ITV2-RC-TFM135

Installation and Maintenance Manual

Electro-Pneumatic Regulator (for RS232C)

ITV10*0-RC*-Q,***
ITV20*0-RC*-Q,***
ITV30*0-RC*-Q***

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	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	1.0 MPa	-101 kPa
Set pressure range	0.005 ~ 0.1 MPa	0.005 ~ 0.5 MPa	0.005 ~ 0.9 MPa	-1.3 ~ -80 kPa
Supply voltage	24 VDC±10%			
Current consumption	Max. 120 mA			
Input/output data	10bit/10bit (data 1023 corresponds to 100%F.S.)			
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)			
Protection structure	IP65			

Model	ITV10*0	ITV20*0	ITV30*0
Size (mm)	50×50×109	50×50×131	66×66×152
Weight (No option)	320 g	420 g	720 g

Table 1.

3 Operation Principle

When the input signal increases the supply solenoid valve ❶ turns on and the exhaust solenoid valve ❷ turns off. Supply pressure is passed to the pilot valve ❸ 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 ❹ will provide output pressure feedback to the control circuit ❺. The control circuit will balance the input signal and output pressure to ensure that the output pressure remains proportional to the input signal.

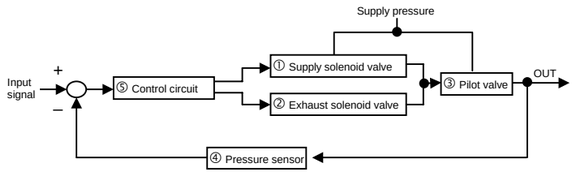


Fig. 1 - Control diagram

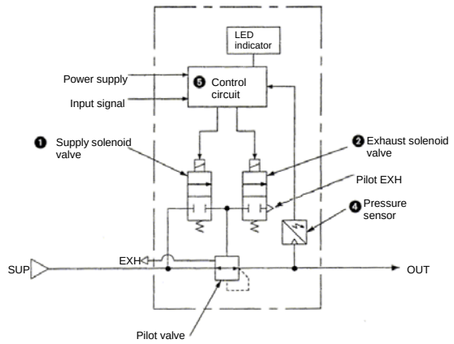
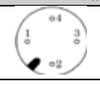


Fig. 2 - Schematic diagram

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.

Item	Pin assignment		Wire colour (Note)
Connector for power supply		1. +24V	Brown
		2. N.C.	White
		3. GND	Blue
		4. N.C.	Black
Connector for communication		1. N.C.	Brown
		2. TxD	White
		3. RxD	Blue
		4. GND	Black
		5. N.C.	Grey

Note: Wire colour when the optional cable is used.
S type P398020-500-3, P398020-502-3,
L type P398020-501-3, P398020-503-3.

5 LED Display and Communication Protocol

• LED Display

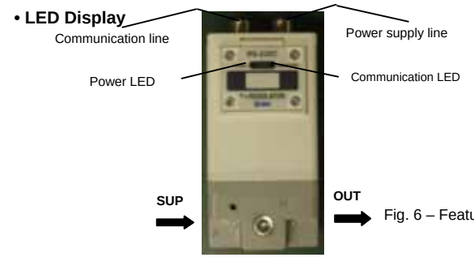


Fig. 6 – Features of the ITV.

Status	Power LED	Communication LED
Waiting input	Green light ON	Light OFF
Receiving	Green light ON	Green light ON
Waiting input/ at error	Red light ON	Light OFF
Receiving/ at error	Red light ON	Green light ON

- **Communication Protocol**

Item	Specification
Comm. type	Master/slave type
Synchronous type	Asynchronous type
Comm. speed	9,600 bps
Start bit	1 bit
Data length	8 bit
Stop bit	1 bit
Parity bit	N/A
Flow control	N/A
Command end code	CR • LF
Character code	ASCII

6 Pressure Setting and Output Monitoring

- Set output pressure

Command	Content	Response	Content
SET nn	Set output pressure (0 - 1023)	nn	0 to 1023
		Out of range	1023 < nn <= 9999
		Unknown command	Except 0 <= nn <= 9999

Note) nn is limited to integral values from 0 to 1023.

- Increase setting for output pressure

Command	Content	Response	Content
INC	Adds 2 to the set data of output pressure.	mm	Indicates the set data plus 2

Note) When set data nn is >= 1021, the value is set as nn=1023.

- Decrease setting for output pressure

Command	Content	Response	Content
DEC	Subtracts 2 to the set data of output pressure.	mm	Indicates the set data minus 2

Note) When set data nn is <= 2, the value is set as nn=0.

- Request for set data

Command	Content	Response	Content
REQ	Request for set data	nn	Displays set data

6 Pressure Setting and Output Monitoring (continued)

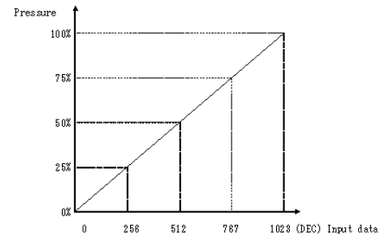
- Request of output pressure data

Command	Content	Response	Content
MON	Request for output pressure data	nn	Displays output pressure data

Pressure setting can be done by sending input data using 10 bit as F.S. to the electro-pneumatic regulator through the master PLC.

Set Data	0	1023	(a/F.S.) × 1023_{DEC}
Output pressure	0%×F.S.(=0)	100%×F.S.	a

EX.) To set pressure at 0.3 MPa by ITV2030 (for 0.5 MPa type)
(0.3 MPa / 0.5 MPa) × $1023=614_{DEC}$
A pressure of 0.3 MPa is set by sending input data of “614” to the electro-pneumatic regulator through the master PLC.
Send "SET 614"



7 Installation & Maintenance

⚠ Caution

- 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
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