



Operation Manual

PRODUCT NAME

*E/P Regulator
(For RS-232C)*

MODEL/ Series/ Product Number

ITV1000/2000/3000/2090-RC Series*

SMC Corporation

Contents

Safety Instructions	P2
Handling precautions	P4
Wiring method and LED indication	P6
Communication specification	P7
Pressure setting method	P7
Communication protocol	P8
Maintenance and inspection	P9



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 and safety requirements for systems and their components
ISO 4413: Hydraulic fluid power - General rules and safety requirements for systems and their components
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
etc.



Danger

Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.



Warning

Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.



Caution

Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Our products cannot be used beyond their specifications. Our products are not developed, designed, and manufactured to be used under the following conditions or environments. Use under such conditions or environments is not covered.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Use for nuclear power, railways, aviation, space equipment, ships, vehicles, military application, equipment affecting human life, body, and property, fuel equipment, entertainment equipment, emergency shut-off circuits, press clutches, brake circuits, safety equipment, etc., and use for applications that do not conform to standard specifications such as catalogs and operation manuals.
3. Use for interlock circuits, except for use with double interlock such as installing a mechanical protection function in case of failure. Please periodically inspect the product to confirm that the product is operating properly.



Safety Instructions

Caution

We develop, design, and manufacture our products to be used for automatic control equipment, and provide them for peaceful use in manufacturing industries.

Use in non-manufacturing industries is not covered.

Products we manufacture and sell cannot be used for the purpose of transactions or certification specified in the Measurement Act.

The new Measurement Act prohibits use of any unit other than SI units in Japan.

Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements". Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)

Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.

This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

***2) Vacuum pads are excluded from this 1 year warranty.**

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.

Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty

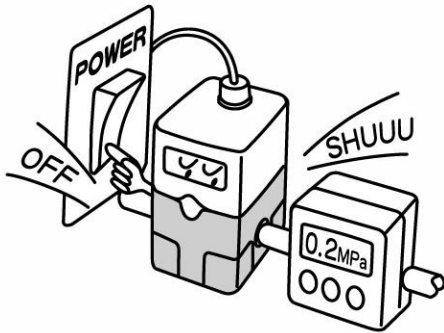
Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.

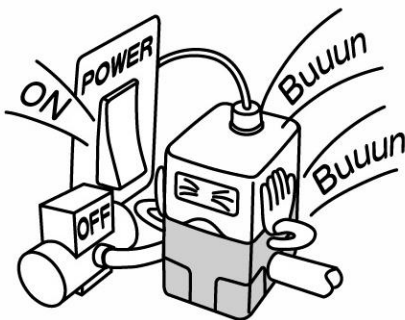
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

Handling precautions

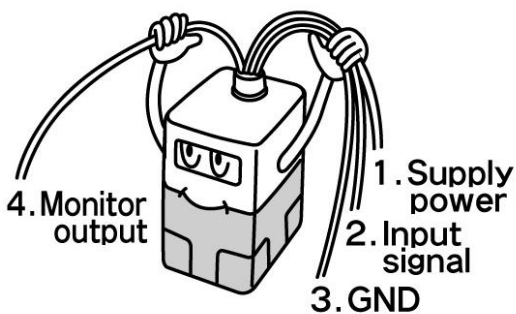
Caution



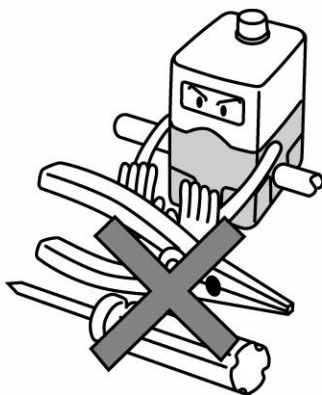
If the power supply to this product is turned off due to a power failure during normal operation, the output on the secondary side will be held and air will flow continuously.



If supply pressure to this product is interrupted or shut off, while the power is still on, the internal solenoid valve will continue to operate and a humming noise will be generated.
Turn off the power supply when supply pressure is interrupted or shut off, since the life of the product may be shortened.

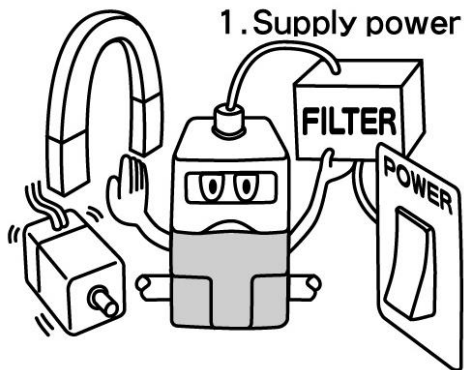


The optional cable connector is a 4 wire type. When the monitor output (switch output) is not being used, prevent the unused wires from touching the other wires, as a malfunction could occur.



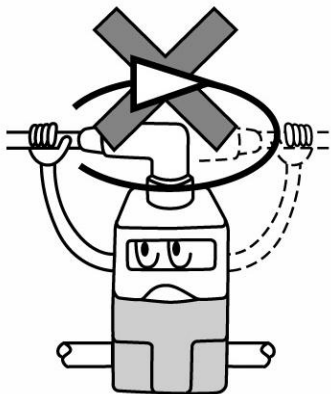
This product is adjusted to specification at the time of shipment from the factory. Avoid careless disassembly or removal of parts, as this can lead to malfunction.

Caution



Take the following steps to avoid malfunction due to noise.

1. Install a line filter etc. to the AC power line to reduce / eliminate power supply noise.
2. Avoid malfunction due to noise by installing this product and its wiring away from strong electric fields, such as those of motors and power cables, etc.
3. Be sure to implement protective measures against load surge for inductive loads (solenoid valves, relays etc.).
4. Turn off the power supply before inserting or removing the connector.



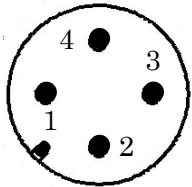
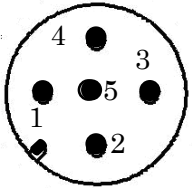
Please note that the right angled cable connector does not rotate and is limited to only one entry direction.

Wiring method and LED indicator

⚠ CAUTION

- ① Incorrect wiring may lead to breakage.
- ② Select a DC power supply with adequate capacity with low ripple.
Ex.) Class 2 voltage source. UL1310 compliant.
- ③ Insert/pull out the connector after cutting the power supply.
- ④ The right angle cable connector does not rotate. Do not rotate it.
- ⑤ For communication master (PLC), we recommend using a product for RS-232C communication with SELV circuit which is compliant to IEC 60950-1, electrical safety standard.

■ Pin assign of ITV side connector

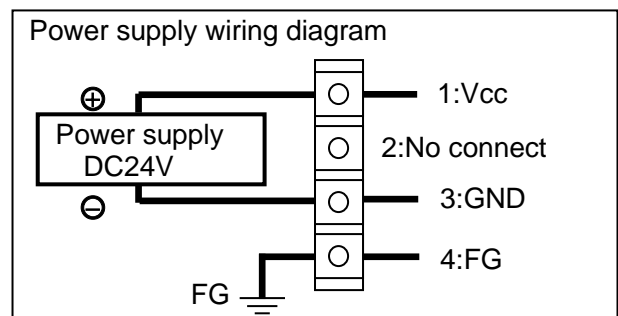
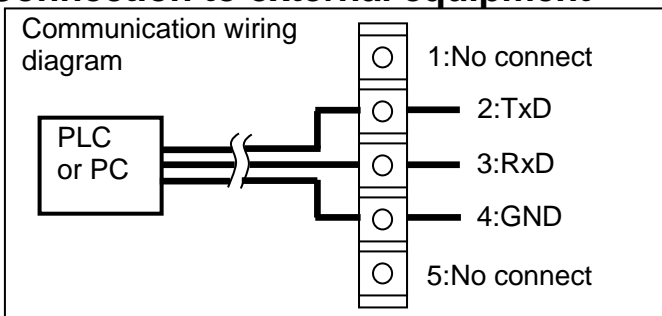
Item	Pin assign	Wire color (Note 1)	
Power supply connector		1. Vcc	Brown
		2. No Connect	White
		3. GND ^{Note3}	Blue
		4. FG	Black
Communication connector		1. No Connect	Brown
		2. TxD ^{Note2}	White
		3. RxD ^{Note2}	Blue
		4. GND ^{Note3}	Black
		5. No Connect	Gray

Note1) Wire color is when the option cable is used.

Note2) TxD is transmission data from ITV, and RxD is received data of ITV.

Note3) Please wire so as not to cause the potential difference between power GND and communication GND.

■ Connection to external equipment



■ LED indication

Status	POWER LED	COMMUNICATION LED
Waiting input	Green lights up	light off
Receiving	Green lights up	Green lights up
Waiting input/ at error	Red lights up	light off
Receiving/ at error	Red lights up	Green lights up

Communication specification

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

Pressure setting method

Pressure setting can be done by sending input data (0-1023) to the electro-pneumatic regulator from the master PLC.

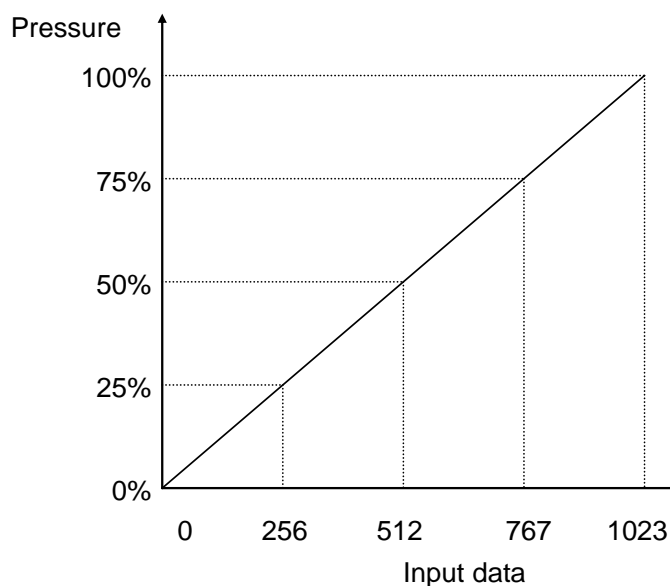
Set Date	0	1023	(a / F.S.) × 1023
Set pressure	0% × F.S. (=0)	100% × F.S.	a

EX.) To set pressure at 0.3MPa by ITV2030(for 0.5MPa type)

$$\frac{0.3\text{MPa}}{0.5\text{MPa}} \times 1023 = 614$$

↑ ↑ ↑
 Set pressure F. S. Set data

A pressure of 0.3MPa is set by sending input data of "SET 614" to the electro-pneumatic regulator through the master PLC.



Communication protocol

The character-code used to communicate is ASCII. Please put space between the command and the numerical value.

■ Setting of output pressure

Command	Content
SET nn	Set required setting data of output pressure (0~1023)

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

Response	Content
nn	Set value nn (0 to 1023)
OUT OF RANGE	$1023 < nn \leq 9999$
UNKNOWN COMMAND	Except $0 \leq nn \leq 9999$

■ Increase setting of output pressure

Command	Content
INC	Add 2 to the setting data of output pressure.

Note) When setting data nn is $nn \geq 1021$, the value is set as $nn=1023$.

Response	Content
mm	indicates the setting data plus 2

■ Decrease setting of output pressure

Command	Content
DEC	Subtract 2 from setting data of output pressure.

Note) When setting data nn is $nn \leq 2$, the values is set as $nn=0$.

Response	Content
mm	indicates the setting data minus 2.

■ Confirmation of setting data

Command	Content
REQ	Require setting data of output pressure .

Response	Content
nn	Feed back setting data nn

■ Requirement of output pressure data

Command	Content
MON	Require output pressure data

Response	Content
nn	Feed back output pressure data nn

Maintenance and inspection

- Turn off the power supply, stop the supplied air, exhaust the residual compressed air and verify the release of air before performing maintenance.
- Foreign matter caught in the inlet of piping or exhaust may interfere with normal operation. Periodic cleaning is necessary.
- Do not use solvents such as benzene, thinner etc. to clean the product including the switch cover. Use a soft cloth to remove stains.

Refer to the SMC website (URL <http://www.smcworld.com>) for more information about troubleshooting.

This operation manual refers to all standard types and is partially applicable to special models.

This operation manual is subject to change without prior notice or any obligation on the part of the manufacturer.

Revision history

A : Addition of connection information
B : Revision of Safety Instruction

SMC Corporation

Tel: + 81 3 5207 8249 Fax: +81 3 5298 5362

URL <https://www.smcworld.com>

Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.

© SMC Corporation All Rights Reserved