



OPERATION MANUAL

E/P REGULATOR

MODEL NAME

ITV1000, ITV2000, ITV3000 series

Series

《For RS-232C》

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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.

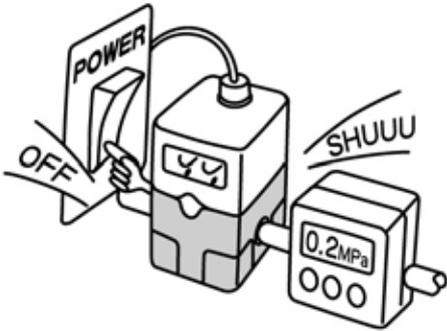
- A. Inspection and maintenance of machinery / equipment should only be performed once measures to prevent falling or runaway of the driver objects have been confirmed.
- B. When equipment is to be removed, confirm the safety process as mentioned above. Cut the supply pressure for this equipment and 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.

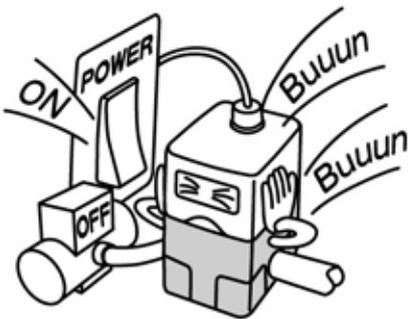
- A. Conditions and environments beyond the given specifications, or if product is used outdoors.
- B. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, clutch and brake 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

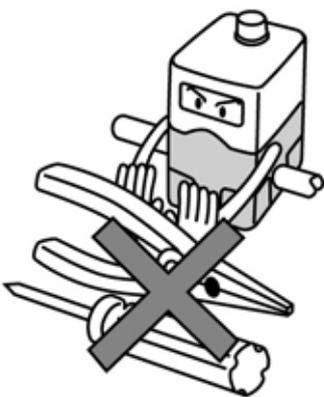
! CAUTION



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.

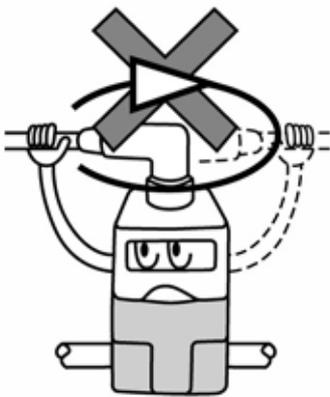
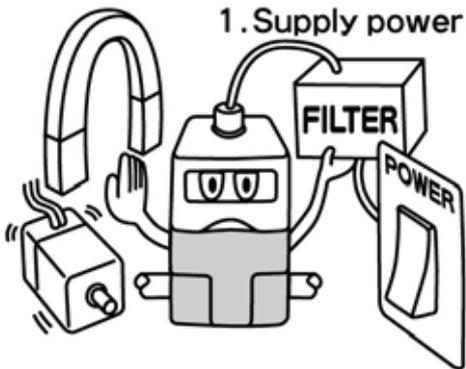


The product is adjusted to each specification at the time of shipment from the factory. Avoid unnecessary disassembly or removal of parts, as this may cause failure.

! 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

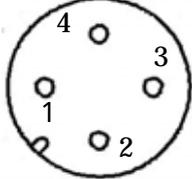
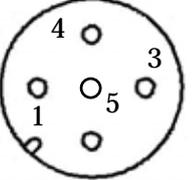
Incorrect wiring may lead to breakage.

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

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

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

Pin assign of ITV side connector

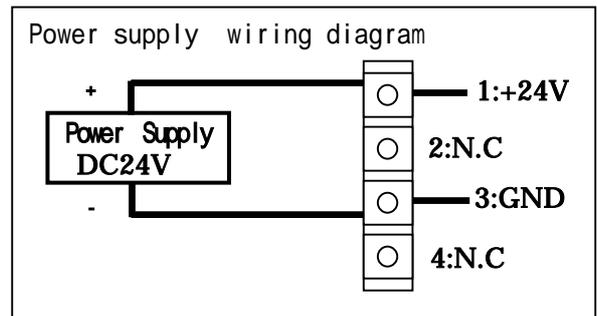
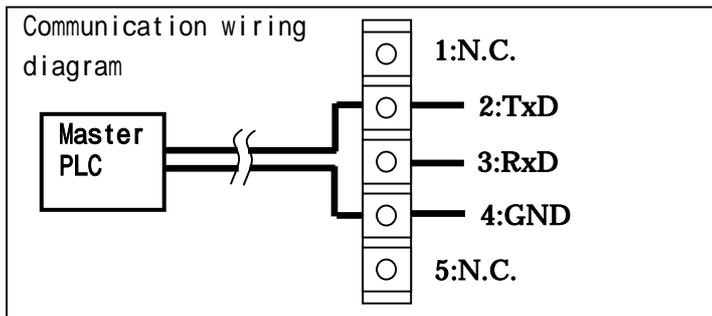
Item	Pin assign	Wire color (Note 1)	
Power supply connector		1 . +24[V]	Brown
		2 . N.C.	White
		3 . GND	Blue
		4 . N.C.	Black
Communication connector		1 . N.C.	Brown
		2 . TxD	White
		3 . RxD	Blue
		4 . GND	Black
		5 . N.C.	Gray

Note1) Wire color when the option cable is used.

S type P398020-500-3, P398020-502-3、

L type P398020-501-3, P398020-503-3

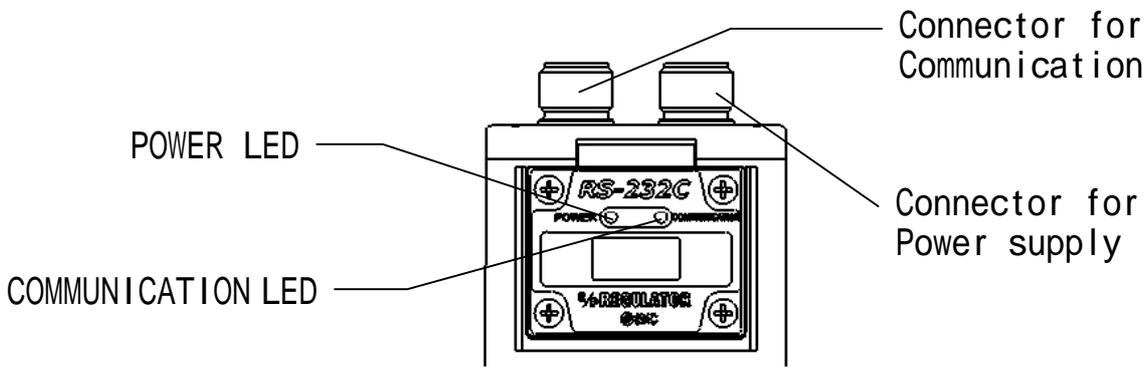
Connection to external equipment



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 RS-232C communication with SELV circuit which is compliant to IEC 60950-1, electrical safety standard.



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

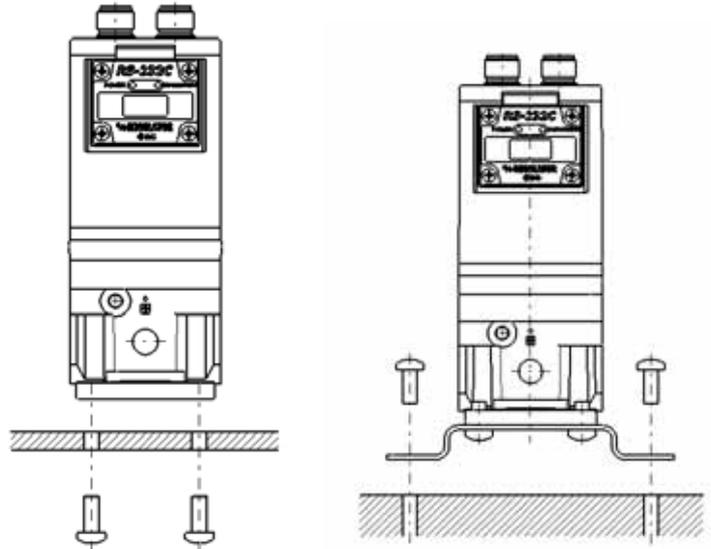
Mounting and Installation

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

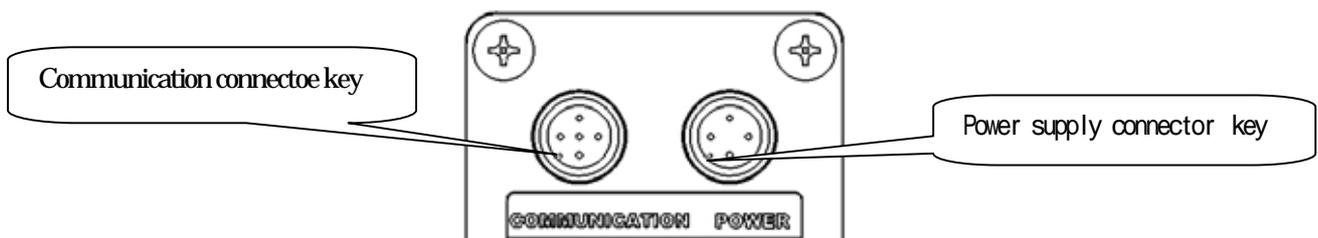
Bracket mounting

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).



Communication protocol

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

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	$1023 < nn$ 9999
UNKNOWN COMMAND	Except 0 nn 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

Pressure setting and output monitoring

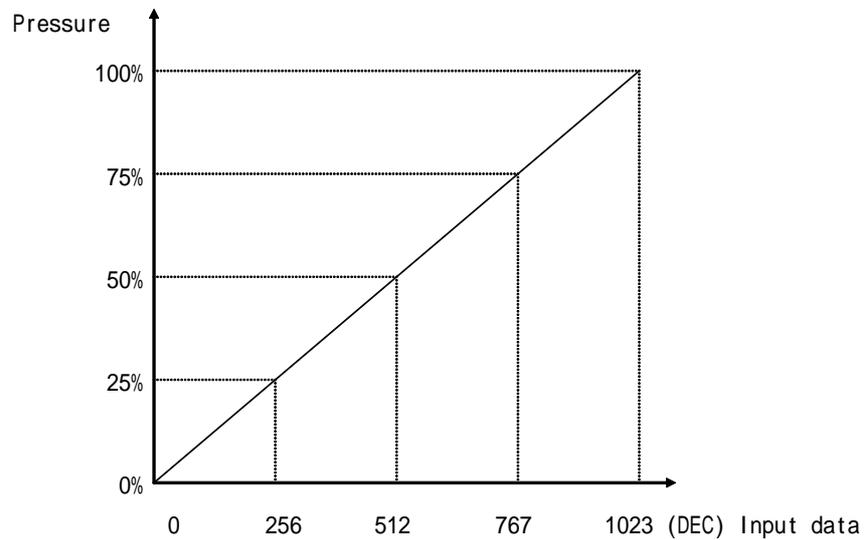
Pressure setting can be done by sending input data using 10bit as F.S. to the electro-pneumatic regulator through the master PLC.

Set Date	0	1023	$[(a / \text{F.S.}) \times 1023]_{\text{DEC}}$
Output pressure	$0\% \times \text{F.S.} (=0)$	$100\% \times \text{F.S.}$	a

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

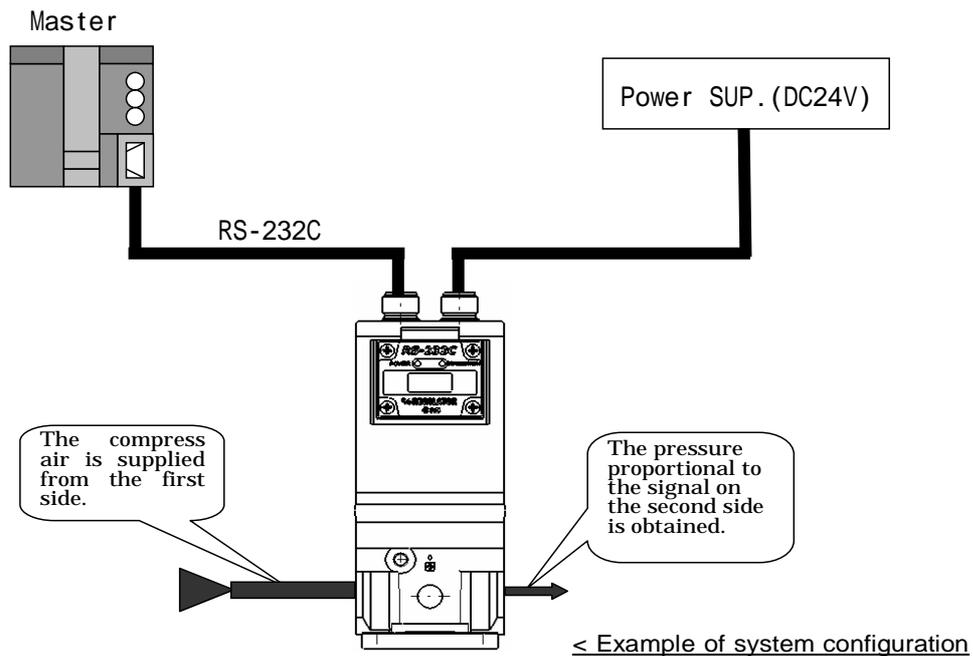
$$(0.3\text{MPa}/0.5\text{MPa}) \times 1023 = 614 \text{ (DEC)}$$

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



System configuration / Applications / Specifications

This regulator is connected to PC or PLC with RS-232C interface.



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 ± 10%		
	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)	320g	420g	720g	

Communication specification (Common)

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

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.

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