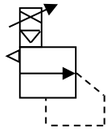
ORIGINAL INSTRUCTIONS

Instruction Manual

Electro-Pneumatic Regulator – High flow rate

ITV11** / ITV21** / ITV31** series



The intended use of the electro-pneumatic regulator is to control the flow and pressure of fluid while connected to an analogue signal.

1 Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “Caution,” “Warning” or “Danger.”
They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC) [*1)], and other safety regulations.

[*1)] ISO 4414: Pneumatic fluid power - General rules relating to systems.
ISO 4413: Hydraulic fluid power - General rules relating to systems.
IEC 60204-1: Safety of machinery - Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots -Safety. etc.

- Refer to product catalogue, Operation Manual and Handling Precautions for SMC Products for additional information.
- Keep this manual in a safe place for future reference.

⚠ 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.

⚠ Warning

- **Always ensure compliance with relevant safety laws and standards.** All work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.
- 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 or radiated disturbances.

⚠ Caution

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

Refer to the SMC website (URL: https//www.smcworld.com) for more information about Safety Instructions.

2 Specifications

2.1 ITV11** / ITV21** / ITV31**

Model		ITV*11*	ITV*13*	ITV*15*
Min. supply pressure		Set pressure + 0.05 MPa		
Max. supply pressure		0.2 MPa	1.0 MPa	
Set pressure range		0.005 to 0.1 MPa	0.005 to 0.5 MPa	0.005 to 0.9 MPa
Power supply	Voltage	24 VDC ± 10%, 12 to 15 VDC		
	Current consumption	0.12 A or less (24 VDC type) 0.18 A or less (12 to 15 VDC type)		
Input signal	Current type [1)]	4 to 20 mADC, 0 to 20 mADC (Sink type)		
	Voltage type	0 to 5 VDC, 0 to 10 VDC		
	Preset input	4 points (Negative common)		
Input impedance	Current type [2)]	250 Ω or less [5)]		
	Voltage type	Approx. 6.5 kΩ		
	Preset input	Approx. 4.7 kΩ (24 VDC type) Approx. 2.0 kΩ (12 VDC type)		
Output signal (monitor output) [2)]	Analogue output	1 to 5 VDC (Output impedance: Approx. 1 kΩ) 4 to 20 mA DC (Sink type) (Load impedance: 250 Ω or less) Output accuracy ±6% F.S. or less		
	Switch output	NPN open collector output: Max. 30 V, 80 mA PNP open collector output: Max. 80 mA		
Linearity		±1% F.S. or less		
Hysteresis		0.5% F.S. or less		
Repeatability		±0.5% F.S. or less		
Sensitivity		0.2% F.S. or less		
Temperature characteristics		±0.12% F.S./°C or less		
Output pressure display [3)]	Accuracy	±2% F.S. ± 1 digit or less		
	Minimum unit	MPa: 0.001, kgf/cm^2: 0.01, bar: 0.01, psi: 0.1 [4)], kPa: 1		
Ambient and fluid temperature		0 to 50°C (no condensation)		
Enclosure		IP65		

Notes

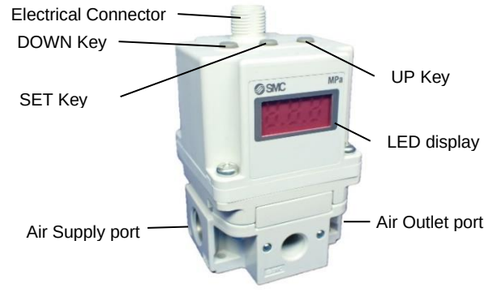
1) 2-wire type 4 to 20 mADC is not available. Power supply voltage (24 VDC or 12 to 15 VDC) is required.
2) Select either analogue output or switch output.
   Further, when switch output is selected, select either NPN or PNP output.
   When measuring the ITV analogue output from 1 to 5 VDC, if the load impedance is less than 100 kΩ, the analogue output monitor accuracy of within ±6% (full span) may not be available.
   The product with an accuracy of within ±6% is supplied upon request. Output pressure remains unaffected.
3) Adjustment of numerical values such as the zero/span adjustment or preset input type is set based on the minimum units for output pressure display (e.g. 0.001 to 0.500 MPa).
   Note that the unit cannot be changed.
4) The minimum unit for 0.9 MPa (130 psi) types is 1 psi.
5) Value for the state with no over current circuit included. If an allowance is provided for an over current circuit, the input impedance varies depending on the input current. This is 350 Ω or less for an input current of 20 mA DC.

Warning

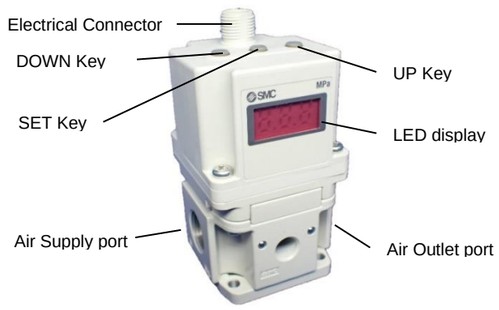
Special products (-X) might have specifications different from those shown in this section. Contact SMC for specific drawings.

3 Names and function of parts

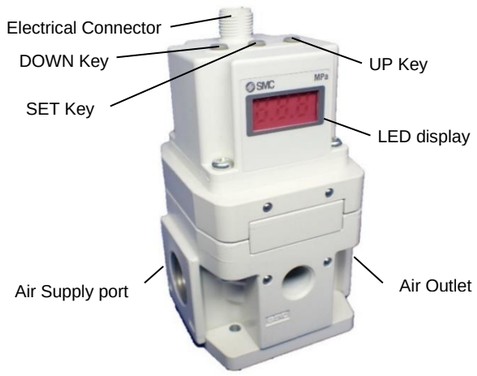
- ITV11**



- ITV21**



- ITV31**



4 Installation

4.1 Installation

⚠ Warning

Do not install the product unless the safety instructions have been read and understood.

- If the power 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.
- 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.
- Length of connector cable shall be 10 m maximum.

4 Installation (continued)

4.2 Environment

⚠ Warning

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact. Check the product specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of the product’s specifications.

4.3 Piping

⚠ Caution

- Before piping make sure to clean up chips, cutting oil, dust etc.
- When installing piping or fittings, ensure sealant material does not enter inside the port. When using seal tape, leave 1 thread exposed on the end of the pipe/fitting.
- Tighten fittings to the specified tightening torque.

4.4 Lubrication

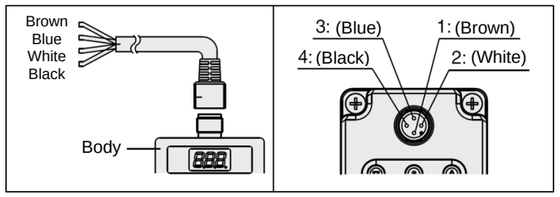
⚠ Caution

- Do not use a lubricator on the input side of this product. If lubrication is required, place the lubricator on the ‘output’ side so that it does not enter the product.
- SMC products have been lubricated for life at manufacture, and do not require lubrication in service.
- If a lubricant is used in the system, refer to the catalogue for details.

5 Wiring

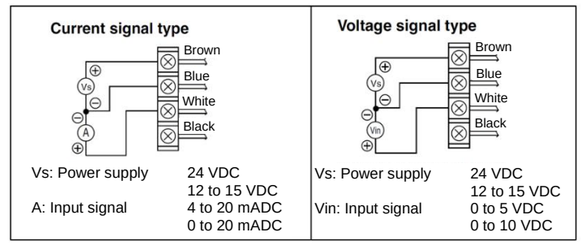
⚠ Caution

- 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.
- Do not insert or remove the connector when the power supply is ON.



No.	Colour	Description
1	Brown	Power supply
2	White	Input signal
3	Blue	GND (COMMON)
4	Black	Monitor output

5.1 Wiring diagram



Note: The right angle type connector extends to the left side (over the supply port side).

6 Settings

Caution

When the ‘SET’ key is operated the minimum/maximum pressure will be present at the outlet port. When primary pressure is applied to the regulator minimum pressure will be present at the outlet port.

- Release the ‘Key Lock ’as explained in section ‘Key-Lock Function’.
- After releasing the key lock, press the ‘SET’ key again to move to F-1.
- To set the minimum pressure (display shows F-1) use the UP/DOWN keys and press the ‘SET’ key to ‘Lock’ the setting.
- To set the maximum pressure (display shows F-2) use the UP/DOWN keys and press the ‘SET’ key to ‘Lock’ the setting.

Note 1: If the above sequence has been followed correctly, the settings will complete automatically.
Note 2: If only setting the minimum pressure, when pressure is ‘SET’, pressing the set button once more will ‘skip’ to the next step.

6.1 Key-Lock function

The keys will be locked and cannot be operated when the power is supplied. ‘Loc’ is displayed when any keys are pressed.

Key-Lock Release

- Press the ‘DOWN’ key for 2 seconds or more.
- Display will flash ‘Loc’ (locked).
- Press the ‘SET’ key to unlock.
  Note: To cancel press the ‘UP’ key.

Key-Lock

- Press the ‘UP’ key for 2 seconds or more.
- Display will flash ‘unL’ (unlocked).
- Press the ‘SET’ key to lock.
  Note: To cancel press the ‘DOWN’ key.

6.2 Error Display

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

No	Content	Display
1	Input signal is outside the 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
6	Outside of the Zero-clear range	Er 6

6.3 Reset function

- Press the ‘UP’ and ‘DOWN’ keys simultaneously for 3 seconds or more.
- Display will indicate ‘RES’.
- Release keys to reset minimum pressure and maximum pressure.

6.4 Zero-clear function

- Press the ‘SET’ key for 2 seconds or more.
- Press the ‘UP’ and ‘DOWN’ keys.
  Display will indicate ‘F03’.
- Press the ‘SET’ key.
  Display will indicate ‘OcL’ (Flashing).
- Press the ‘UP’ and ‘DOWN’ keys simultaneously.
  Display will indicate ‘Ocl’.
- Press the ‘UP’ and ‘DOWN’ keys simultaneously for 3 seconds or more.
  Display will indicate ‘clr’ (1second).
- Zero-clear is complete.

6 Settings (continued)

6.5 Initialization

- Press the ‘SET’ key for 2 seconds or more.
- Press the ‘UP’ and ‘DOWN’ keys.
  Display will indicate ‘F99’.
- Press the ‘SET’ key.
  Display will indicate ‘ini’ (Flashing).
- Press the ‘UP’ and ‘DOWN’ keys simultaneously.
  Display will indicate ‘ini’.
- Press the ‘UP’ and ‘DOWN’ keys simultaneously for 5 seconds or more.
  Display Turns OFF (for 1 second).
- Initialization is complete.

7 How to Order

Refer to the operation manual or catalogue on the SMC website (URL: http// www.smcworld.com) for How to order information.

8 Outline dimensions

Refer to the operation manual or catalogue on the SMC website (URL: http// www.smcworld.com) for outline dimensions.

9 Maintenance

Caution

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- If handled improperly, compressed air can be dangerous.
- Maintenance of pneumatic systems should be performed only by qualified personnel.
- Before performing maintenance, turn off the power supply and be sure to cut off the supply pressure. Confirm that the air is released to atmosphere.
- After installation and maintenance, apply operating pressure and power to the equipment and perform appropriate functional and leakage tests to make sure the equipment is installed correctly.
- If any electrical connections are disturbed during maintenance, ensure they are reconnected correctly and safety checks are carried out as required to ensure continued compliance with applicable national regulations.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.
- Ensure all air is exhausted from the product before maintenance.

10 Limitations of Use

11.1 Limited warranty and Disclaimer/Compliance Requirements
Refer to Handling Precautions for SMC Products.

11 Product disposal

This product should not be disposed of as municipal waste. Check your local regulations and guidelines to dispose of this product correctly, in order to reduce the impact on human health and the environment.

12 Contacts

Refer to www.smcworld.com or www.smc.eu for your local distributor / importer.

SMC Corporation

URL : https:// www.smcworld.com (Global) https:// www.smc.eu (Europe)
SMC Corporation, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, Japan
Specifications are subject to change without prior notice from the manufacturer.

Template DKP50047-F-085M