



# OPERATION MANUAL

## E/P REGULATOR

MODEL NAME

**ITV1000, ITV2000, ITV3000 series**

Series

《For DeviceNet》

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# 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". To ensure safety, be sure to observe ISO 4414 and other safety practices.

## Definition

Label	Meaning of label
! WARNING	Operator error could result in serious injury or loss of life.
! CAUTION	Operator error could result in injury or equipment damage.

## ! WARNING

**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.

**Only personnel with appropriate training should operate 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 operators.

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

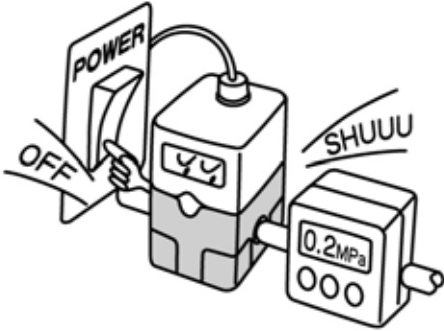
- A. Inspection and maintenance of machinery / equipment should only be performed once measures to prevent falling or runaway of the driver objects have been confirmed.
- B. When equipment is to be removed, confirm the safety process as mentioned above. Cut the supply pressure for this equipment and exhaust all residual compressed air in the system.
- C. Before machinery / equipment is restarted, take measures to prevent shooting-out of cylinder piston rod, etc.

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

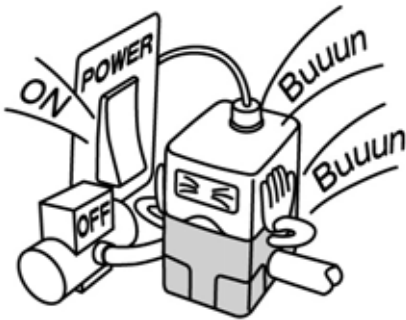
- A. Conditions and environments beyond the given specifications, or if product is used outdoors.
- B. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, clutch and brake circuit in press applications, or safety equipment.
- C. An application which has the possibility of having negative effects on people, property, or animals requiring special safety analysis.

## Precautions for Handling

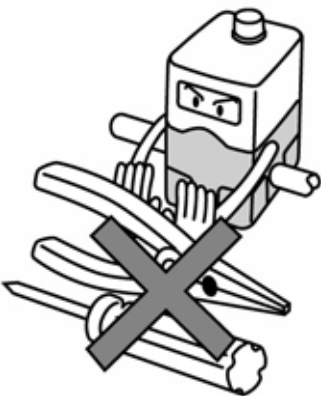
### ! CAUTION



If the power supply for this product is cut due to a power failure during controlling, the output of the secondary side is held temporarily. If the secondary side output is released to the atmosphere, air will keep coming out. Handle with care.



If the pressure supply is cut while power is supplied, the built in solenoid valve will keep operating and may make a buzzing noise. This may affect the life of the solenoid valve. Be sure to cut the power supply to the product when cutting the pressure supply.

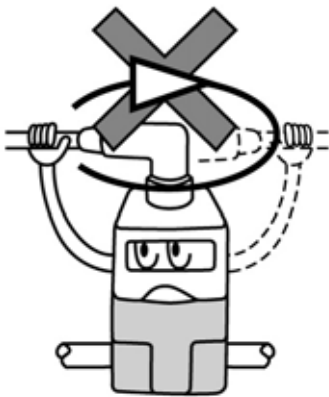
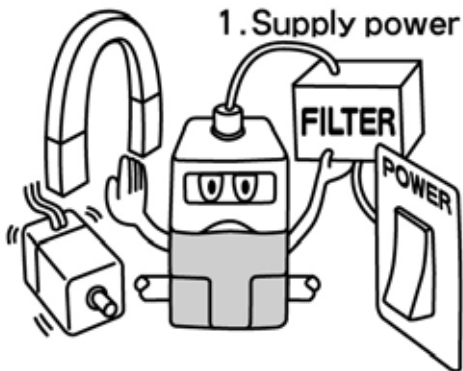


The product is adjusted to each specification at the time of shipment from the factory. Avoid unnecessary disassembly or removal of parts, as this may cause failure.

## ! CAUTION

Take the following measures against malfunction due to noise.

- 1 ) Install a line filter in the AC power supply line to remove noise.
- 2 ) Separate the signal lines from any intense electric field such as motor lines and power transmission lines as far as possible so as not to be affected by noise.
- 3 ) For inductive loads such as solenoid valves and relays, make sure to take measures against load surge.
- 4 ) Ensure the power supply is cut before removing the connector, to avoid the impact of chattering.



The right angle cable connector does not rotate. Do not rotate it.

# Wiring and LED display

## ! CAUTION

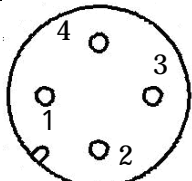
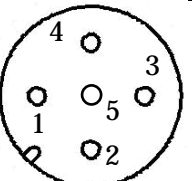
Incorrect wiring may lead to breakage.

Insert/pull out the connector after cutting the power supply.

In the communication cable(5 pins)is connected to the connector for the power supply cable(4 pins) by mistake, the internal substrate can break. Pay attention for connecting the cable.

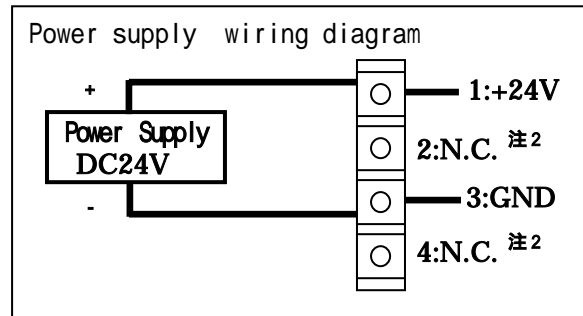
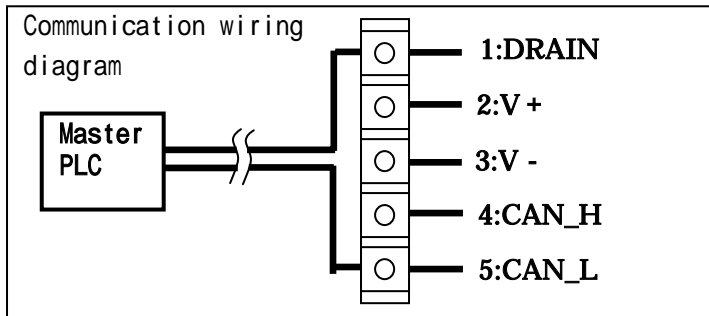
The right angle cable connector does not rotate. Do not rotate it.

### Pin assign of ITV side connector

Item	Pin assign	Wire color (Note 1)	
Power supply connector		1 . +24[V]	Brown
		2 . N.C.	-
		3 . GND	Blue
		4 . N.C.	-
Communication connector		1 . DRAIN	-
		2 . V +	Red
		3 . V -	Black
		4 . CAN_H	White
		5 . CAN_L	Blue

Note1) Wire color when the option cable is used.

### Connection to external equipment



Note 2:

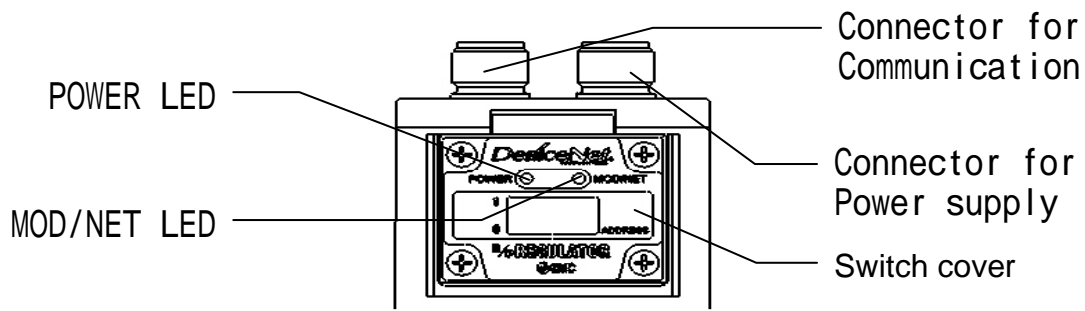
The power cable recommends the 2-wire cable P398020-504-3(S type) or P398020-505-3 (L type). Please never wire for neither pin 2 nor pin 4 when you use other 4-wire cables. An internal substrate might be damaged.

The communications cable recommends the use of our company PCA-1557633.

Select a DC power supply with adequate capacity with low ripple.

Ex. : Class 2 voltage source. UL1310 compliant.

For communication master (PLC), we recommend using a product for Device Net communication with SELV circuit which is compliant to IEC 60950-1, electrical safety standard.



**LED indication**

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

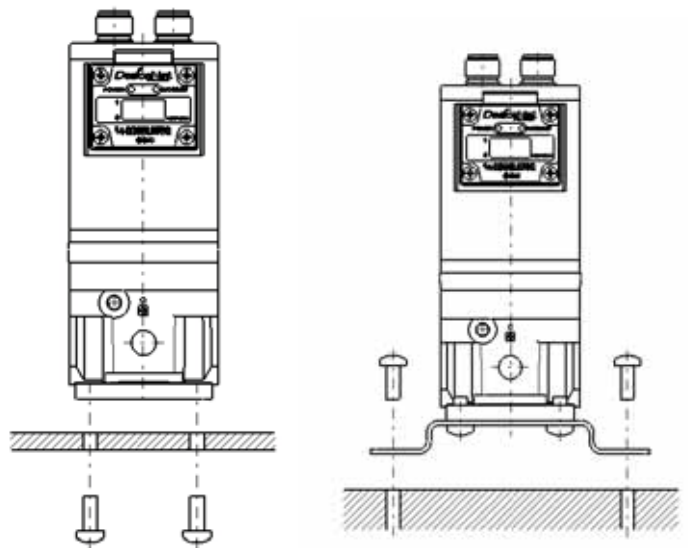
**Mounting and Installation**

**Installation**

**Direct mounting**

When the product is mounted directly onto the panel or device, use screws suitable for the thread holes below. (See drawing on the right)

Series	Mounting thread hole	Tightening torque
ITV1000	M4 × 0.7 (Depth 6)	2 ~ 3N·m
ITV2000, ITV3000	M5 × 0.8 (Through)	5 ~ 6N·m



Direct mounting

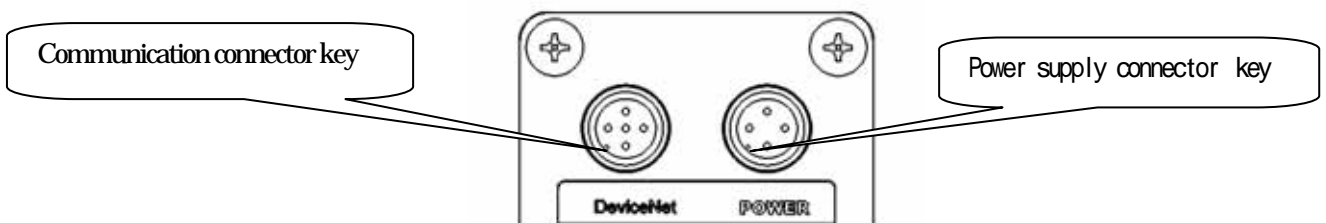
Bracket mounting

**Bracket mounting**

When the bracket is mounted to the product for mounting it onto the panel or device, fix the bracket to the product with the screws provided. (See table above for tightening torque). The hole of 7 has become empty in the bracket for a fixed screw.

**Connector mounting**

When mounting the connector with cable to the product, match up the position of the connector groove (cable side) and key (product side).



# Switch setting

## Safety Instructions for Setting

Turn off the power supply while setting the switch.

- If there is foreign matter or water droplets around the switch cover, clean it off before opening the cover.
- 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

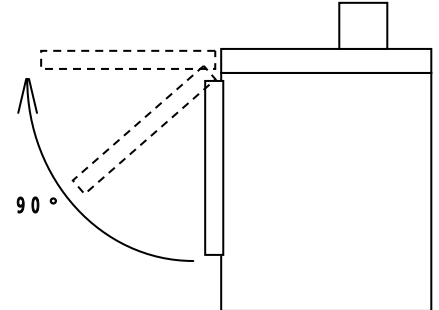
Loosen the screws of the switch cover.

Open the cover from the bottom upwards (See drawing)

Set switch referring to the setting procedure below.

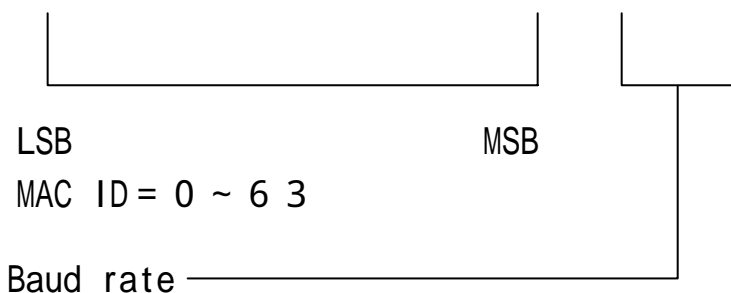
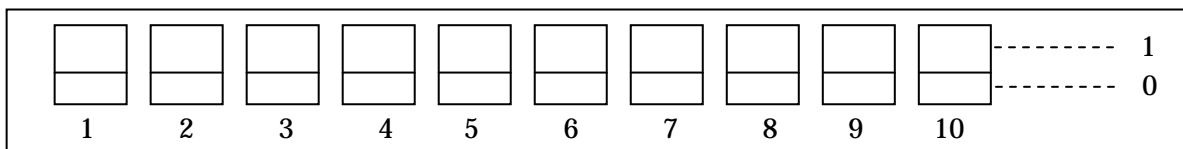
After setting the switch, tighten the switch cover in the reverse order of the above procedure.

(Tightening torque 0.6 to 0.8Nm)



## Setting of DIP switch

Please execute the settings of the range of MAC ID and the baud rate, with the dip switch in ten poles.



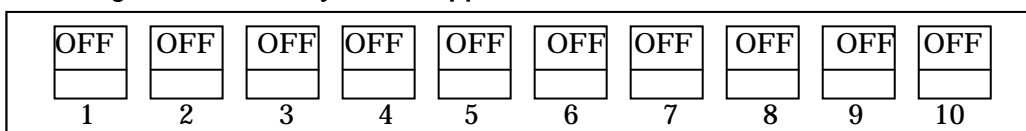
- Setting method
- 0 : Setting by switch
  - 1 : Setting by software
- MAC ID and baud rate is set by way of the network.
- Note
- 0 : Clear output pressure
  - 1 : Hold output pressure

Note :

1. This switch is selected to hold or clear the output pressure. When the D-Net line causes a communication error do to disconnection.
2. 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 when factory is shipped



## Pressure setting and output monitoring

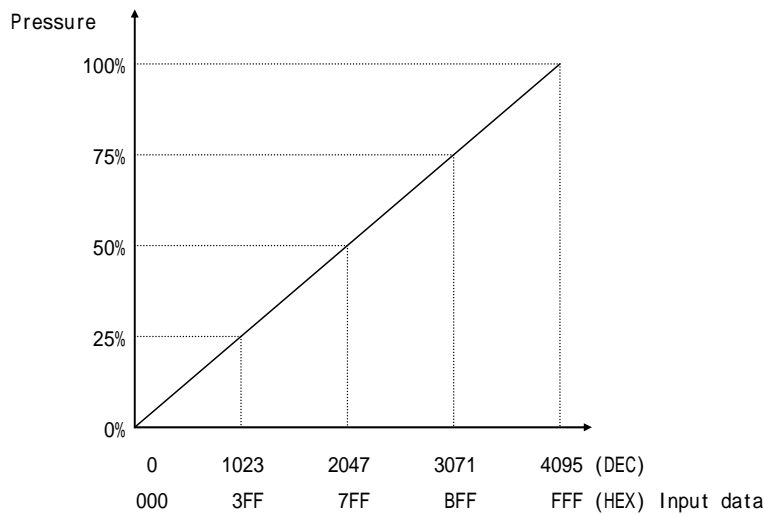
Pressure can be set by sending the input data, in which F.S. consists of 12 bits, to the E/P regulator through master PLC(target value to word area).

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

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

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

0.3MPa of pressure is set by sending input data of “999” to the electromagnetic regulator through the master PLC.



## Communication data

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

Item	Output (Poll request)	Input (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 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.

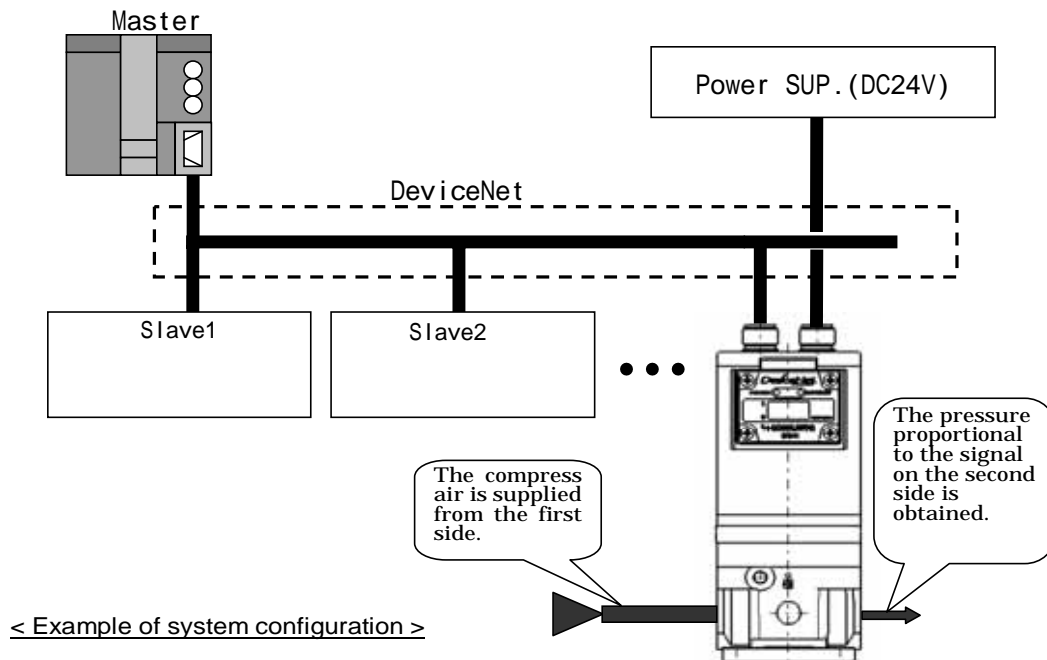
The pressure setting is assumed that data 17FEh of 150%FS is a limit value.

The accuracy guarantee : to 100%FS.



## System configuration / Applications / Specifications

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



As shown in the structure example above, this product is to control air pressure for pneumatic equipment. Do not use it for any other application.

## Specifications

Model	ITV1010	ITV1030	ITV1050	-
	ITV2010	ITV2030	ITV2050	ITV2090
	ITV3010	ITV3030	ITV3050	-
Minimum supply pressure	Set pressure + 0.1MPa			Set pressure - 13.3kPa
Maximum supply pressure	0.2MPa	1.0MPa	1.0MPa	- 101kPa
Set pressure range	0.005 ~ 0.1MPa	0.005 ~ 0.5MPa	0.005 ~ 0.9MPa	- 1.3 ~ - 80kPa
Power source	Voltage	DC 24V ± 1.0%		
	Current consumption	0.12A or less		
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. or less /			
Operating temperature	0 to 50 (No dew condensation)			
Standards	CE marking, UL(CSA)			
Enclosure	IP65			IP65 equivalent
Model	ITV10 0	ITV20 0	ITV30 0	
Size (mm × mm × mm)	50 × 50 × 109	50 × 50 × 131	66 × 66 × 152	
Weight (No option)	320 g	420 g	720 g	

## Communication specification (Common)

Item	Specifications	Remarks
Field bus	DeviceNet	Release2.0
EDS file	ITV.EDS	
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.

## 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 document describes the general purpose product. Some parts may differ for particular special products.
- This manual is subject to change without prior notice.

ITV2 - OM00080 - A