

Installation and Maintenance Manual

Electro-Pneumatic Regulator

Series ITV0000-Q



1 Safety Instructions

This manual contains essential information for the protection of users and others from possible injury and/or equipment damage.

- Read this manual before using the product, to ensure correct handling, and read the manuals of related apparatus before use.
- Keep this manual in a safe place for future reference.
- These instructions indicate the level of potential hazard by label of "Caution", "Warning" or "Danger", followed by important safety information which must be carefully followed.
- To ensure safety of personnel and equipment the safety instructions in this manual and the product catalogue must be observed, along with other relevant safety practices.

Caution	Indicates a hazard with a low level of risk, which if not avoided, could result in minor or moderate injury.
Warning	Indicates a hazard with a medium level of risk, which if not avoided, could result in death or serious injury.
Danger	Indicates a hazard with a high level of risk, which if not avoided, will result in death or serious injury.

- Electromagnetic compatibility:

This product is class A equipment intended for use in an industrial environment. There may be potential difficulties in ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbances.

Warning

- **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 can be used in various operating conditions, their compatibility with the specific pneumatic system must be based on specifications or after analysis and/or tests to meet specific requirements.

- **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 personnel.

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

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

- When equipment is to be removed, confirm the safety process as mentioned above. Switch off air and electrical supplies and exhaust all residual compressed air in the system.

Before machinery/equipment is re-started, ensure all safety measures to prevent sudden movement of cylinders etc. (Supply air into the system gradually to create back pressure, i.e. incorporate a soft-start valve).

- **Do not use this product outside of the specifications. Contact SMC if it is to be used in any of the following conditions:**

- Conditions and environments beyond the given specifications, or if the product is to be used outdoors.
- Installations in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverage, recreation equipment, emergency stop circuits, press applications, or safety equipment.
- An application, which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.

Caution

- Ensure that the air supply system is filtered to 5 microns.

2 Specifications

Model	ITV001*	ITV003*	ITV005*	ITV009*
Min. supply pressure	(Set pressure) + 0.1 MPa			(Set pressure) -1 kPa
Max. supply pressure	0.2 MPa	1.0 MPa	1.0 MPa	-101 kPa
Set pressure range	0.001 ~ 0.1 MPa	0.001 ~ 0.5 MPa	0.001 ~ 0.9 MPa	-1 ~ -100 kPa
Supply voltage	24 VDC±10%, 12 to 15 VDC			
Current consumption	24 VDC	Max. 120 mA		
	12 VDC	Max. 180 mA		
Input impedance	Current type	250 Ω		
	Voltage type	10 kΩ		
Output signal	Analogue output 1 to 5 VDC. Min. load impedance 1 kΩ			
Maximum flow rate	3.5 l/min (ANR) @ SUP. 0.2 MPa	6.0 l/min (ANR) @ SUP. 0.6 MPa	6.0 l/min (ANR) @ SUP. 0.6 MPa	2.0 l/min (ANR) @ SUP. -101 kPa
Linearity	Max. ±1%F.S.			
Hysteresis	Max. 0.5%F.S.			
Repeatability	Max. ±0.5%F.S.			
Sensitivity	Max. 0.2%F.S.			
Temperature characteristics	Max. ±0.12%F.S./°C			
Operating temperature	0~50°C (without condensation)			
Protection structure	IP65 equivalent			
Weight (No option)	100 g			

Table 1.

3 Operation Principle

When the input signal increase the supply solenoid valve ① turns on and the exhaust solenoid valve ② turns off. Supply pressure is passed to the port through the supply solenoid valve. The pressure sensor ③ will provide output pressure feedback to the control circuit ④. The control circuit will balance the input signal and output pressure to ensure that the output pressure remains proportional to the input signal.

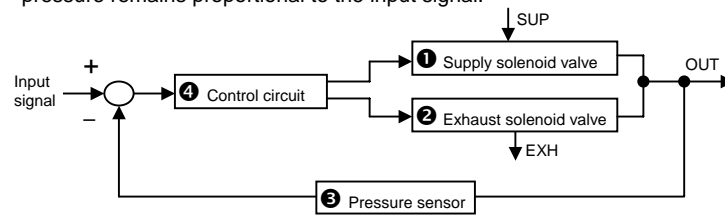


Fig. 1 - Control diagram

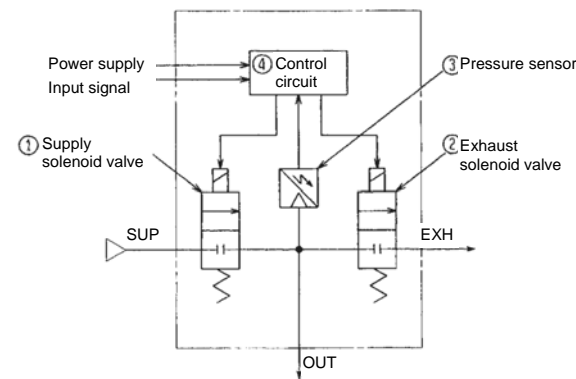


Fig. 2 - Schematic diagram

4 Wiring

Caution

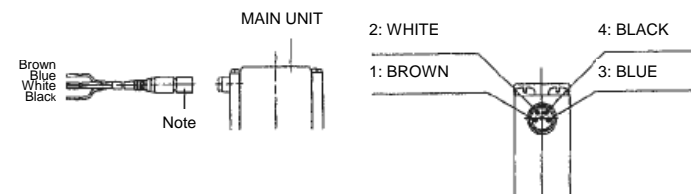


Fig. 3 - Connection details

Caution

Note) Do not turn the connector to avoid breaking the connector pins.

No.	Colour	Contents
1	Brown	Power supply
2	White	Input signal
3	Blue	GND (common)
4	Black	Output signal

Table 2.

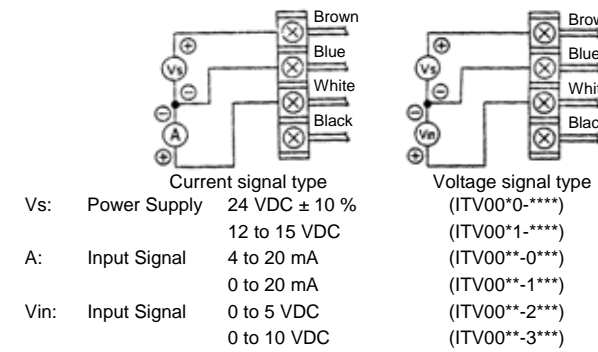
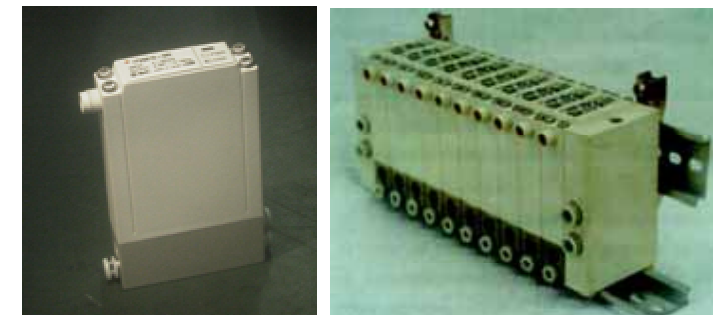


Fig. 4 - Wiring diagrams

5 The Regulator



Single unit

Manifold

Fig. 5 - The ITV.

6 Error Function

If input signal is out of specification the LED flashes. To reset error, turn off power supply temporarily and confirm given input.

7 Installation & Maintenance

Caution

- This product is pre-set at the factory and must not be dismantled. Contact your local SMC office for advice.
- Ensure, when installing this product that it is kept clear of power lines to avoid noise interference.
- Ensure that load surge protection is fitted when inductive loads are present (i.e. solenoid, relay, etc.)
- Ensure precautions are in place if the product is used in a 'free flow output' condition. Air will continue to flow continuously.
- Do not use a lubricator on the input side of this product. If lubrication is necessary, place the lubricator on the 'output' side.
- Ensure all air is exhausted from the product before maintenance.
- Maximum length of connector cable shall be 10 m.

7 Installation & Maintenance (continued)

Special care when using ITV009*

Caution

- Connect vacuum pump to "VAC" port.
- On adjustment of pressure, increasing input signal makes change from atmosphere to vacuum and decreasing input signal makes change from vacuum to atmosphere.
- ITV009* can use only negative pressure, so take care not to give positive pressure by mistake.
- If capacity of vacuum ejector is relatively small or inside diameter of piping material is small, variation of setting pressure (degree of pressure variation when the condition is changed with flow or without flow) may become large. In this case, change vacuum ejector or piping material. When a change is impossible, add a volume tank to the product. (Volume of the tank is dependent on operating condition.)
- After input signal is changed, response time of vacuum pressure is influenced by content volume (including piping) on setting side and the capacity of the vacuum ejector.

8 Contacts

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