



**Installation and Maintenance Manual**  
**Electro-Pneumatic Regulator**  
**Series ITV10\*0-X157, ITV20\*0-X157,**  
**ITV30\*0-X157 (10 bit Digital Input Type)**



**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.

<b>Caution</b>	Indicates a hazard with a low level of risk, which if not avoided, could result in minor or moderate injury.
<b>Warning</b>	Indicates a hazard with a medium level of risk, which if not avoided, could result in death or serious injury.
<b>Danger</b>	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	ITV1010-X157 ITV2010-X157 ITV3010-X157	ITV1030-X157 ITV2030-X157 ITV3030-X157	ITV1050-X157 ITV2050-X157 ITV3050-X157
Min. supply pressure	(Set pressure) + 0.1 MPa		
Max. supply pressure	0.2 MPa	1.0 MPa	
Set pressure range	0.005 ~ 0.1 MPa	0.005 ~ 0.5 MPa	0.005 ~ 0.9 MPa
Supply voltage	24 VDC±10%		
Current consumption	Max. 120 mA		
Input signal	10 bit (Parallel input)		
Input impedance	Max. 4.7 kΩ		
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)		
Pressure display	Accuracy	±3%F.S	
	Min. Unit	MPa: 0.01, kgf/cm <sup>2</sup> : 0.01, bar: 0.01, PSI: 0.1 <sup>Note</sup> , kPa: 1	
Protection structure	Main unit: IP65, Cable connector: IP67		

Table 1.

Note: 1 PSI is the minimum unit on ITV\*050.

**3 Operation Principle**

When the input signal increases the supply solenoid valve ① turns on and the exhaust solenoid valve ② turns off. Supply pressure is passed to the pilot valve ③ through the supply solenoid valve. The pilot valve will open the main valve allowing partial supply pressure to pass to the out port. The pressure sensor ④ will provide output pressure feedback to the control circuit ⑤. The control circuit will balance the input signal and output pressure to ensure that the output pressure remains proportional to the input signal.

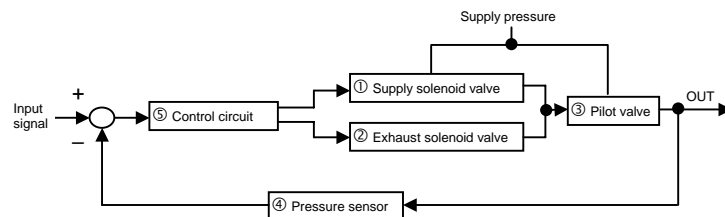


Fig. 1 - Control diagram

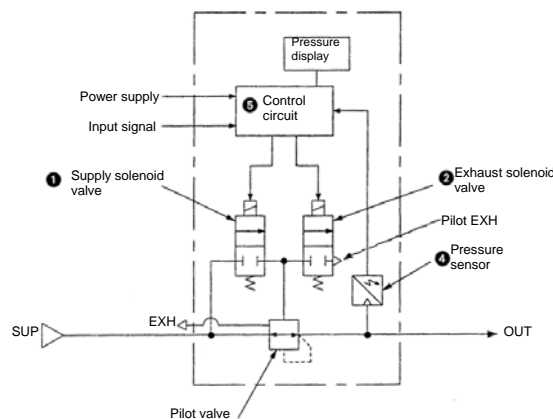


Fig. 2 - Schematic diagram

**4 Wiring**

**Caution**

Connect the cable to the connector on the main unit. Take precautions, as incorrect wiring will damage the unit. Use a DC power supply capable of supplying the necessary power requirements with minimal ripple.

Signal name	Wire colour
+24 V	Pink- Black2
GND	Green-Black2
Signal common	Blue
MSB bit 10	Blue-Black2
bit 9	Grey-Black1
bit 8	Orange-Black1
bit 7	Green-Black1
bit 6	Pink-Black1
bit 5	Blue-Black1
bit 4	Grey
bit 3	Orange
bit 2	Green
LSB bit 1	Pink

Table 2.

**5 Pressure Setting**

Ex) In case that setting pressure is 0.3MPa on ITV2030(0.5MPa specification)

(0.3MPa/0.5MPa) × 1023 = 614 (DEC)=266(HEX)

Binary data of "614"(DEC) is "10 0110 0110"

VALUE	1	0	0	1	1	0	0	1	1	0
SIGNAL	MSB 10bit	9bit	8bit	7bit	6bit	5bit	4bit	3bit	2bit	1bit LSB
INPUT	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF

By inputting 12-24VDC between common and each signal wire, input states becomes "ON".

Common is no polarity.

**6 Function of the 'Error' Display**

If an abnormality is detected by the ITV the LED display will show 'Er' followed by a code number. Isolate the power supply and ascertain the problem and solve. Re-instate power supply after correcting fault. Error codes are as shown in the table below.

No	Content	Display
2	EEProm read/write error	Er 2
3	Memory read/write error	Er 3
4	Solenoid valve fault	Er 4

Table 2.

**7 Installation & Maintenance**

**Caution**

- If the electrical supply fails, settings are 'held' for a short period.
- If the air pressure fails with power 'on' the solenoid will 'flutter'. Turn off the power or input 0 MPa on a preset pressure position.
- If the monitor output function is not used, ensure that the wire is totally insulated.
- This product is pre-set at the factory and must not be dismantled by the user. 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.
- Length of connector cable shall be 10 m maximum.

**8 Contacts**

AUSTRIA	(43) 2262 62280	NETHERLANDS	(31) 20 531 8888
BELGIUM	(32) 3 355 1464	NORWAY	(47) 67 12 90 20
CZECH REP.	(420) 541 424 611	POLAND	(48) 22 211 9600
DENMARK	(45) 7025 2900	PORTUGAL	(351) 21 471 1880
FINLAND	(358) 207 513513	SLOVAKIA	(421) 2 444 56725
FRANCE	(33) 1 6476 1000	SLOVENIA	(386) 73 885 412
GERMANY	(49) 6103 4020	SPAIN	(34) 945 184 100
GREECE	(30) 210 271 7265	SWEDEN	(46) 8 603 1200
HUNGARY	(36) 23 511 390	SWITZERLAND	(41) 52 396 3131
IRELAND	(353) 1 403 9000	UNITED KINGDOM	(44) 1908 563888
ITALY	(39) 02 92711		

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