



# Installation and Maintenance Manual Series ITV20\*0-X156, ITV30\*0-X38 (16 point Preset Input Type). Electro-Pneumatic Regulator

For future reference, please keep this manual in a safe place

This manual should be read in conjunction with the current catalogue

## 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 label 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. (Note 1): ISO 4414: Pneumatic fluid power-Recommendations for the application of equipment to transmission and control systems. (Note 2): JIS B 8370 : Pneumatic system axiom

**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.

## 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 component 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. Switch off air and electrical supplies and exhaust all residual compressed air in the system.
- 3) 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.)

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 beverage, 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.

## CAUTION

Ensure that the air supply system is filtered to 5 micron

## Specifications

Model	ITV2010 - X156	ITV2030 - X156	ITV2050 - X156
	ITV3010 - X38	ITV3030 - X38	ITV3050 - X38
Min. Supply Pressure	Setting Pressure + 0.1 MPa		
Max. Supply Pressure	0.2 MPa (2.0 kgf/cm <sup>2</sup> )	1.0 MPa (10.2 kgf/cm <sup>2</sup> )	
Setting Pressure Range	0.005-0.1MPa	0.005-0.5MPa	0.005-0.9MPa
Max. Flow Rate	1500 l/min (ANR) ITV20** (SUP: at 0.7 MPa) 5000 l/min (ANR) ITV30** (SUP: at 0.7 MPa)		
Supply Voltage	24 VDC ±10%		
Current Consumption	0.12A or less (at constant output)		
Input Signal	4 bit (Parallel input)		
Input Impedance	4.7 kΩ or less		
Output Signal	NPN Open Collector Type: 30V 30mA PNP Open Collector Type: 30V 30mA		
Output Linearity	±1% or less (Full Scale)		
Repeatability	±0.5% or less (Full Scale)		
Sensitivity	0.2% or less (Full Scale)		
Temperature Characteristics	±0.12% or less (Full Scale)/°C		
Protection Structure	Main unit: IP65, Cable connector: IP67		
Display of Pressure	Accuracy	±3% (Full Scale)	
	Min. Unit	MPa: 0.01, kgf/cm <sup>2</sup> : 0.01, bar: 0.01, PSI: 0.1 (Note 1), kPa: 1	
Ambient and fluid temperature	0-50 °C (without condensation)		

(Note 1) 1 PSI is the minimum unit on ITV2050

## Fig 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

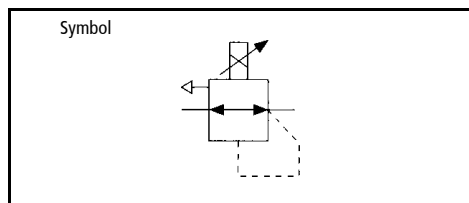


Fig 2

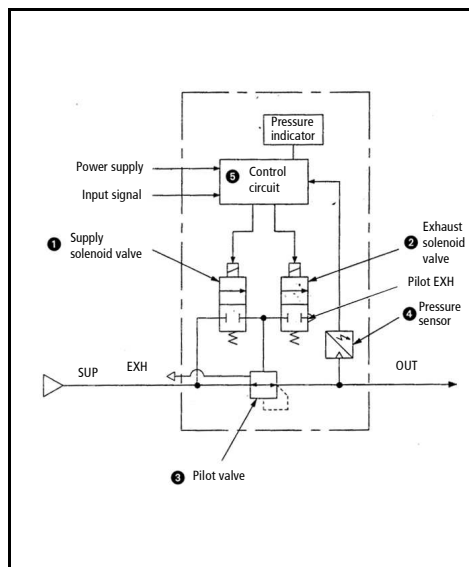


Fig 4

## Function of the 'Error' Display

If an abnormality is detected by the ITV2000 the LED display will show 'Er' followed by a code number. Isolate the power supply and ascertain and solve the problem. Re-instate power supply after correcting fault.

Error codes are as follows:

Nº	Content	Display
1	Input Signal Outside Spec.	Er 1
2	EEPROM Reading/Writing Error	Er 2
3	Memory Reading/Writing Error	Er 3
4	Solenoid Valve Fault	Er 4
5	Switch Output Over-Current	Er 5

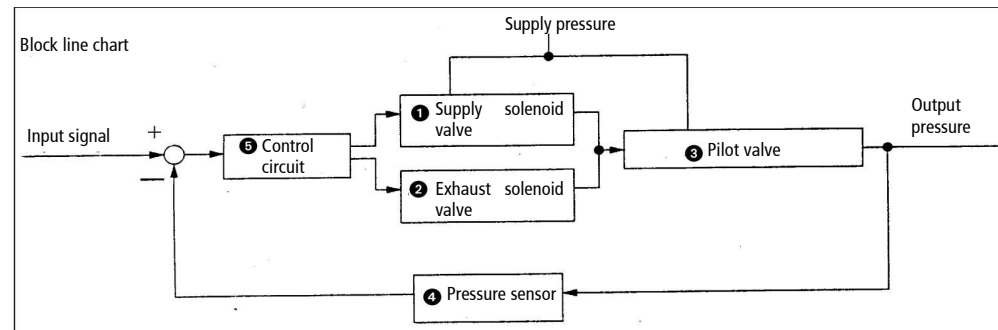


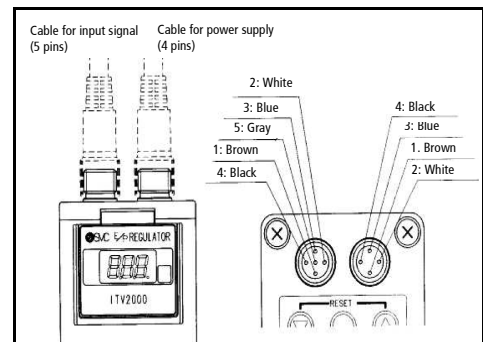
Fig 5

## CAUTION

## Wiring

Connect the cables to the connectors on the unit as shown in the following diagrams. 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 3m straight cable connection is specified, this refers to the power supply cable, the communications cable.



## Assignment of cable signal wire for power supply

Pin nº	Wire color	Description
1	Brown	Supply power
2	White	Without connector
3	Blue	GND
4	Black	Output signal

## Assignment of cable signal wire for signal

Pin nº	Wire color	Description
1	Brown	Input 0 bit (S0)
2	White	Input 1 bit (S1)
3	Blue	Input 2 bit (S2)
4	Black	Input 3 bit (S3)
5	Gray	Input common

Fig 6

## Function of Key-Lock

With input signal applied



The keys are locked after connecting power, and can not be operated. 'Loc' is indicated on Display when any keys are pushed.

1. Key-Lock Release
  - 1) Push 'Down' key for longer than 2 seconds.
  - 2) Display will flash 'Loc' (locked).
  - 3) Push 'Set' key to unlock.

Note: To cancel push 'Up' key.

2. Key-Lock
  - 1) Push 'Up' key for longer than 2 seconds.
  - 2) Display will flash 'unL' (unlocked).
  - 3) Push 'Set' key to lock.

Note: To cancel push 'Down' key.

## Setting the Regulator

## CAUTION

If there is a mishandling in key operation during setting of the regulator, power down the unit and restart the key operation from the beginning.

## CAUTION

One of the preset pressures between P1 and P16 must be selected for each status of input signal, therefore take sufficient care of the status of the input signal when power is supplied to the unit.

## CAUTION

During shipment, all of the settings for F1, F2, P1 - P16 will be zero.

- Release 'Key Lock' as explained in section 'Function of Key-Lock'
- To set minimum pressure (display shows F-1) use up/down keys and press 'Set' key to 'Lock' setting. This minimum pressure setting is only necessary when the auto memory function is selected. If it is not, skip to the next setting.
- To set maximum pressure (display shows F-2) use up/down keys, and press 'Set' key to 'Lock' setting. This maximum pressure setting is only necessary when the auto memory function is selected. If it is not, skip to the next setting.
- To set preset pressure P1 (display shows P-1) use up/down keys, and press 'Set' key to 'Lock' setting. To return to present pressure indication, press 'Set' key and 'Up' key together for longer than 2 seconds.
- To set preset pressure P16 (display shows P-16) use up/down keys, and press 'Set' key to 'Lock' setting.

Note 1: If the above sequence has been followed correctly, the settings will complete automatically. The present pressure will be indicated.

Note 2: If any settings are not required, pressing the 'Set' key once more will 'skip' to the next step.

## Auto Memory Function

In auto memory function, it is possible for F1 and F2 inputs to be divided randomly into 15, and assign each value to a preset memory.

If this function is not required, there is no need to set any value for F1 and F2. Input only the preset pressure from P1 to P16 range as above.

- Release 'Key-Lock' as explained in section 'Function of Key-Lock'
- 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 return to present pressure indication, press 'Set' key and 'Up' key for longer than 2 seconds.
- To complete Auto memory setting, press 'up' key and 'down' key together for longer than 2 seconds. The display shows 'ASE' for an instant, and then returns to present pressure indication.

Note: If the above sequence has been followed correctly, the auto-assignment of preset memory is now complete. Each value assigned is automatically input from P1 to P16.

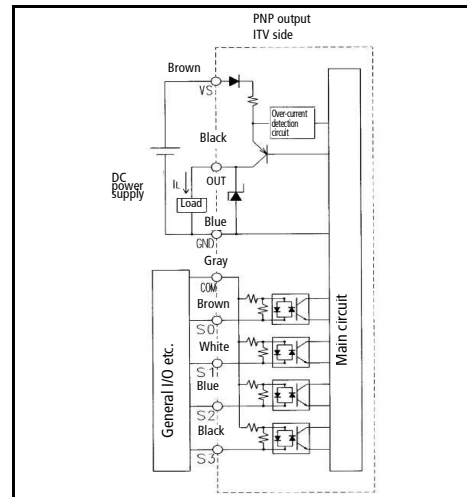
## CAUTION

The minimum resolution pressure is determined by the LED display minimum unit. Please refer to the Specifications table.

## Input Correspondent to Preset Pressure

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

## PNP Output Circuit



## CAUTION

Load current (IL) shall be 30mA or less. If more load current flows, "Er.5" is indicated on LED indicator and switch output function stops. However, pressure control does not stop. Keep in mind this difference.

## CAUTION

1. If the electrical supply fails, settings are 'held' for a short period.
2. If the air pressure fails with power 'on' the solenoid will 'flutter'. Turn off the power to stop the pressure supply or input OMPa into one of the preset pressure positions.
3. If the monitor output function is not used, ensure that the wire is totally insulated.

## CAUTION

1. This product is pre-set at the factory and must not be dismantled by the user. Contact your local SMC office for advice.
2. Ensure, when installing this product, that it is kept clear of power lines to avoid noise interference.
3. Ensure that surge protection is fitted when inductive loads are present (i.e. solenoid, relay etc.).
4. Ensure precautions are in place if the product is used in a 'free flow output' condition. All 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.
5. Ensure all air is exhausted from the product before maintenance.

When you enquire about the product, please contact the following

## SMC Corporation:

	Phone		Phone
AUSTRIA	(43) 2262-62 280	ITALY	(39) 02-92711
BELGIUM	(32) 3-355 1464	NETHERLANDS	(31) 20-531 8888
CZECH REP.	(420) 5-414 24611	NORWAY	(47) 67 12 90 20
DENMARK	(45) 70 25 29 00	POLAND	(48) 22-548 50 85
FINLAND	(358) 9-859 5800	PORTUGAL	(351) 2-610 89 22
FRANCE	(33) 1-64 76 1000	SPAIN	(34) 945-18 4100
GERMANY	(49) 6103 4020	SWEDEN	(46) 8-603 0700
GREECE	(30) 1-342 6076	SWITZERLAND	(41) 52- 396 3131
HUNGARY	(36) 1-371 1343	TURKEY	(90) 212 221 1512
IRELAND	(351) 1-403 9000	UK	(44) 1908-56 3888