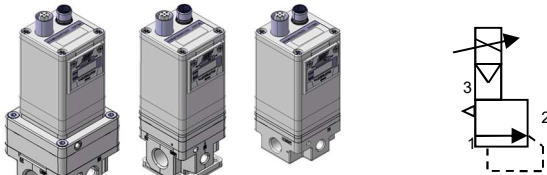




ORIGINAL INSTRUCTIONS

Instruction Manual
Electro-Pneumatic Regulator
PROFIBUS DP
ITV*0*0-PR**** Series



The intended use of the electro-pneumatic regulator is to control the flow and pressure of fluid while connected to PROFINET communication.

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)^{*)}, and other safety regulations.
- *) 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: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots.
- 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	Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
	Warning	Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
	Danger	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 General specifications

Model	ITV*010	ITV*030	ITV*050	ITV2090
Min. supply pressure	(Set pressure) + 0.1 MPa			(Set pressure) -13.3 kPa
Max. supply pressure	0.2 MPa	1.0 MPa		-101 kPa
Set pressure range	0.005 to 0.1 MPa	0.005 to 0.5 MPa	0.005 to 0.9 MPa	-1.3 to -80 kPa
Supply voltage	24 VDC ± 10%,			
Current consumption	0.14 A or less ¹⁾			
Input / output data	12bit / 12bit (data 4095 corresponds to 100% F.S.)			
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			
Ambient and fluid temperature	0 to 50°C (no condensation)			
Enclosure rating	IP65			

Note 1) Excluding current consumption of communication line for PROFIBUS DP.

2.2 Size / Weight specifications

Model	ITV10*0	ITV20*0	ITV30*0
Size (mm)	50×50×124	50×50×146	66×66×167
Weight (no options)	350 g	450 g	750 g

2.3 Communication specifications

Item	Specification	Remarks
Communication protocol	PROFIBUS DP	For DP-V0
Baud rate ^(Note)	9.6 k / 19.2 k / 45.4 k / 93.75 k / 187.5 k / 500 k / 1.5 M / 3 M / 6 M / 12 Mbps	Setting by master
GSD-File	SMC_1412.GSD	
Occupied area (Input/output data)	IN:16 bit (2Byte) OUT:16 bit (2Byte) DIAG:56 bit (7Byte)	Lower 2 bits of 7 bytes of diagnostic area are for diagnostic information.
Communication data resolution	12 bit (4096 resolution)	
Output pressure condition at communication error	Clear (Output pressure becomes zero.)	
Address setting	Switch setting / Software setting	Set using switches
Terminator	Built into the product	Set using switches

Note) Baud rate is related to the communication distance.

Warning

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

3 Installation

3.1 Installation

Warning

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

3.2 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.

3.3 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.

3.4 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 to be used in the system, refer to the catalogue for details.

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.

The 3 m straight cable specified refers to the power supply cable. The communication cable should be ordered separately.

4.1 Power supply connector

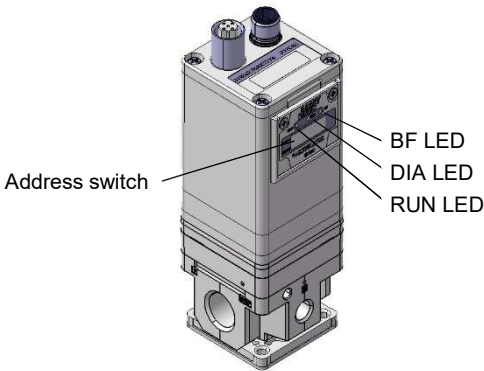
Item	Pin assignment	Wire colour
Connector for power supply		1. +24V Brown
		2. F.G. White
		3. GND Blue
		4. N.C. -

4.2 Communication connector

Item	Pin assignment	Wire colour
Connector for communication		1. N.C. -
		2. RXD/TXD_N(A) Green
		3. N.C. -
		4. RXD/TXD_P(B) Red
		5. N.C. -

Note: Wire colours shown are when the optional cable is used.

5 LED Display



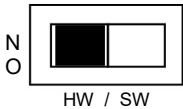
Item	LED ON	LED OFF
BF	PROFIBUS communication error (Red)	PROFIBUS communication
DIA	Diagnostic error (Red)	Internal operation is normal
RUN	Power ON (Green)	Power OFF

6 Settings

Caution

- Turn OFF the power supply before setting the switches.
- Setting the address switch requires the removal of 4 screws in the front panel of the product.
- Take care as the panel hinges to a maximum of 90 degrees.
- After setting the switches, always close and fix the panel securely. Tighten the screws to a torque of 0.6 – 0.8 N·m.

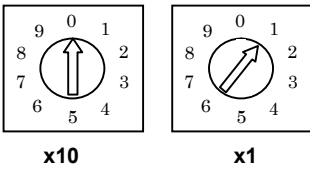
6.1 Address setting mode switch



- The Node address of the product can be set using software mode (SW) or hardware mode (HW).
When software (SW) mode is selected, the communication master sets the node address.
The setting range is 1 to 125.

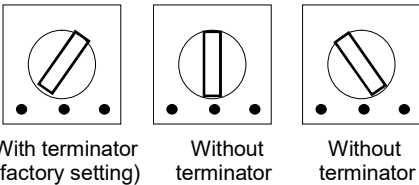
6.2 Address setting switch

- In hardware (HW) mode use the switches shown, to set the node address.
The node address setting range is 01 to 99.
Setting at the time of shipment is 01.



6.3 Terminator setting switch

Set the line terminator for the PROFIBUS communication.



When the product is connected to the PROFIBUS communication line, ensure the switch is set to “with terminator”.

7 Communication Data Allocation

Target value (O area)	Set target value (from PLC to ITV) Resolution: 12 bit (100 %F.S.), Occupied byte: 2 Byte <table><tr><td>0</td><td>0</td><td>0</td><td>*</td><td>Target value (lower 12 bits)</td></tr><tr><td>b15</td><td></td><td></td><td>b11</td><td>b0</td></tr></table>	0	0	0	*	Target value (lower 12 bits)	b15			b11	b0								
0	0	0	*	Target value (lower 12 bits)															
b15			b11	b0															
Output pressure (I area)	Put 0 in upper 4 bits (Note) Monitor the output pressure(from ITV to PLC) Resolution: 12 bit (100 %F.S.), Occupied byte: 2 Byte <table><tr><td>0</td><td>0</td><td>0</td><td>*</td><td>Output pressure (lower 12 bits)</td></tr><tr><td>b15</td><td></td><td></td><td>b11</td><td>b0</td></tr></table> Resolution may exceed 12bit depending on control conditions.	0	0	0	*	Output pressure (lower 12 bits)	b15			b11	b0								
0	0	0	*	Output pressure (lower 12 bits)															
b15			b11	b0															
Diagnostic (DIA)	Monitors the product error. 7 bytes are occupied for external diagnostic data. Diagnostic data allocated to byte 7, as shown below. Byte7 <table><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>B</td><td>A</td></tr><tr><td>b7</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>b0</td></tr></table> A. Internal diagnostic error 0: Normal 1: Error B. Over range error 0: Normal 1: Error	0	0	0	0	0	0	0	B	A	b7								b0
0	0	0	0	0	0	0	B	A											
b7								b0											

Note: Although 100% F.S. for target value is 12 bit, communication is available up to 150% F.S. (accuracy is guaranteed up to 100% F.S.)
Over range error is output when 150% F.S. is exceeded.

- Output pressure at this time is controlled by the input data immediately before the error occurred.
- Pressure can be set by sending the input data, in which F.S. consists of 12 bits, to the E/P regulator through the master PLC (target value to word area).

Setting data	0000h	0FFFh	[(a/F.S.) x 4095] HEX
Output pressure	0% x F.S. (=0)	100% x F.S.	a

8 How to Order

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

9 Outline Dimensions

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

10 Maintenance

10.1 General 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.

11 Limitations of Use

11.1 Limited warranty and disclaimer/compliance requirements

Refer to Handling Precautions for SMC Products.

12 Product Disposal

This product shall 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.

13 Contacts

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

SMC Corporation

URL : [https:// www.smcworld.com](https://www.smcworld.com) (Global) [https:// www.smc.eu](https://www.smc.eu) (Europe)
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