Voltage type: Approx. 6.5 kΩ, Preset input: Approx. 2.7 kΩ
6. **Output signal (monitor output)**: Analog output: 1 to 5 VDC (Load impedance: 1 kΩ or more), Switch output: 4 to 20 mA (Sink type) (Load impedance: 250 Ω or less)
7. **Output pressure display**: Accuracy: ±3% (full span), Minimum unit: MPa: 0.01, kgf/cm²: 0.01, bar: 0.01, PSI: 0.1, kPa: 1
8. **Ambient and fluid temperature**: Temperature: 0 to 50°C (with no condensation)
9. **Enclosure**: Weight: ITV101 Approx. 250 g (without options), Weight: ITV103 Approx. 350 g (without options), Weight: ITV105 Approx. 480 g (without options)

### How to Order

- **Model**: ITV 3 0 1 0 0 1 2 S Q
- **Pressure range**: Current 4 to 20 mA (Sink type), Current 0 to 20 mA (Sink type), Voltage 0 to 5 VDC, Voltage 0 to 10 VDC
- **Input signal**: Current 0 to 20 mA (Sink type), Voltage 0 to 5 VDC
- **Monitor output**: Current 0 to 20 mA (Sink type), Voltage 0 to 10 VDC
- **Thread type**: Port size: 1/8 (1000 type), 1/4 (1000, 2000, 3000 type), 3/8 (2000, 3000 type), 1/2 (3000 type)
- **Bracket**: Without bracket, Flat bracket, L-bracket
### 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>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**

- Bracket B ☐
- Bracket C ☐
- Connection NPT1/4 N02 ☐
- Connection NPT3/8 N03 ☐
- Connection NPT1/2 N04 ☐
- Connection G 1/4 F02 ☐
- Connection G 3/8 F03 ☐
- Connection G 1/2 F04 ☐

**Optional specifications**

- L-bracket [ITV20]: ☐
- Spacer ☐
- Spacer with L-bracket (3 + 4) ☐

### Modular Products and Accessory Combinations

<table>
<thead>
<tr>
<th>Applicable products and accessories</th>
<th>ITV20</th>
<th>ITV30</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Air filter</td>
<td>AF30</td>
<td>AF40</td>
</tr>
<tr>
<td>2. Mist separator</td>
<td>AFM30</td>
<td>AFM40</td>
</tr>
<tr>
<td>3. L-bracket</td>
<td>B310L</td>
<td>B410L</td>
</tr>
<tr>
<td>4. Spacer</td>
<td>Y30</td>
<td>Y40</td>
</tr>
<tr>
<td>5. Spacer with L-bracket (3 + 4)</td>
<td>Y30L</td>
<td>Y40L</td>
</tr>
</tbody>
</table>

### Accessory (Option)/Part No.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part no.</th>
<th>ITV10</th>
<th>ITV20</th>
<th>ITV30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flat bracket</td>
<td>P3020114</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Mounting thread is not included.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L-bracket</td>
<td>INI-398-0-6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Mounting thread is not included.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Straight type 3 m</td>
<td>TM-4DSX3HG4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right angle type 3 m</td>
<td>TM-4DLX3HG4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Dimensions

**Flat bracket**

- 100
- 50
- 4 x ø7
- 8 x ø4.5
- 4 x ø5.5
- 36
- 40
- 84

**L-bracket**

- 50
- 40
- 36
- 40
- 8 x ø4.5
- 4 x ø5.5
- 23
When the input signal rises, the air supply solenoid valve ① turns ON, and the exhaust solenoid valve ② turns OFF. Therefore, supply pressure passes through the air supply solenoid valve ① and is applied to the pilot chamber ③. The pressure in the pilot chamber ③ increases and operates on the upper surface of the diaphragm ④. As a result, the air supply valve ⑤ linked to the diaphragm ④ opens, and a portion of the supply pressure becomes output pressure. This output pressure feeds back to the control circuit ⑧ via the pressure sensor ⑦. Here, a correct operation functions until the output pressure is proportional to the input signal, making it possible to always obtain output pressure proportional to the input signal.

**Working Principle Diagram**

[Labeled diagram showing the working principle of the ITV1000/2000/3000 Series with labels for Input signal, Output signal, Control circuit, Air supply solenoid valve, Exhaust solenoid valve, Diaphragm, Pilot chamber, Supply valve, Pressure sensor, Power supply, and Output signal]

**Block diagram**

[Labeled diagram showing the block diagram with labels for Input signal, Output pressure, Control circuit, Air supply solenoid valve, Exhaust solenoid valve, Diaphragm, Pilot valve, and Pressure sensor]
Electro-pneumatic Regulator Series ITV1000/2000/3000

Series ITV101

**Linearity**

Set pressure: 0.05 MPa

**Hysteresis**

Set pressure: 0.05 MPa

**Repeatability**

Supply pressure: 0.2 MPa

Pressure Characteristics

Set pressure: 0.05 MPa

Flow Characteristics

Supply pressure: 0.2 MPa

Relief Flow Characteristics

Supply pressure: 0.2 MPa

Series ITV201

**Linearity**

Set pressure: 0.05 MPa

**Hysteresis**

Set pressure: 0.05 MPa

**Repeatability**

Supply pressure: 0.2 MPa

Pressure Characteristics

Set pressure: 0.05 MPa

Flow Characteristics

Supply pressure: 0.2 MPa

Relief Flow Characteristics

Supply pressure: 0.2 MPa
**Series ITV1000/2000/3000**

**Series ITV301**

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

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

**Relief Flow Characteristics**
- Supply pressure: 0.2 MPa

### Linearity
- Graph showing linearity with input signal (% F.S.) vs. set pressure (MPa)

### Hysteresis
- Graph showing hysteresis with input signal (% F.S.) vs. output deviation factor (% F.S.)

### Repeatability
- Graph showing repeatability with repetition vs. output deviation factor (% F.S.)
Series ITV103

**Linearity**

- **Set pressure:** 0.2 MPa
- **Supply pressure:** 0.7 MPa

**Pressure Characteristics**

- **Set point:**

**Flow Characteristics**

- **Supply pressure:** 0.7 MPa

**Relief Flow Characteristics**

- **Supply pressure:** 0.7 MPa

Series ITV203

**Linearity**

- **Set pressure:** 0.2 MPa
- **Supply pressure:** 0.7 MPa

**Pressure Characteristics**

- **Set point:**

**Flow Characteristics**

- **Supply pressure:** 0.7 MPa

**Relief Flow Characteristics**

- **Supply pressure:** 0.7 MPa
Series ITV1000/2000/3000

Series ITV303

Linearity

Pressure Characteristics

Set pressure: 0.2 MPa

Flow Characteristics

Supply pressure: 0.7 MPa

Relief Flow Characteristics

Supply pressure: 0.7 MPa
**Electro-pneumatic Regulator Series ITV1000/2000/3000**

**Series ITV105**

**Pressure Characteristics**
Set pressure: 0.4 MPa

**Linearity**
Set pressure (MPa)

**Flow Characteristics**
Flow rate (/min (ANR))

**Hysteresis**
Set pressure (MPa)

**Relief Flow Characteristics**
Supply pressure: 1.0 MPa

**Repeatability**

**Series ITV205**

**Pressure Characteristics**
Set pressure: 0.4 MPa

**Linearity**
Set pressure (MPa)

**Flow Characteristics**
Flow rate (/min (ANR))

**Hysteresis**
Set pressure (MPa)

**Relief Flow Characteristics**
Supply pressure: 1.0 MPa

**Repeatability**

Series ITV1000/2000/3000

Series ITV305

**Linearity**

- **Set pressure** (MPa)
- **Input signal** (%F.S.)

**Hysteresis**

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

**Repeatability**

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

**Pressure Characteristics**

- **Set pressure**: 0.4 MPa
- **Output deviation factor** (%F.S.)
- **Supply pressure** (MPa)

**Flow Characteristics**

- **Set pressure** (MPa)
- **Output deviation factor** (%F.S.)
- **Flow rate** (l/min (ANR))

**Relief Flow Characteristics**

- **Set pressure** (MPa)
- **Output deviation factor** (%F.S.)
- **Flow rate** (l/min (ANR))

Supply pressure:
- ITV305: 1.0 MPa
- ITV1000/2000/3000: 1.0 MPa

Set point:
- ITV305: 0.4 MPa
- ITV1000/2000/3000: 1.0 MPa

Output deviation factor (%F.S.):
- ITV305: 0.0 to 1.0
- ITV1000/2000/3000: 0.0 to 1.0
Electro-pneumatic Regulator Series ITV1000/2000/3000

Dimensions

ITV10□□
Flat bracket

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

Cable connector (4-wire)
Right angle type

Cable connector (4-wire)
Straight type

Setting part

ITV1000
E REGULATORPCMS

Mounting hole

4 x ø7

M3 x 0.5
Solenoid valve EXH

SUP (1)
OUT (2)

4 x M4 x 0.7 thread depth 6 mm through
Mounting hole

Solenoid valve EXH

EXH (3)

12.5
Cable connection threads

Rc1/8
Exhaust port

2 x Rc1/8, 1/4
Port size

45
22
2.3

L-bracket

2 x Rc1/8, 1/4
SUP port, OUT port

2 x M4 x 0.7 thread depth 6 mm through
Mounting hole

25
15

(10)
(7)

30
36

P3.5

(INI-398-0-6)

(Optional)

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

M12 x 1

(Optional)
**Series ITV1000/2000/3000**

**Dimensions**

**ITV20 □ □**  
Flat bracket

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

Cable connector (4-wire)  
Right angle type

Cable connector (4-wire)  
Straight type

**Solenoid valve**  
EXH

**SUP (1)**  
OUT (2)

4 x ø7  
Mounting hole

12.5  
Cable connection threads

M12 x 1

**Flat bracket P3020114**  
(Optional)

4 x M5 x 0.8 thread depth 6 mm through  
Mounting hole

**L-bracket**

**SUP port, OUT port**

2 x Rc1/4, 3/8

12

**INDEX**

14-8-24
Electro-pneumatic Regulator Series ITV1000/2000/3000

Dimensions

**ITV30**

**Flat bracket**

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

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

**L-bracket**

- M5 x 0.8 Solenoid valve EXH
- SUP port, OUT port
- Exhaust port

M12 x 1 Cable connection threads

4 x M5 x 0.8 thread depth 6 mm through Mounting hole

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

**Made to Order Specifications:**
Please contact SMC regarding detailed dimensions, specifications and delivery times.

### 1. Ozone Resistant

Fluoro rubber is used for the rubber parts of seals.

<table>
<thead>
<tr>
<th>Standard model number</th>
<th>Ozone resistant</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>Ozone resistant</td>
</tr>
</tbody>
</table>

### 2. Reverse Type

In compliance with input, inverse proportional pressure is displayed.

- **ITV10**
- **ITV20**
- **ITV30**

#### Input/output characteristics chart

<table>
<thead>
<tr>
<th>Input signal (%F.S.)</th>
<th>Output pressure (MPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.005 MPa</td>
</tr>
<tr>
<td>100</td>
<td>0</td>
</tr>
</tbody>
</table>

- **X102**

### 4. Digital Input Type

Parallel input type with digital 10 bit.

- **ITV10** `-X93`
- **ITV20** `-X93`
- **ITV30** `-X93`

Note 1) □ in part number is the same model no. for the standard products.

### 5. DeviceNet Compliant

It is conforming to DeviceNet.

- **ITV10** `-X80`
- **ITV20** `-X80`
- **ITV30** `-X80`

Note 1) □ in part number is the same model no. for the standard products.
Note 2) The pressure is not indicated.

### 3. 16 Points Preset Input Type

Able to control 16-point-pressure by 4 bit switching input

- **ITV10** `-X81`
- **ITV20** `-X81`
- **ITV30** `-X81`

Note 1) □ in part number is the same model no. for the standard products.
Note 2) Monitor output is switch output type only.
Series ITV1000/2000/3000
Made to Order Specifications:
Please contact SMC regarding detailed dimensions, specifications and delivery times.

6 Manifold Specifications (Except Series ITV3000)
2 through 8 station manifold.

How to Order Manifold

ITV1000/2000

Valve stations

2 stations

8 stations

OUT port size

02 1/4

03 3/8

Connection thread type

PT

N

F

NPT

PF

How to Order Manifold Assembly

Example

ITV20-02-3

Blanking plate assembly

ITV2050-212S-X26

Electro-pneumatic regulator

ITV1030-311S-X26

Electro-pneumatic regulator

P398020-13

ITV1000/2000

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 Rc1/8 (ITV1000), Rc1/4 (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.

7 High-Speed Response Time Specifications

Pressure response with no load is approx. 0.1 sec.

ITV 2 0 1 0 - 0 1 2 5 - X88

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 4 to 20 mA (Sink type)

1 Current 0 to 20 mA (Sink type)

2 Voltage 0 to 5 VDC

3 Voltage 0 to 10 VDC

Monitor output

1 Analog output 1 to 5V DC

2 Switch output/NPN output

3 Switch output/PNP output

4 Analog output 4 to 20 mA (Sink type)

Thread type

N NPT

F G

Port size

1 1/8 (1000 type)

2 1/4 (10000, 2000 type)

3 3/8 (2000 type)

Cable connector type

S Straight type 3 m

L Right angle type 3 m

N Without cable connector

Bracket

- Without bracket

B Flat bracket

C L-bracket
Operating Environment

⚠️ Warning
1. Employ suitable protective measures in locations where there is contact with water droplets, oil or welding spatter, etc.
2. Consult 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 Best Pneumatics Vol. 16.

Air Supply

⚠️ 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.

Handling

⚠️ Caution
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. 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.
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. Please note that the right angle cable does not rotate and is limited to only one entry direction.
9. 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 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.).
   4) Install or remove the connector after shutting off the power supply to avoid the influence of chattering of the power supply.
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 Rc1/8, Rc1/4 and Rc1/2.
11. Specifications on page 1 is in case of static environment. Pressure may fluctuate when air is consumed at the output side.
12. For details on the handling of this product, refer to the instruction manual which is included with the product.
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

Note) A right angle type cable is also available. The entry direction for the right angle type connector is to the left (SUP port side). Never turn the connector as it is not designed to turn.

Wiring diagram

Current signal type
Voltage signal type

<table>
<thead>
<tr>
<th></th>
<th>Brown</th>
<th>White</th>
<th>Blue</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power supply</td>
<td>Input signal</td>
<td>GND (COMMON)</td>
<td>Monitor output</td>
</tr>
<tr>
<td>2</td>
<td>24 VDC</td>
<td>12 to 15 VDC</td>
<td>4 to 20 mA</td>
<td>0 to 20 mA</td>
</tr>
<tr>
<td>3</td>
<td>Vs: Power supply</td>
<td>Vin: Input signal</td>
<td>0 to 5 VDC</td>
<td>0 to 10 VDC</td>
</tr>
</tbody>
</table>

Preset input type

<table>
<thead>
<tr>
<th></th>
<th>Brown</th>
<th>White</th>
<th>Blue</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>S1 OFF</td>
<td>S2 OFF</td>
<td>S1 ON</td>
<td>S2 ON</td>
</tr>
</tbody>
</table>

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.

Monitor output wiring diagram

Analog output, voltage type

Switch output, NPN type

Switch output, PNP type

Analog output, current type (sink type)

+ When 30 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 regulating pressure range, by unit of standard measured pressure, is shown in the table below.

<table>
<thead>
<tr>
<th>Unit</th>
<th>Regulating pressure range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ITV-01</td>
</tr>
<tr>
<td>MPa</td>
<td>0.05 to 0.1</td>
</tr>
<tr>
<td>kgf/cm²</td>
<td>0.05 to 1</td>
</tr>
<tr>
<td>bar</td>
<td>0.05 to 1</td>
</tr>
<tr>
<td>PSI</td>
<td>0.7 to 15</td>
</tr>
<tr>
<td>kPa</td>
<td>5 to 100</td>
</tr>
</tbody>
</table>