



Installation and Maintenance Manual
Electro-Pneumatic Regulator
Series ITV10*0-X156, ITV20*0-X156,
ITV30*0-X156, (old number ITV30*0-X38)
(16 point Preset 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.

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	ITV1010-X156 ITV2010-X156 ITV3010-X156	ITV1030-X156 ITV2030-X156 ITV3030-X156	ITV1050-X156 ITV2050-X156 ITV3050-X156
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
Max. flow rate	200 l/min (ANR) ITV10** (SUP: at 1.0 MPa) 1500 l/min (ANR) ITV20** (SUP: at 1.0 MPa) 4000 l/min (ANR) ITV30** (SUP: at 1.0 MPa)		
Supply voltage	24 VDC±10%		
Current consumption	Max. 120 mA		
Input signal	4 bit (Parallel input)		
Input impedance	Max. 4.7 kΩ		
Output signal	NPN - Open collector type: 30 V 30 mA PNP - Open collector type: 30 mA		
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 ² : 0.01, bar: 0.01, PSI: 0.1 ^{Note 1} , kPa: 1	
Protection structure	Main unit: IP65, Cable connector: IP67		

Table 1.

Note 1: 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.

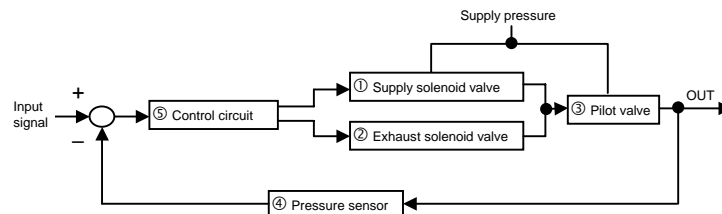


Fig. 1 - Control diagram

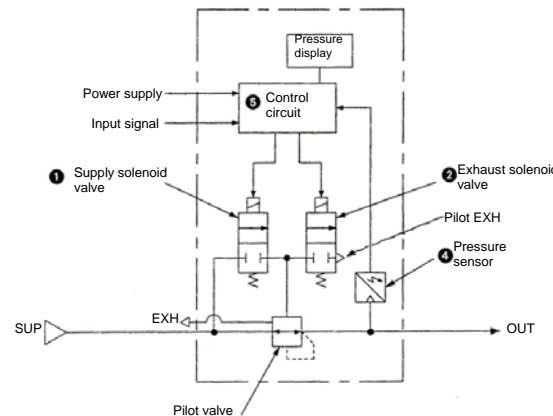


Fig. 2 - Schematic diagram

4 Wiring

Caution

Connect the cable to the connector on the main unit as shown in the following diagram. Take precautions, as incorrect wiring will damage the unit. Use a DC power supply capable of supplying the necessary power requirements with minimal ripple. When 3 m straight cable connection is specified, this refers to the power supply cable, the communications cable should be ordered separately.

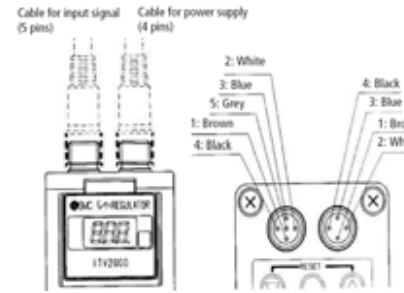


Fig. 3 - Connection details

Item	Pin assignment	Wire colour	
Connector for power supply	1	+24 V	Brown
	2	N.C.	White
	3	GND	Blue
	4	Output signal	Black
Connector for input signal	1	Input 0 bit (S0)	Brown
	2	Input 1 bit (S1)	White
	3	Input 2 bit (S2)	Blue
	4	Input 3 bit (S3)	Black
	5	Input common	Grey

Table 2.

5 Setting the Regulator

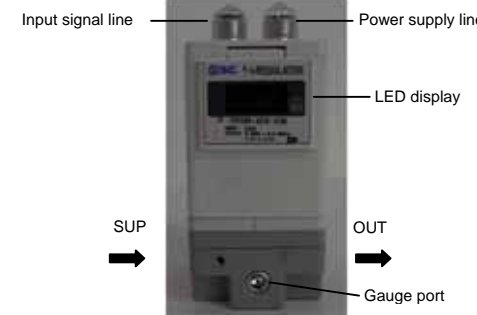


Fig. 4 - Key features of the ITV.

Caution

- After releasing key lock, SET needs to be pressed again to get to F-1

For auto memory function, set F1 and F2 as required, the difference will be divided by 15 and the values assigned to preset memory.

- To set minimum pressure (display shows F-1) use up/down keys and press 'Set' key to 'Lock' setting.
 - To set maximum pressure (display shows F-2) use up/down keys and press 'Set' key to 'Lock' setting.
- To complete auto memory setting, press 'up' and 'down' keys together for longer than 2 seconds. The display shows 'ASE' for an instant and returns to the current pressure display.

If auto memory function is not required, there is no need to set values for F1 or F2. Press 'Set' key until display shows P-1.

- To set preset pressures P1 - P16 use up/down keys and press 'Set' key to 'Lock' setting. Repeat for required preset pressures.
- To return to current pressure display, press 'Set' and 'Up' keys together for longer than 2 seconds.

Note 1: If an error is made whilst setting the regulator, power down the unit and restart the key operation from the beginning.

Note 2: During shipment, all settings for F1, F2 and P1 - P16 will be zero.

5 Setting the Regulator (continued)

Note 3: For safety reasons it is recommended that P1 is zero.
 Note 4: If the above sequence has been followed correctly, the settings will complete automatically.

Note 5: Pressing the set button once more will 'skip' to the next step.
 Note 6: The minimum resolution is determined by the minimum value for the unit displayed.

6 Function of Key-Lock

The keys are locked after connecting power and cannot be operated. 'Loc' is displayed when any keys are pushed.

- Key-Lock Release
 - Push 'Down' key for longer than 2 seconds.
 - Display will flash 'Loc' (locked).
 - Push 'Set' key to unlock.
- Note: To cancel push 'Up' key.

- Key-Lock Push 'Up' key for longer than 2 seconds.
 - Display will flash 'unL' (unlocked).
 - Push 'Set' key to lock.
- Note: To cancel push 'Down' key.

7 Input States for Preset Pressures

Preset pressure	S3	S2	S1	S0
P01	OFF	OFF	OFF	OFF
P02	OFF	OFF	OFF	ON
P03	OFF	OFF	ON	OFF
P04	OFF	OFF	ON	ON
P05	OFF	ON	OFF	OFF
P06	OFF	ON	OFF	ON
P07	OFF	ON	ON	OFF
P08	OFF	ON	ON	ON
P09	ON	OFF	OFF	OFF
P10	ON	OFF	OFF	ON
P11	ON	OFF	ON	OFF
P12	ON	OFF	ON	ON
P13	ON	ON	OFF	OFF
P14	ON	ON	OFF	ON
P15	ON	ON	ON	OFF
P16	ON	ON	ON	ON

Table 3.

8 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
1	Input signal is outside specification	Er 1
2	EEProm read/write error	Er 2
3	Memory read/write error	Er 3
4	Solenoid valve fault	Er 4
5	Switch output over-current	Er 5

Table 4.

Caution

Maximum load current is 30 mA. If more load current flows, "Er.5" is displayed and the switch output function stops. The pressure control does not stop. Keep in mind this difference.

9 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.

10 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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URL : [http:// www.smcworld.com](http://www.smcworld.com) (Global) [http:// www.smceu.com](http://www.smceu.com) (Europe)

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