



Compact Electro-pneumatic Regulator **Series *ITV0000***



Compact and lightweight electro-pneumatic regulator

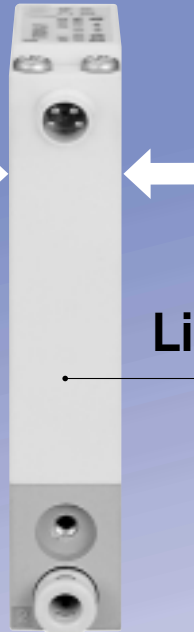
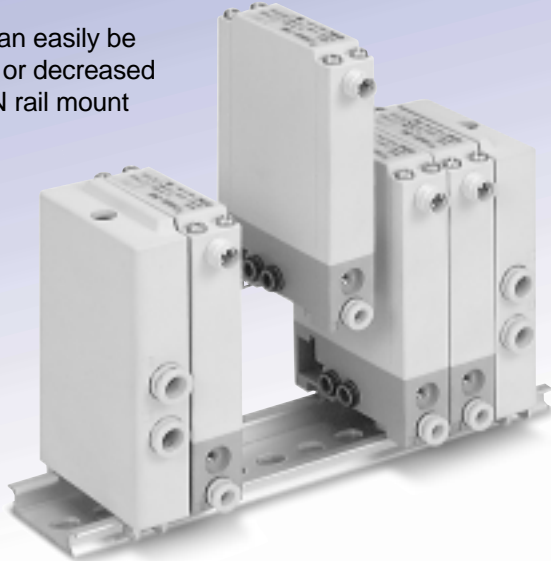
Compact **15mm**

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

Compact Electro-pneumatic Regulator
Series **ITV0000**

Realizes space savings and reduction of weight for manifold use

Stations can easily be increased or decreased due to DIN rail mount design.

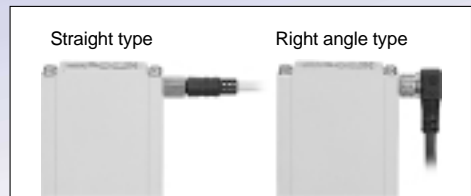


Full scale

Lightweight **100g**

Cable connectors

Straight type and right angle type are available.



Built-in One-touch fitting

With error indication LED

Brackets

Flat and L brackets are available.



Flat bracket

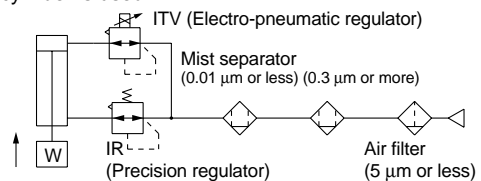
L bracket

Model	Pressure range	Power supply voltage	Input signal	Output signal	Option
ITV001□	0.1MPa	24VDC	4 to 20mA	Analog output	<ul style="list-style-type: none"> Cable connectors Straight type Right angle type Brackets Flat bracket L bracket
ITV003□	0.5MPa		0 to 20mA		
ITV005□	0.9MPa	12VDC	0 to 5VDC	1 to 5V	
ITV009□	-100kPa		0 to 10VDC		

- Equivalent to IP65
- Linearity within $\pm 1\%$ (full span)
- Hysteresis 0.5% (full span)
- Repeatability $\pm 0.5\%$ (full span)
- High-speed response time **0.1sec** (without load)

High stability

Stable pressure control is possible even when a metal cylinder is used.



Compact Electro-pneumatic Regulator

Series *ITV0000*

How to Order

Single unit and single unit for manifolds

ITV00 **1** **0** - **3** **N**

Pressure range

1	0.1MPa
3	0.5MPa
5	0.9MPa
9*	-100kPa

* Option

Power supply voltage

0	24VDC
1*	12 to 15VDC

* Option

Input signal

0*	Current type 4 to 20mADC
1*	Current type 0 to 20mADC
2*	Current type 0 to 5VDC
3	Current type 0 to 10VDC

* Option

Built-in One-touch fitting type

For single unit

Symbol	SUP (VAC) [1]	OUT [2]	EXH (ATM) [3]
Nil	Metric size (light gray)	ø4	
U	Inch size (orange)	ø5/32"	

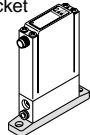
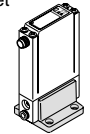
For manifolds

Symbol	SUP (VAC) [1]	OUT [2]	EXH (ATM) [3]	
Nil	Metric size (light gray)	ø6	ø4	ø6
U	Inch size (orange)	ø1/4"	ø5/32"	ø1/4"

Cable connector (option)

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

Bracket (option for single unit only)

Nil	Without bracket
B	Flat bracket 
C	L bracket 

Base type

Nil	For single unit
M	For manifold

Manifolds

IITV00 - **02** - n

Stations

02	2 stations
03	3 stations
⋮	⋮
10	10 stations

Option

If a DIN rail longer than the specified stations is required, specify the applicable stations in two digits.

(Maximum 10 stations)

Example) IITV00-05-07

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 page 8.

How to Order Manifold Assemblies (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.

IITV00-03 1 set (Manifold part number)

* ITV0030-3MS ... 2 sets [Electro-pneumatic regulator part number (1, 2 stations)]

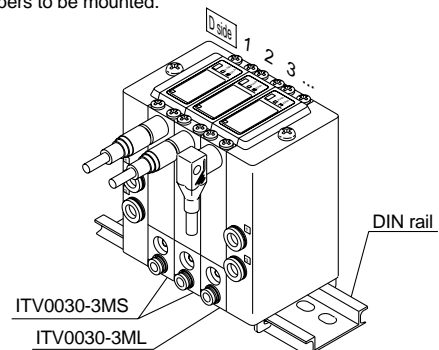
* ITV0030-3ML ... 1 set [Electro-pneumatic regulator part number (3 stations)]

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

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

The asterisk (*) specifies mounting.

Add an asterisk (*) at the beginning of electro-pneumatic regulator part numbers to be mounted.



Specifications



Model	ITV001□	ITV003□	ITV005□	ITV009□
Minimum supply pressure	Set pressure + 0.1MPa			Set pressure -1kPa
Maximum supply pressure	0.2MPa	1.0MPa		-101kPa
Set pressure range	0.001 to 0.1MPa	0.001 to 0.5MPa	0.001 to 0.9MPa	-1 to -100kPa
Maximum flow rate	3.5 /min (ANR) (Supply pressure: 0.2MPa)	6 /min (ANR) (Supply pressure: 0.6MPa)	6 /min (ANR) (Supply pressure: 0.6MPa)	2 /min (ANR) (Supply pressure: -101kPa)
Power supply	Voltage	24VDC ±10%, 12 to 15VDC		
	Current consumption	Power supply voltage 24VDC type: 0.12A or less Power supply voltage 12 to 15VDC type: 0.18A or less		
Input signal	Voltage type	0 to 5VDC, 0 to 10VDC		
	Current type	4 to 20mADC, 0 to 20mADC		
Input impedance	Voltage type	Approx. 10kΩ		
	Current type	Approx. 250kΩ		
Output signal	Analog output	1 to 5 VDC (Load impedance: 1kΩ or more) Output accuracy: Within ±6% (full span)		
Linearity	Within ±1% (full span)			
Hysteresis	Within ±0.5% (full span)			
Repeatability	Within ±0.5% (full span)			
Sensitivity	Within 0.2% (full span)			
Temperature characteristics	Within ±0.12% (full span)/°C			
Operating temperature range	0 to 50°C (with no condensation)			
Enclosure	Equivalent to IP65*			
Connection type	Built-in One-touch fitting			
Connection size	For single unit	Metric size	[1], [2], [3]: ø4	
		Inch size	[1], [2], [3]: ø5/32"	
	Manifold	Metric size	[1], [3]: ø6, [2]: ø4	
		Inch size	[1], [3]: ø1/4", [2]: ø5/32"	
Weight ^{Note 1)}	100g or less (without options)			

Note 1) Indicates the weight of a single unit.

For IITV00-n

Total weight (g) ≤ Stations (n) x 100 + 130 (Weight of end block A, B assembly) + Weight (g) of DIN rail

Note 2) Specifications other than the following are optional.

Pressure range: 0.1MPa, 0.5MPa, 0.9MPa, Power supply voltage: 24VDC, Input signal: 0 to 10VDC

Note 3) When there is a downstream flow consumption, pressure may become unstable depending on piping conditions.

* When used under conditions equivalent to IP65, use the regulator after piping a fitting/tube to the breathing hole. (For details, refer to "Specific Product Precautions 1" on page 11.)

Accessories (Optional)

Bracket

Flat bracket assembly
P39800022



L bracket assembly
P39800023



Cable connector

Straight type
M8-4DSX3MG4



Right angle type
ELWIKA-KV4408 PVC025 2M

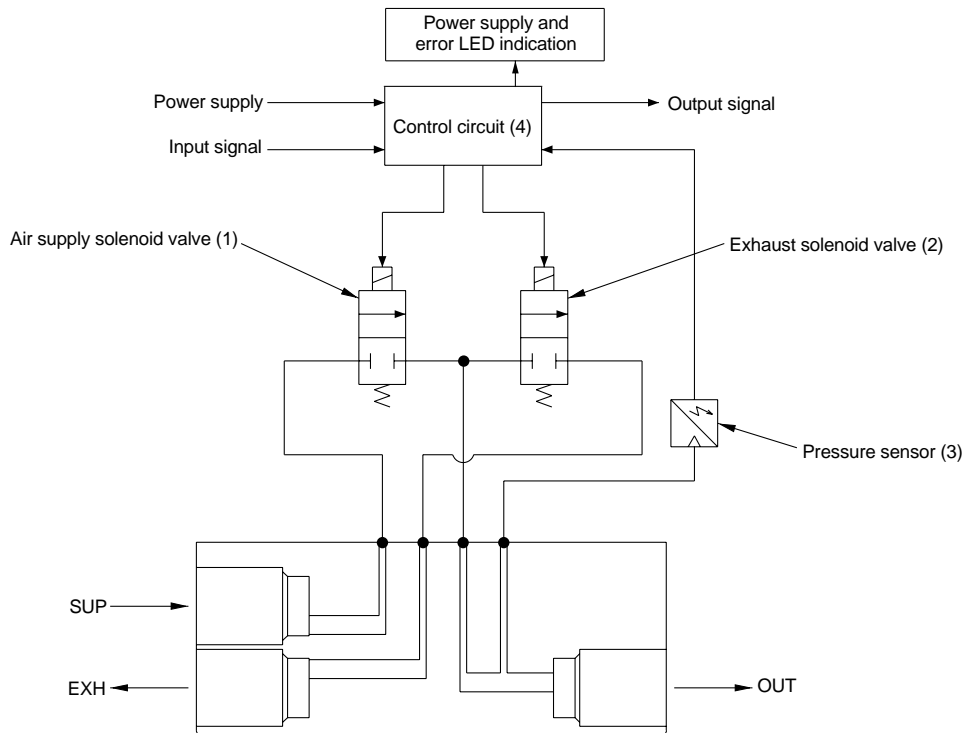


Series ITV0000

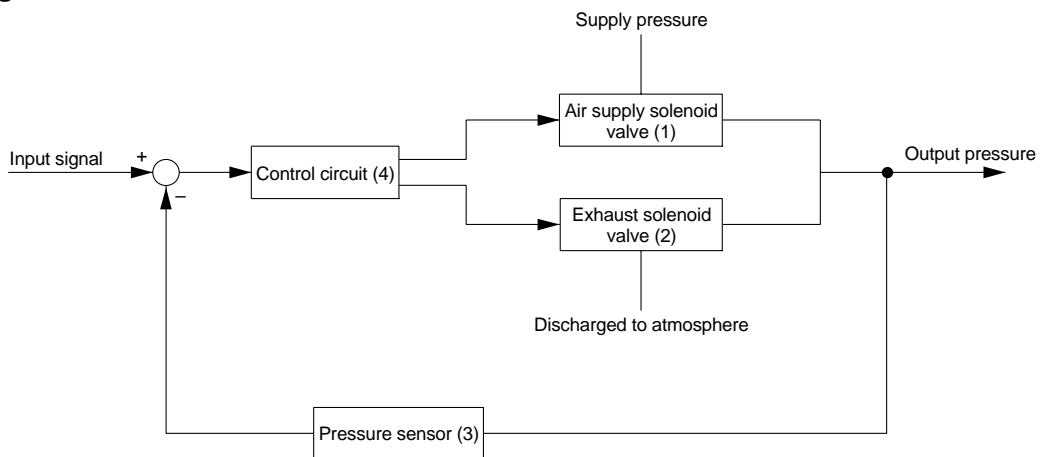
Working Principle

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.

Working principle diagram

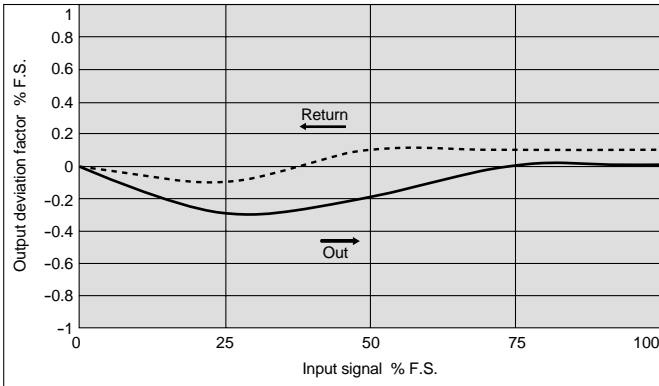


Block diagram



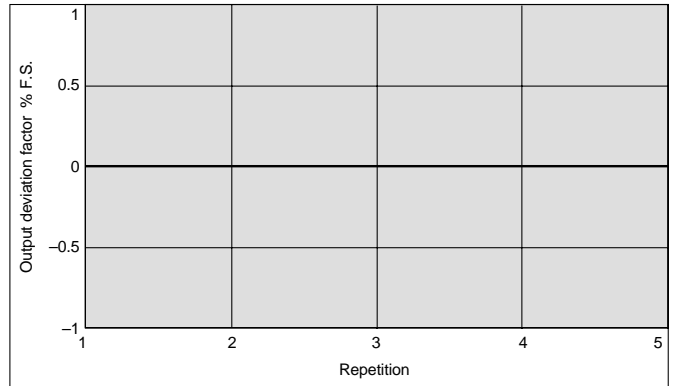
Series ITV001

Linearity, hysteresis



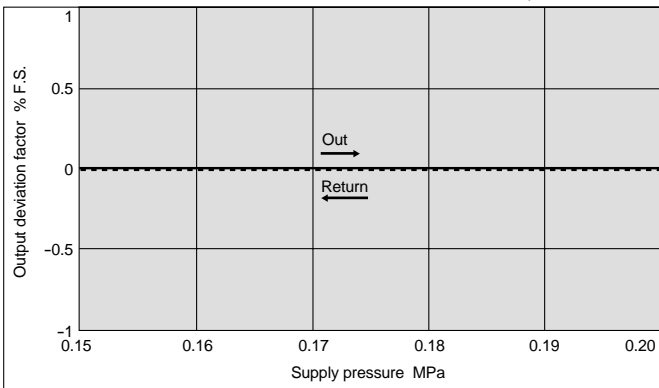
Repeatability

With 50% of signal input



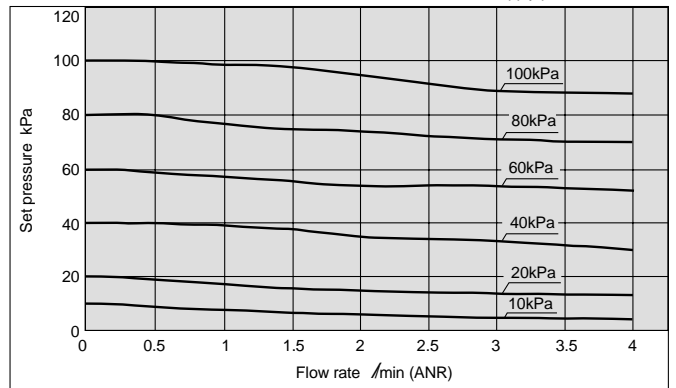
Pressure characteristics

Set pressure: 0.05MPa



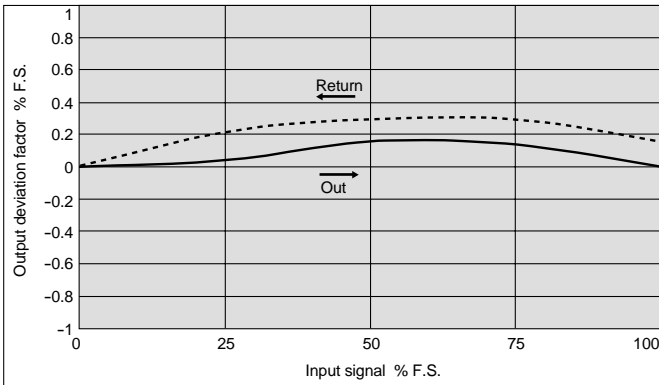
Flow characteristics

Supply pressure: 0.2MPa



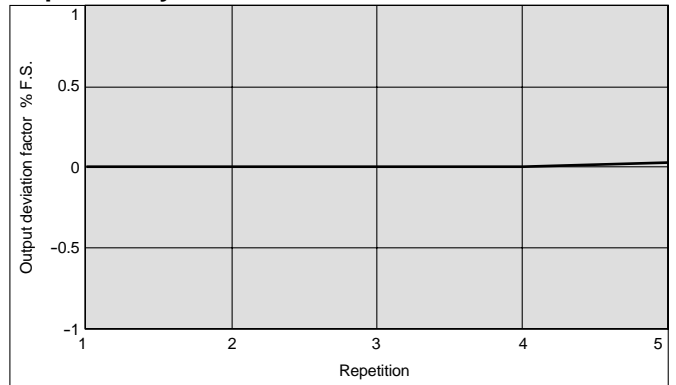
Series ITV003

Linearity, hysteresis



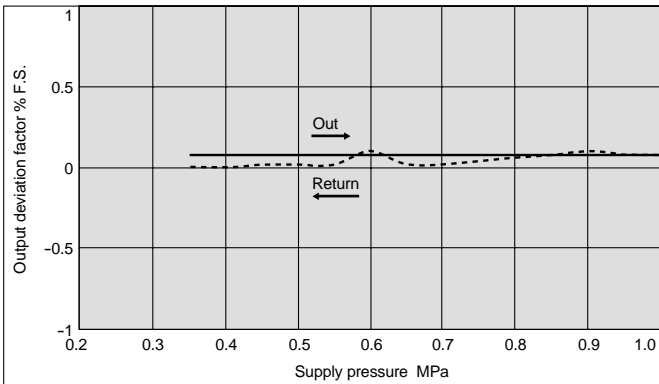
Repeatability

With 50% of signal input



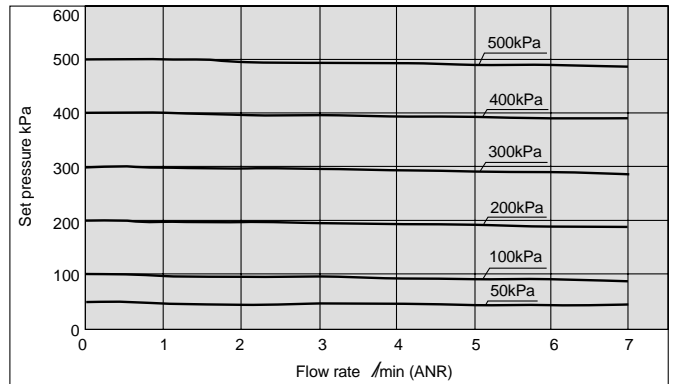
Pressure characteristics

Set pressure: 0.25MPa



Flow characteristics

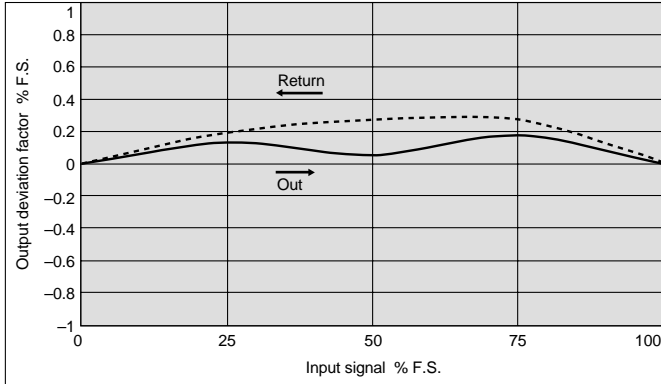
Supply pressure: 0.6MPa



Series ITV0000

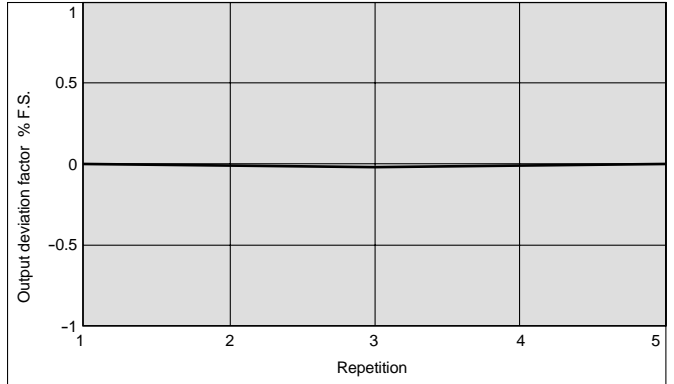
Series ITV005

Linearity, hysteresis



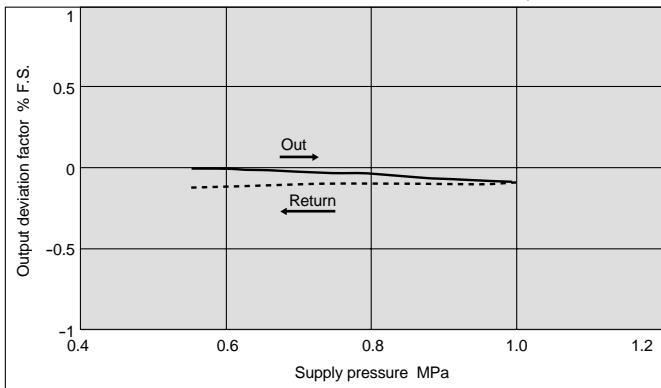
Repeatability

With 50% of signal input



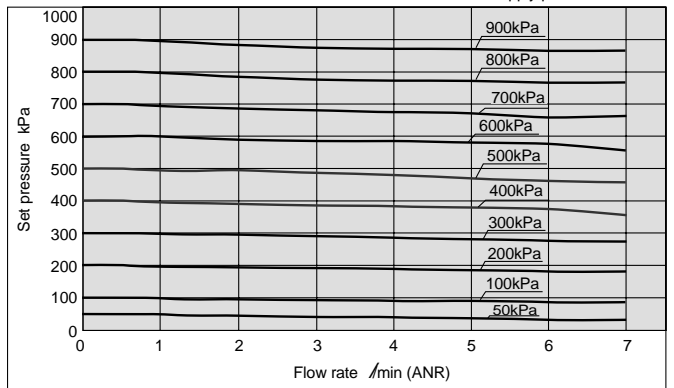
Pressure characteristics

Set pressure: 0.45MPa



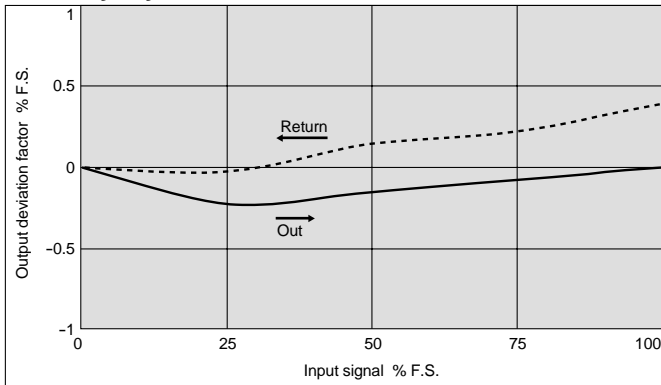
Flow characteristics

Supply pressure: 1.0MPa



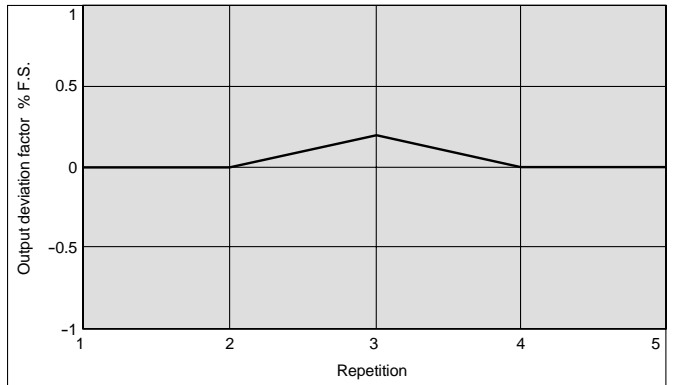
Series ITV009

Linearity, hysteresis

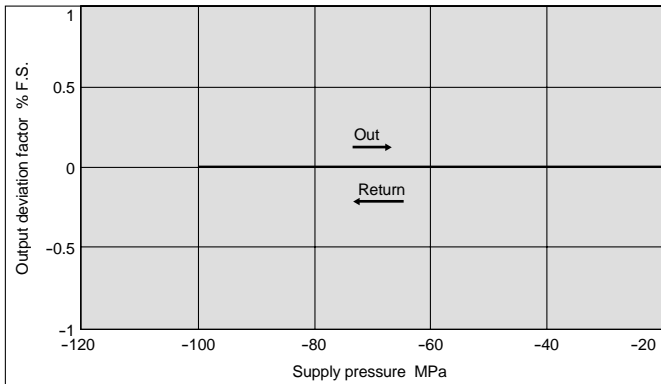


Repeatability

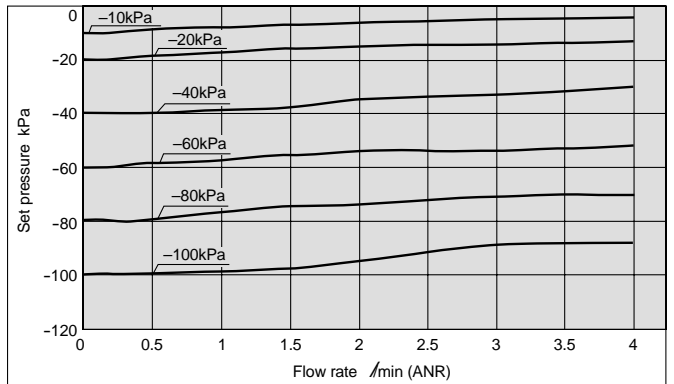
With 50% of signal input



Pressure characteristics

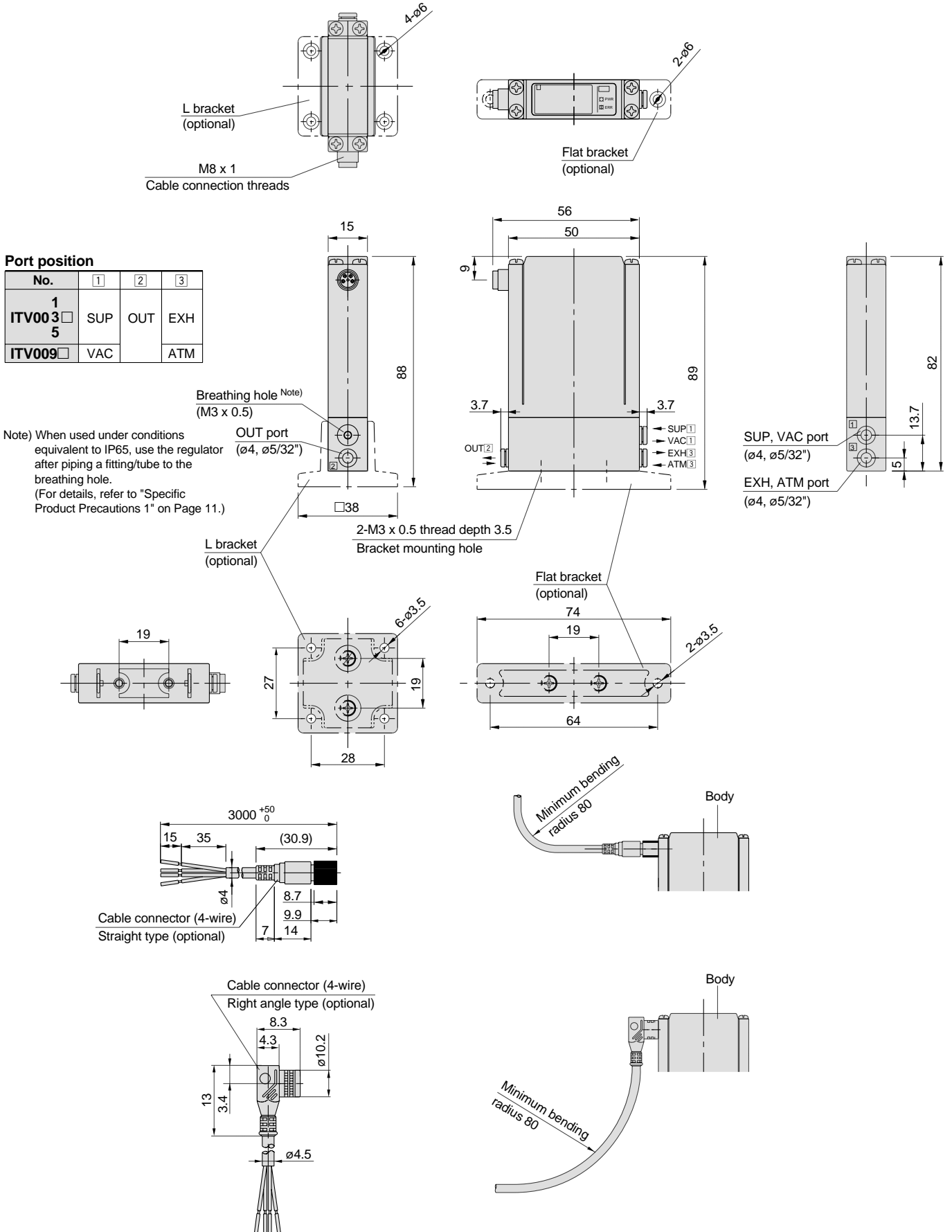


Flow characteristics



Dimensions

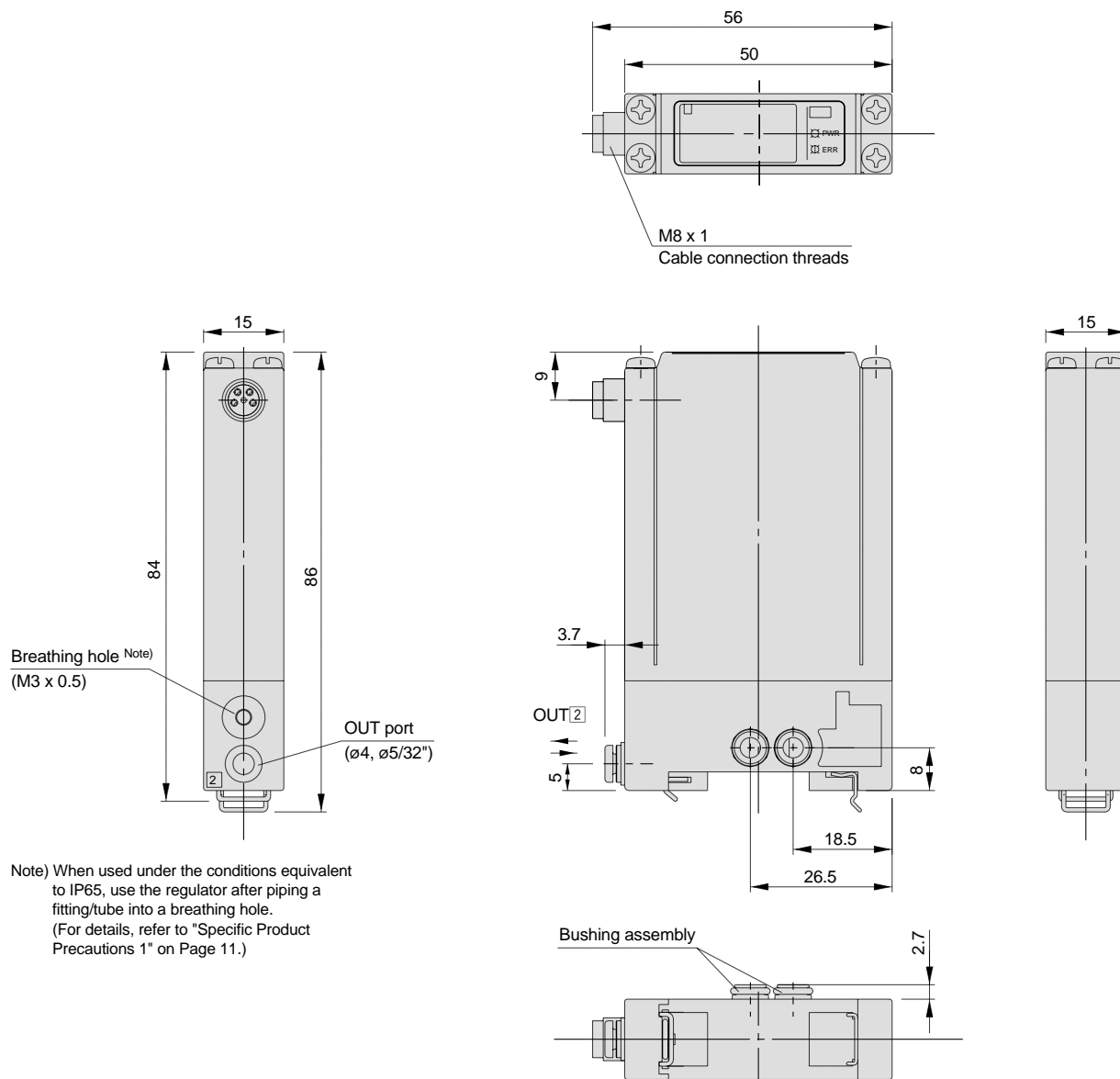
Single unit



Series ITV0000

Dimensions

Single unit for manifolds

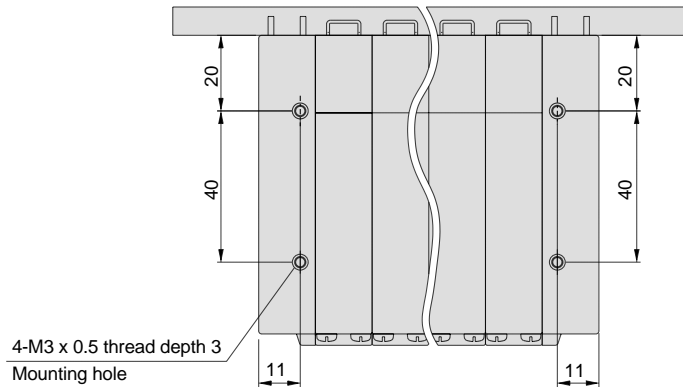


Note) When used under the conditions equivalent to IP65, use the regulator after piping a fitting/tube into a breathing hole.
(For details, refer to "Specific Product Precautions 1" on Page 11.)

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

Dimensions

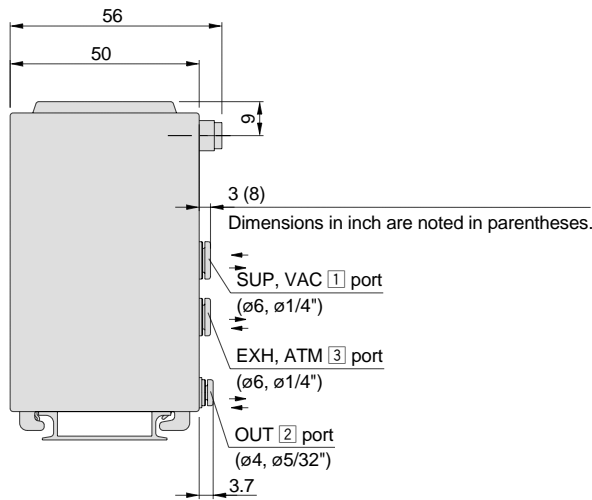
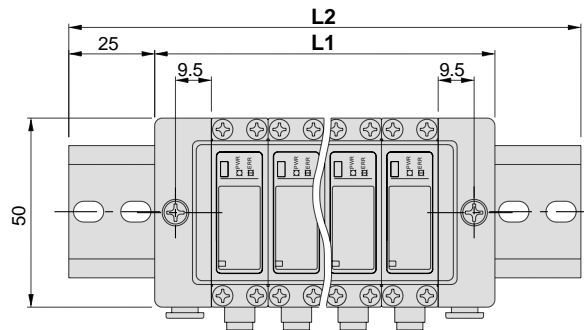
Manifolds



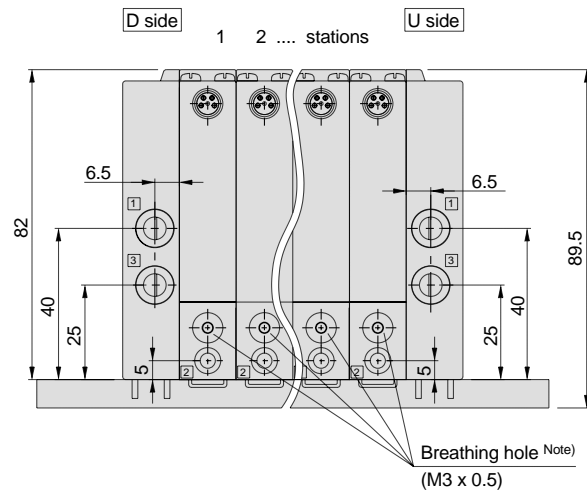
Port position

No.	1	2	3
1 ITV003□	SUP	OUT	EXH
5 ITV009□	VAC		ATM

Note) Stations are counted starting from the D side.



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



Note) When used under conditions equivalent to IP65, use the regulator after piping a fitting/tube to the breathing hole.
(For details, refer to "Specific Product Precautions 1" on page 11.)


Manifold stations n	(mm)									
	2	3	4	5	6	7	8	9	10	
L1	60	75	90	105	120	135	150	165	180	
L2	110.5	123	148	160.5	173	185.5	198	223	235.5	





Series *ITV0000*

Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by labels of "**Caution**", "**Warning**" or "**Danger**". To ensure safety, be sure to observe ISO 4414 ^{Note 1)}, JIS B 8370 ^{Note 2)} and other safety practices.

 **Caution:** Operator error could result in injury or equipment damage.

 **Warning:** Operator error could result in serious injury or loss of life.

 **Danger:** In extreme conditions, there is a possible result of serious injury or loss of life.

Note 1) ISO 4414: Pneumatic fluid power – Recommendations for the application of equipment to transmission and control systems.

Note 2) JIS B 8370: General Rules for Pneumatic Equipment

Warning

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

Since the products specified here are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or after analysis and/or tests to meet your specific requirements.

2. Only trained personnel should operate pneumatically operated machinery and equipment.

Compressed air can be dangerous if an operator is unfamiliar with it. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced operators.

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

1. Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out control positions.

2. When equipment is to be removed, confirm the safety process as mentioned above. Cut the supply pressure for this equipment and exhaust all residual compressed air in the system.

3. Before machinery/equipment is restarted, take measures to prevent shooting-out of cylinder piston rod, etc. (Bleed air into the system gradually to create back-pressure.)

4. Contact SMC if the product is to be used in any of the following conditions:

1. Conditions and environments beyond the given specifications, or if product is used outdoors.

2. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, press applications, or safety equipment.

3. An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.



Series ITV0000

Electro-pneumatic Regulator Precautions

Be sure to read before handling.

Piping

⚠ Caution

1. Preparation before piping

Before piping, air blow (flush) or wash thoroughly to remove chips, cutting oil and other impurities from inside the piping.

2. Wrapping of sealant tape

When connecting pipes and fittings, etc., be sure that chips from the pipe threads and sealing material do not get inside the regulator.

Further, when sealant tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.

Operating Environment

⚠ Warning

1. Do not operate in locations with an atmosphere of corrosive gases, chemicals, sea water, water or steam, or where the same substances will adhere to the regulator.

2. Do not operate in locations where vibration or impact occurs.

3. In locations under direct sunlight, provide a protective cover, etc.

4. In locations near heat sources, block off the radiated heat.

5. In locations where water, lubricant or spatter from welding, etc. will adhere to the regulator, implement suitable protective

Air Supply

⚠ Warning

1. This regulator is designed for use with compressed air. Contact SMC if any other fluid will be used.

2. Do not use compressed air that includes chemicals, synthetic fluids containing organic solvents, salinity, or corrosive gases, since this can cause malfunction.

Handling of One-touch Fittings

⚠ Caution

1. Tube attachment/detachment for One-touch fittings

1) Attaching a tube

1. Take a tube having no flaws on its periphery and cut it off at a right angle. When cutting the tube, use tube cutter TK-1, 2 or 3. Do not use pliers, nippers or scissors, etc. If cutting is done with tools other than tube cutters, the tube may be cut diagonally or become flattened, etc. This can make a secure installation impossible and cause problems such as the tube coming loose after installation or air leakage. Allow some extra length in the tube.

2. Hold the tube and push it in slowly, inserting it all the way into the fitting.

3. After inserting the tube, pull on it lightly to confirm that it will not come out. If it is not installed securely all the way into the fitting, this can cause problems such as air leakage or the tube pulling out.

2) Detaching a tube

1. Push in the release button sufficiently. When doing this, push the collar evenly.

2. Pull out the tube while holding down the release button so that it does not snap back. If the release button is not pressed down sufficiently, there will be increased bite on the tube and it will become more difficult to detach it.

3. When using the removed tube again, cut off the portion which has been chewed before reusing it. If the chewed portion of the tube is used as is, this can cause problems such as air leakage or difficulty in removing the tube.

2. When mounting a One-touch fitting, use a suitable wrench to tighten the hexagonal flats of the fitting.

Moreover, position the wrench at the lower part of the hexagonal flats as close to the threads as possible. When a wrench of the proper size for the hexagonal flats is not used, it will damage the hexagonal flats.

3. Tightening of M3, M5, and M6 connection threads

1) M3

After tightening by hand, tighten an additional 1/4 rotation with the correct tool.

2) M5 and M6

After tightening by hand, tighten an additional 1/6 rotation with the correct tool.

Overtightening can cause damage to the threads and/or air leakage due to deformation of the gasket. Undertightening can cause loose threads and air leakage, etc.

Precautions on Tube by Other Manufacturers

⚠ Caution

1. When using tubes by manufacturers other than SMC, confirm that the tube's outside diameter tolerance satisfy the following specifications.

1) Nylon tubing: $\pm 0.1\text{mm}$ or less

2) Soft nylon tubing: $\pm 0.1\text{mm}$ or less

3) Polyurethane tubing: $+0.15\text{mm}$ or less,
 -0.2mm or less

Do not use a tube if the outside diameter tolerance is not satisfied. It may not be possible to connect the tubing, or leakage or disconnection may occur after connecting.



Series ITV0000 Specific Product Precautions 1

Be sure to read before handling.

Refer to pages 9 and 10 for safety instructions and precautions.

Air Supply

⚠ Caution

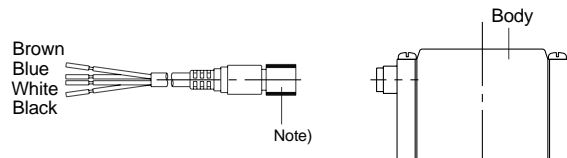
1. Install an air filter near this product on the supply side. Select a filtration degree of $5\mu\text{m}$ or less.
2. Compressed air containing a large amount of drainage can cause malfunction of this product and other pneumatic equipment. As a countermeasure, install an after-cooler, air dryer or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

For details on the above compressed air quality, refer to SMC's "Air Cleaning Equipment" catalog.

Wiring

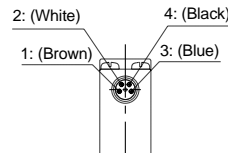
⚠ Caution

1. Connect the cable to the connector on the body with the wiring arranged as shown below. Proceed carefully, as incorrect wiring can cause damage. Furthermore, use DC power at the correct rating and with a low ripple.



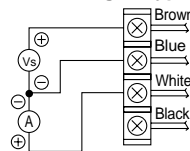
Terminal no.	1	2	3	4
Lead wire color	Brown	White	Blue	Black
Wiring	Power supply	Signal	COM	Monitor

Note A right angle type is also available. The entry direction for the right angle type connector is downward (OUT port side). Never turn the connector as it is not designed to turn. If turned forcibly, it will damage the connector port.



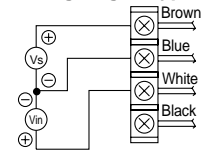
Wiring diagram

Current signal type



Vs: Power supply 24VDC
12 to 15VDC
A: Input signal 4 to 20mADC
0 to 20mADC

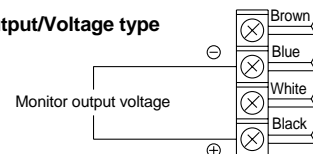
Voltage signal type



Vs: Power supply 24VDC
12 to 15VDC
Vin: Input signal 0 to 5VDC
0 to 10VDC

Monitor output wiring diagram

Analog output/Voltage type





Series ITV0000 Specific Product Precautions 2

Be sure to read before handling.

Refer to pages 9 and 10 for safety instructions and precautions.

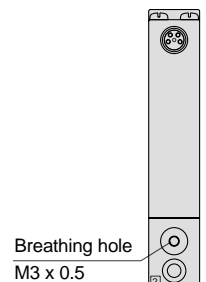
Handling

⚠ Caution

1. Do not use a lubricator on the supply side of this product, as this can cause a malfunction. When lubrication of terminal equipment is necessary, connect a lubricator on the output side of this regulator.
2. If electric power is shut off while pressure is being applied, output pressure will be maintained.
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 supply to this regulator is cut off due to a power failure, etc., when it is in a regulated state, output pressure will be maintained temporarily. Handle carefully when operating with output pressure released to the atmosphere, as air will continue to flow out until reaching atmospheric pressure.
4. If supply pressure to this regulator 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 solenoid valve may be shortened by this, be sure to shut off the power supply when supply pressure is shut off.
5. This product is adjusted for each specification at the time of shipment from the factory. Avoid unnecessary disassembly or removal of parts, as this can lead to a malfunction.

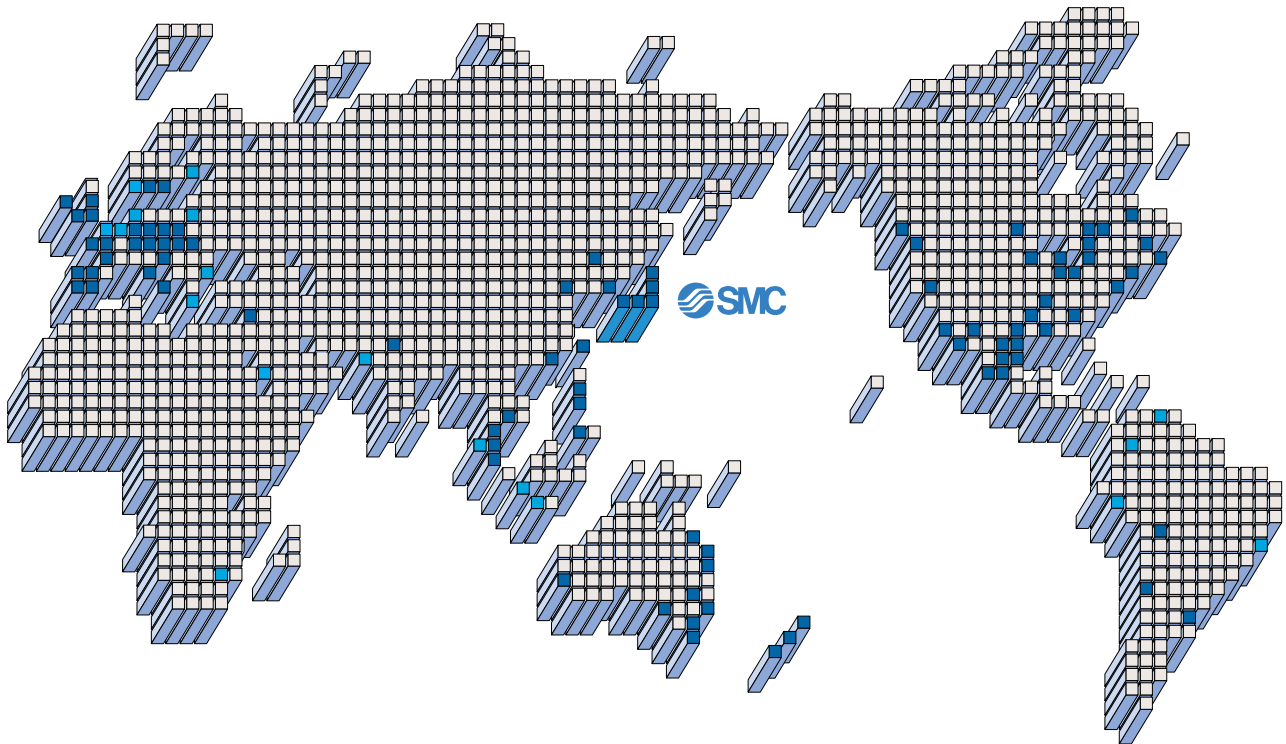
⚠ Caution

6. The optional cable connector is a 4 wire type. When the monitor output (analog output) is not being used, keep the monitor output wire (black) from touching the other wires as this can cause a malfunction.
7. Be aware that the right angle cable does not rotate and is limited to only one entry direction.
8. Take the following steps to avoid malfunction caused by noise.
 - 1) Remove power supply noise during operation by installing a line filter, etc., in the AC power line.
 - 2) Install this product and its wiring as far as possible from strong electric fields such as those of motors and power lines, etc.
 - 3) Be sure to implement protective measures against load surge for induction loads (solenoid valves, relays, etc.).
9. Characteristics are limited only to the static state, and when air is consumed on the output side, pressure may fluctuate.
10. For details on the handling of this product, refer to the instruction manual included with the product.
11. In locations where the body is exposed to water, dust, etc., there is a possibility that they can enter into the body through the breathing hole.
Using a fitting/tube (M-3AU-3 fitting and TIU01□-□□ tube are recommended), install piping extended to a location where there is no water, dust, etc.





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