



Operation Manual

PRODUCT NAME

*E/P Regulator
(DeviceNet™ type)*

MODEL/ Series/ Product Number

ITV1000/2000/3000/2090-DE Series*

- Install and operate the product only after reading the Operation Manual carefully and understanding its contents.
- Specifically, read the safety instructions carefully.
- Keep this operation manual available whenever necessary.

SMC Corporation

Contents

Contents	P1
Safety Instructions	P2
Handling precautions	P4
Wiring method and LED indication	P6
System configuration	P7
Communication specification	P7
Setting of dipswitch	P8
Pressure setting and output monitoring	P10
Communication data	P10
Maintenance and inspection	P11



E/P Regulator 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 10218-1992: Manipulating industrial robots -Safety.
etc.



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

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. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.

2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.

3. An application which could have negative effects on people, property, or animals requiring special safety analysis.

4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.



E/P Regulator Safety Instructions

Caution

1. The product is provided for use in manufacturing industries.

The product herein described is basically provided for peaceful use in manufacturing industries. If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
If anything is unclear, contact your nearest sales branch.

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.

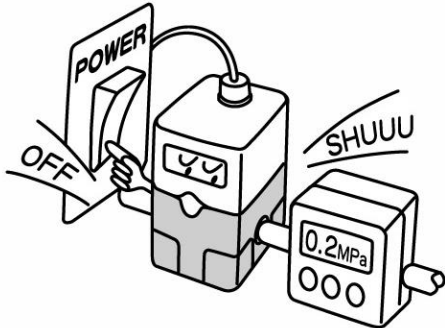
Compliance Requirements

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.

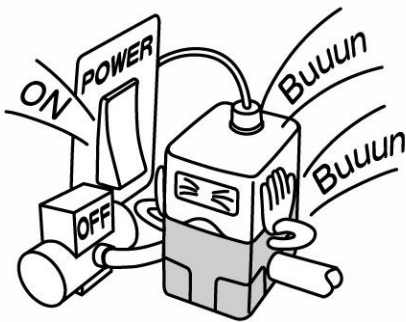
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulation of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

Handling precautions

Caution

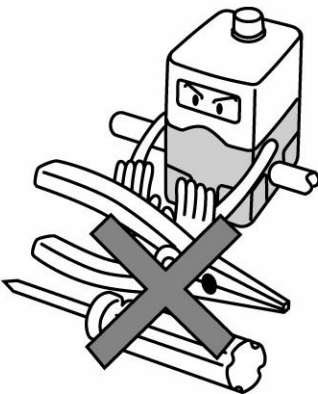


If the power supply to this product is turned off due to a power failure during normal operation, the output on the secondary side will be held and air will flow continuously.




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.

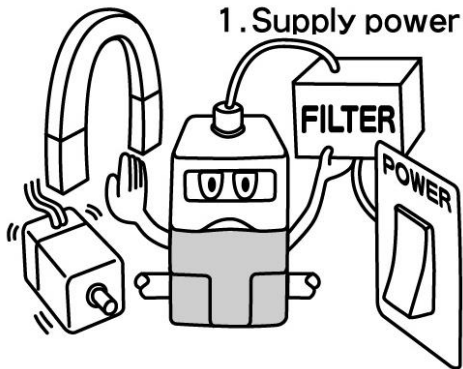
Turn off the power supply when supply pressure is interrupted or shut off, since the life of the product may be shortened.



This product is adjusted to specification at the time of shipment from the factory.

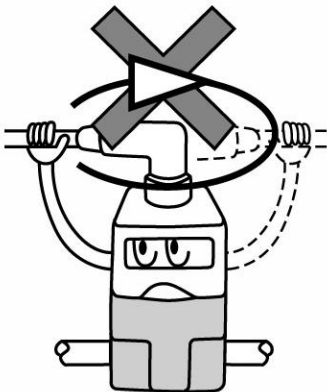
Avoid careless disassembly or removal of parts, as this can lead to malfunction.

 **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.



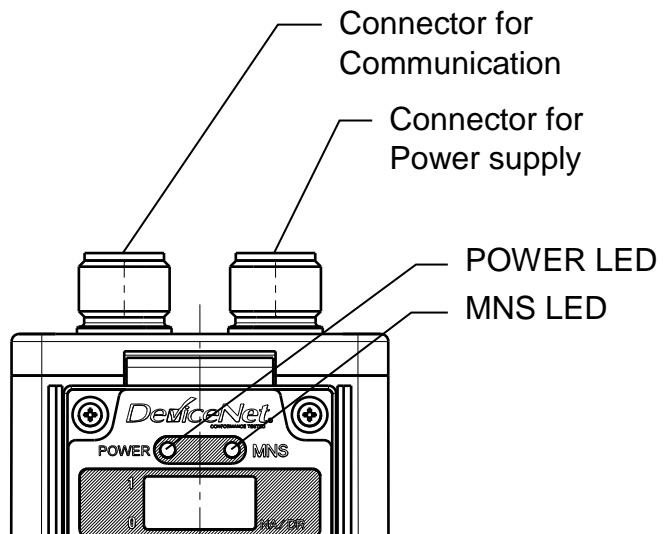
Please note that the right angled cable connector does not rotate and is limited to only one entry direction.

Wiring method and LED indication

⚠ CAUTION

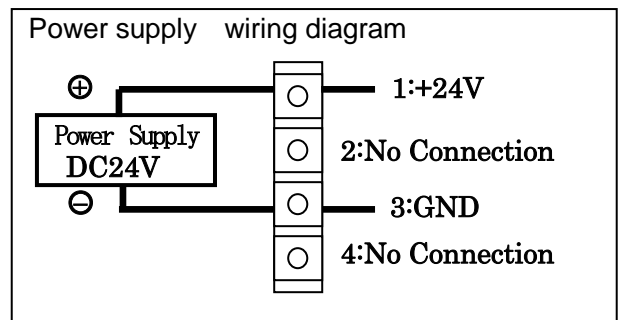
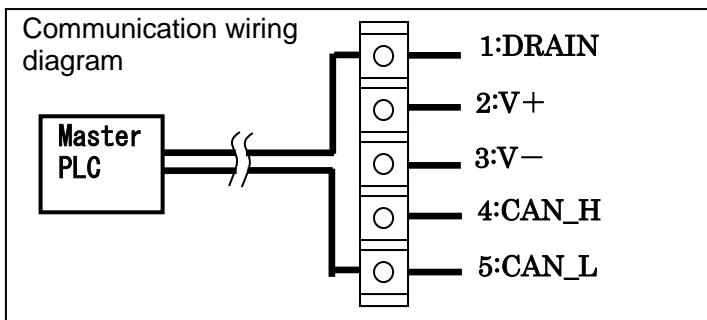
- ① Proceed carefully, as incorrect wiring can cause damage.
- ② Use a DC power supply with sufficient capacity and a low ripple.
Example: Class 2 voltage source. UL1310 compliant.
- ③ Turn off the power supply to remove and insert the connector.
- ④ Never rotate the right angled type connector as it is not designed to rotate.
- ⑤ The communications cable recommends the use of our company PCA-1557633 (socket type).

DeviceNet™ Connector		Power supply Connector	
M12 5PIN CONNECTOR		M12 4PIN CONNECTOR	
1	4	1	4
2	3	2	3
1. DRAIN	Shield	1. Vcc	Brown
2. V+	Red	2. No Connection	-
3. V-	Black	3. GND	Blue
4. CAN H	white	4. No Connection	-
5. CAN L	Blue		



The line color is when the optional cable is used.

■ Connection to external equipment

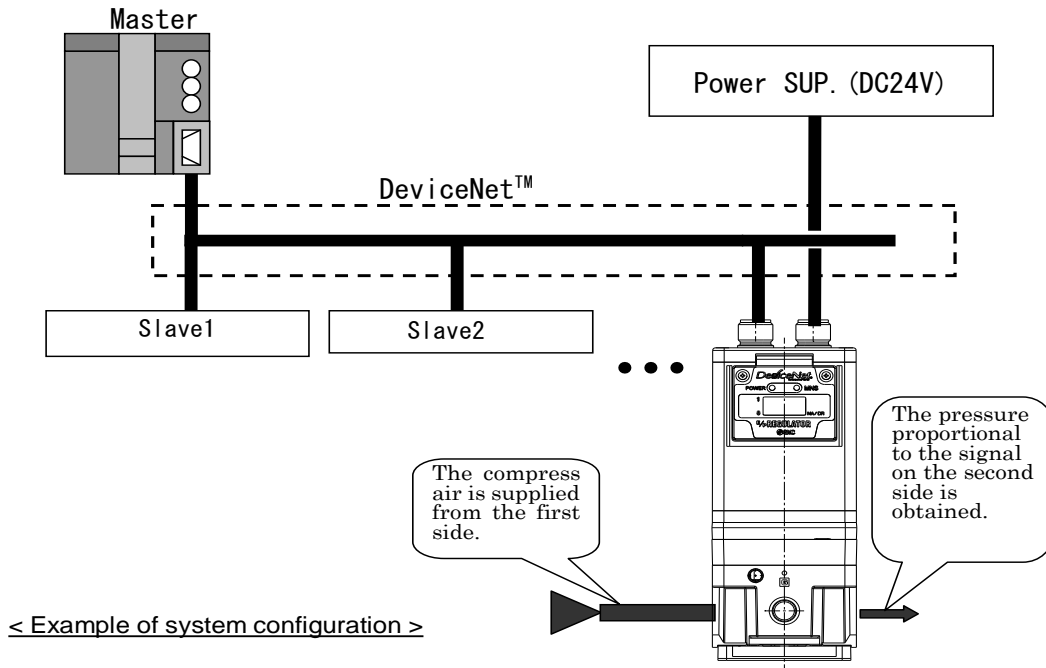


■ LED indication

Item	Turning ON	Turning OFF	Blinking
POWER	Power ON (Green)	Power OFF	—
MOD/NET	ON line (Green)	OFF line	Communication unestablishment (Green)
	Fatal error (Red)		Negligible error (Red) (I/O connection time out)

System configuration

This product is connected to the field bus (DeviceNet™) as a slave.



Communication specification

Item	Specifications	Remarks
Field bus	DeviceNet™	Volume1(Edition3.8) Volume3(Edition1.5)
EDS file	ITV-A.EDS	Down load from Web
Slave type	Group 2 Only	
Device type	00h(Generic Device)	
MAC ID	0 to 63	Due to the dip switch or the master
Baud rate (Note)	125k/250k/500k/ bps	Due to the dip switch or the master
Consumed connection size	2byte (pooled I/O connection)	Target value of pressure
Produced connection size	2byte (pooled I/O connection)	Pressure monitor value
Support message	Polled I/O Explicit	

Note) Baud rate relates to communication distance.

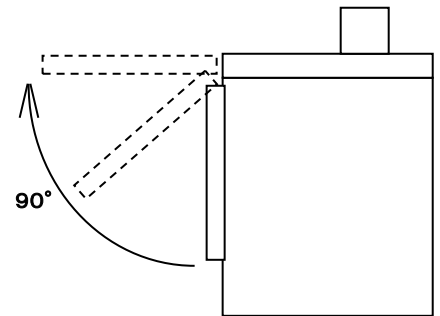
Setting of dipswitch

CAUTION

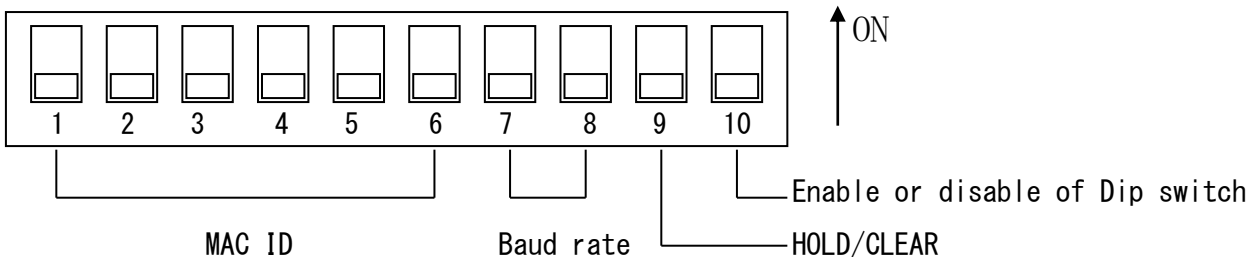
- ① Turn off the power supply while setting the switch.
- ② If there is foreign matter or water droplets around the switch cover, clean it off before opening the cover.
- ③ Refer to the drawing below for the setting at the time of shipment from the factory. Confirm the condition of switches before use and reset if necessary.

■ Setting procedure

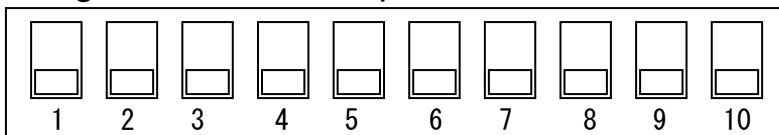
- ① Loosen the screws of the switch cover.
- ② Open the cover from the bottom upwards.
(See drawing)
- ③ Set switches according to the following procedure.
- ④ After setting the switch, tighten the switch cover in the reverse order of the above procedure.
(Tightening torque 0.6 to 0.8Nm)



■ Dipswitch



■ Setting at the time of shipment



Node address: 0 Baud rate: 125kbps
Hold/Clear: Clear Dip switch: enable

■Setting of MAC ID

MAC ID	1	2	3	4	5	6
0	OFF	OFF	OFF	OFF	OFF	OFF
1	OFF	OFF	OFF	OFF	OFF	ON
2	OFF	OFF	OFF	OFF	ON	OFF
:	:	:	:	:	:	:
62	ON	ON	ON	ON	ON	OFF
63	ON	ON	ON	ON	ON	ON

■Setting of baud rate

Baud rate	7	8
125kbps	OFF	OFF
250kbps	OFF	ON
500kbps	ON	OFF
Can not setting	ON	ON

■Setting of Hold/Clear

This switch is selected to hold or clear the output pressure, when the DeviceNet™ line causes a communication error due to disconnection.

Setting	9	Function
Hold	ON	Hold the output pressure
Clear	OFF	Exhaust the output pressure

When switching off the power supply to ITV in the communication, output pressure is maintained. The condition that the communication begins from power supply re-investing time depends on the setting of dip switch No.9.

■Setting of dip switch

This switch is selected to dip switch enable or disable.

Setting	10
enable	OFF
disable	ON

Pressure setting and output monitoring

Pressure setting can be done by sending input data using 12bit as F.S. to the electro-pneumatic regulator through the master PLC (e.g. entering a target value to the output word data area).

Set Date	0000h	0FFFh	$[(a / \text{F.S.}) \times 4095]_{\text{HEX}}$
Output pressure	$0\% \times \text{F.S.}$	$100\% \times \text{F.S.}$	a

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

$$(0.3\text{MPa}/0.5\text{MPa}) \times 4095 = 2457 \text{ (DEC)} = 999 \text{ (HEX)}$$

Pressure of 0.3MPa is set by sending input data of "999" to the electro-pneumatic regulator through the master PLC.

Communication data

I/O data (Poll command sending and receiving data)

Item	Output from PLC (Poll request)	Input to PLC (Poll response)
Data size	2Byte(16bit)	2Byte(16bit)
Communication data	$b_{15}, b_{14}, \dots, b_1, b_0$	$b_{15}, b_{14}, \dots, b_1, b_0$

The I/O data occupies two bytes (16bit) respectively.

The pressure is set (output) or is monitored (input) by the data of b_{15}, \dots, b_1, b_0 .

Subordinate position 12bit $b_{11} \dots b_0$ corresponds to 100%FS of pressure.

The pressure setting is assumed that data 1332h of 120%FS is a limit value.

The accuracy guarantee is to 100%FS.

It might response to PLC a very high numerical value such as FFFFh in around outlet pressure 0. It is because of recognition that pressure is a minus side due to the erro, and this is not a failure. (The response data from 8000h to FFFFh shows a minus side.)

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.

Revision history

A: P11 Addition note
B: overall revision
C: P6 Add cable color

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