

# OPERATION MANUAL

## E/P REGULATOR

MODEL NAME

### ITV1000、ITV2000、ITV3000 series

Series



## CONTENTS

Contents	P1
Safety precautions	P2
Handling precautions	P3-4
Wiring method	P5-6
Key lock function	P7
Setting method	P8-9
Gain/Sensitivity manual adjustment method	P10
Switch output	P11
Pressure unit setting function	P11
Reset function	P12
Error indication function	P12
Faults and troubleshooting methods	P13-16

## Safety precautions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by labels of "CAUTION" "WARNING", or "DANGER". To ensure safety, be sure to observe ISO 4414, JIS B 8370 and other safety practices.

### ■ Explanation of label

Label	Meaning of label
 <b>WARNING</b>	Operator error could result in serious injury or loss of life.
 <b>CAUTION</b>	Operator error could result in injury or equipment damage.

### **WARNING**

#### **1. 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 are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or after analyses and/or tests to meet your specific requirements. The expected performance and safety assurance will be the responsibility of the person who has determined the compatibility of the system. This person should continuously review the suitability of all items specified, referring to the latest catalog information with a view to giving due consideration to any possibility of equipment failure when configuring a system.

#### **2. 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 operators.

#### **3. Do not service machinery / equipment or attempt to remove components until safety is confirmed.**

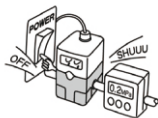
- Inspection and maintenance of machinery / equipment should only be performed once safety of personnel and equipment is confirmed.
- When equipment is to be removed. Stop supplied air, exhaust the residual pressure, verify the release of air, turn the power off and confirm safety before performing maintenance.
- Before machinery / equipment is restarted, ensure safety before applying power.

#### **4. Contact our company if the product is to be used in any of the following conditions.**

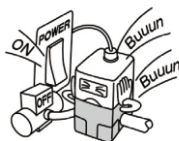
- Conditions and environments beyond the given specifications, or if product is used outdoors.
- Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, clutch and brake circuit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

## Handling precautions

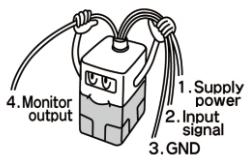
### ⚠ CAUTION



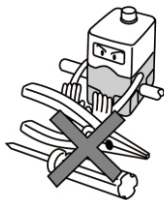
If power to this product is cut off due to a power failure, etc. when it is in a controlled state, residual pressure will be retained temporarily. Handle carefully when operating with output pressure released to the atmosphere, as air will continue to flow out.



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 may be generated. Since the life of the product may be shortened, shut off the power supply also when supply pressure is interrupted or shut off.

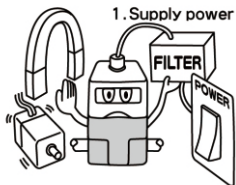


The optional cable connector is a 4 wire type. When the monitor output (analogue output or switch output) is not being used, prevent it from touching the other wires as a malfunction could occur.



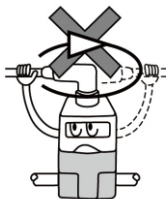
This product is adjusted for each specification at the time of shipment from the factory. Avoid careless disassembly or removal of parts, as this can lead to malfunction.

 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 line, etc.
3. Be sure to implement protective measures against load surge for induction loads (solenoid valves, relays etc.).
4. Turn off the power supply before installing or removing the connector.



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

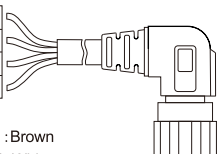
## Wiring method



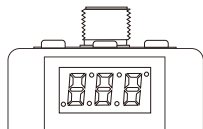
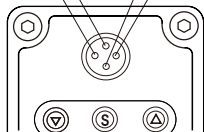
CAUTION

- ① Proceed carefully, as incorrect wiring can cause damage.
- ② Use DC power supply with sufficient capacity and a low ripple.
- ③ Turn off the power supply to remove and insert the connector.
- ④ Never turn the right angled type connector as it is not designed to turn.

1	Brown	Power supply
2	White	Input signal
3	Blue	GND (COMMON)
4	Black	Monitor output



3: Blue  
4: Black  
1: Brown  
2: White

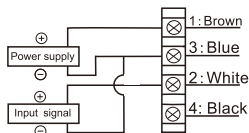


Note) The wire color is for when optional cable is used.

### Wiring diagram (Power supply and input signal)

Current/Voltage type (ITV※0※※-0、ITV※0※※-1、ITV※0※※-2、ITV※0※※-3)

Power supply	24VDC	(ITV※0※0-※)
	12~15VDC	(ITV※0※1-※)
Input signal	4~20mADC	(ITV※0※※-0)
	0~20mADC	(ITV※0※※-1)
	0~5VDC	(ITV※0※※-2)
	0~10VDC	(ITV※0※※-3)

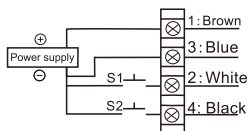


### Preset input type (ITV※0※※-4)

Power supply	24VDC	(ITV※0※0-4)
	12~15VDC	(ITV※0※1-4)

Fig.1 Relation between preset pressure and switch

Preset pressure	P_1	P_2	P_3	P_4
S1	OFF	ON	OFF	ON
S2	OFF	OFF	ON	ON



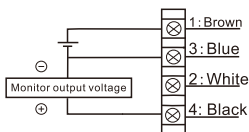
## Wiring diagram(Monitor output)



CAUTION

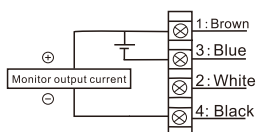
When the monitor output is not being used, prevent it from touching the other wires as this can cause a malfunction.

Analogue output · Voltage type  
(ITV※0※※-※1)



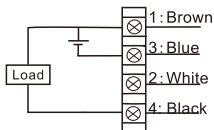
Only use equipment with a minimum load impedance of  $1k\Omega$ .

Analogue output · Current (sink) type  
(ITV※0※※-※4)



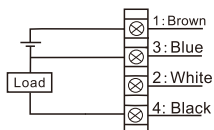
Only use equipment with a maximum load impedance of  $250\Omega$ .

Switch output · NPN type  
(ITV※0※※-※2)



When a current of approx.  $30\text{mA DC}$  or more is applied, the over current circuit is archived, "Er.5" is displayed and the operation stops.

Switch · PNP type  
(ITV※0※※-※3)



When a current of approx.  $30\text{mA DC}$  or more is applied, the over current circuit is archived, "Er.5" is displayed and the operation stops.

## Key locking function



Upon power-on, the device enters a key-lock state immediately, preventing any key operations. To adjust product settings (such as pressure unit, gain, sensitivity, etc.), the key-lock must be unlocked first.

### Unlocking the keys

NO	Key operation	LED Display
1		(current )pressure is displayed
2	Press ▽key for 2 seconds or more.	
3		Loc flashes on the display
4	Press S-key	
5		Loc is displayed for approx.1 second
6	Key lock is released	(current) pressure is displayed

▲④ Press △ key to cancel.

### Locking the keys

NO	Key operation	LED Display
1		(current) pressure is displayed
2	Press △key for 2 seconds or more.	
3		Loc flashes on the display
4	Press S-key	
5		Loc is displayed for approx.1 second
6	Keys are locked	(current) pressure is displayed

▲④ Press ▽ key to cancel.

## Setting method

### CAUTION

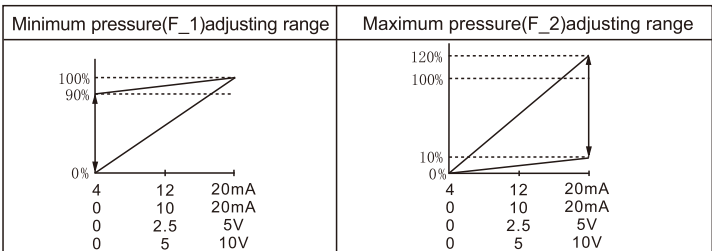
- ① If the incorrect key is pressed or incorrect information is displayed during setting, power must be shut off and the procedure started again.
- ② The minimum pressure setting refers to the output of the set minimum pressure whenever pressure is supplied to the primary side, even if there is no signal input on the secondary side.
- ③ After the product settings are finalized and locked, the product will begin to operate. Please exercise caution. It is recommended to perform operations when there is no air supply pressure.

### Preset input type(ITV※0※※-4)

NO	Key operation	LED Display
1	Unlock keys (refer to P7)	
2	Press S-key	
3	Set P_1 by using the $\Delta$ and $\nabla$ keys.	P_1' $\rightleftharpoons$ .000'(displayed alternately) $\Delta$ and $\nabla$ keys to change the value
4	Press S-key	
5	Set P_2 by using the $\Delta$ and $\nabla$ keys.	P_2' $\rightleftharpoons$ .000'(displayed alternately) $\Delta$ and $\nabla$ keys to change the value
6	Press S-key	
7	Set P_3 by using the $\Delta$ and $\nabla$ keys.	P_3' $\rightleftharpoons$ .000'(displayed alternately) $\Delta$ and $\nabla$ keys to change the value
8	Press S-key	
9	Set P_4 by using the $\Delta$ and $\nabla$ keys.	P_4' $\rightleftharpoons$ .000'(displayed alternately) $\Delta$ and $\nabla$ keys to change the value
10	Press S-key	(return)current pressure is displayed
11	Lock keys (refer to P7)	

▲Note: P\_1 to P\_4 are adjustable in a range from 0% to 100% of the rated value. (DEFAULT VALUE: 0%)

Current/Voltage Type(ITV※0※※-0、ITV※0※※-1、ITV※0※※-2、ITV※0※※-3)		
NO	Key operation	LED Display
1	Unlock keys (refer to P7)	
2	Press S-key	
3	Set the minimum pressure by using the $\Delta$ and $\nabla$ keys.	F_1' $\Rightarrow$ .000'(displayed alternately) $\Delta$ and $\nabla$ keys to change the value
4	Press S-key	
5	Set the maximum pressure by using the $\Delta$ and $\nabla$ keys.	F_2' $\Rightarrow$ .900'(displayed alternately) $\Delta$ and $\nabla$ keys to change the value
6	Go to no. 11 for monitor output: analogue output (voltage and current) type.	
7	Press S-key	
8	Set P_1 by using the $\Delta$ and $\nabla$ keys.	P_1' $\Rightarrow$ .000'(displayed alternately) $\Delta$ and $\nabla$ keys to change the value
9	Press S-key	current pressure is displayed
10	Set P_2 by using the $\Delta$ and $\nabla$ keys.	P_2' $\Rightarrow$ .900'(displayed alternately) $\Delta$ and $\nabla$ keys to change the value
11	Press S-key	(return)current pressure is displayed
12	Lock keys (refer to P7)	



▲The specific adjustment scope is as follows:

- 1:F\_1 is adjustable in a range from 0% to 90% of the rated value(DEFAULT VALUE: 0%).
- 2:The pressure of less than 0% is not output, even if F\_1 is adjusted to less than 0%.
- 3:F\_2 is adjustable in a range from 10 to 120% of the rated value(DEFAULT VALUE: 100%).
- 4:Do not input signals exceeding 100% pressure. Operate within the rated range.
- 5:The difference between F\_1 and F\_2 is adjustable in a range of 10% of the rated value.
- 6:The adjustment like making the relation of  $F_1 > F_2$  is not available.



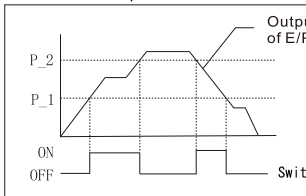
## Mode of switch output

By setting P\_1 and P\_2, three types of actions can be achieved.

▲ Limited to monitor output and switch output types (ITV※0※※-※2、ITV※0※※-※3)

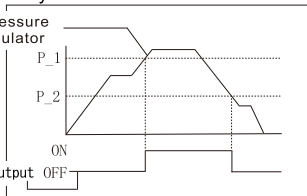
◆ P\_1 < P\_2

Window comparator mode

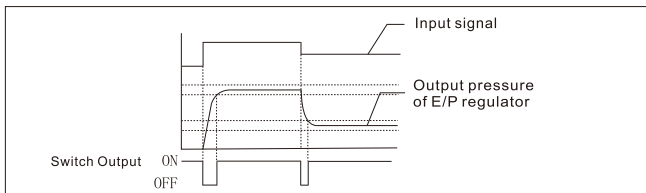


◆ P\_1 ≥ P\_2

Hysteresis mode



◆ P\_1 = P\_2 = 0: Self-diagnosis mode (Reaches the set pressure, switches to ON)



## Pressure Unit Setting

Pressure Unit (MPa/bar/psi).

N0	Key operation	LED Display
1	Unlock keys (refer to P7)	
2	Press S-key for 3 seconds or more	F01' ⇔ 0L.9' (displayed alternately)
3	Press the Δ key	F02' ⇔ 5L.0' (displayed alternately)
4	Press the Δ key	F03' ⇔ 0cL' (displayed alternately)
5	Press the Δ key	F81' ⇔ Un.0' (displayed alternately)
6	Press S-key	
7	Press the Δ/∇ keys to set the gain F81	Un.0' ⇔ MPa (Right) Un.1' ⇔ bar (Middle) Un.2' ⇔ psi (Left) Δ and ∇ keys to change the value
8	Press S-key	
9	Press S-key for 3 seconds or more	
10	Lock keys (refer to P7)	

▲ After setting, the corresponding indicator light on the upper right of the LED display will turn on (left/middle/right).

## Reset function

### Reset method

NO	Key operation	LED Display
1	Unlock keys (refer to P7)	
2	Press and hold both $\Delta$ and $\nabla$ for more than 3 seconds.	current pressure is displayed
3		display 'ES' approximate 1 second
4	Reset settings.	

### Reset content

Item	Reset content	Application model
F_1	0%F.S.	Current / Voltage input type
F_2	100%F.S.	Current / Voltage input type
P_1、P_2	100%F.S.	Switch output type
P_1 ~ P_4	0%F.S.	Preset input type

▲Gain (GL) and sensitivity (SL) and Pressure unit (MPa/bar/psi) are not reset.

## Error indicating function

NO	LED Display	Contents of error	Countermeasure
1	Er.1	Input signal exceeds the rated value range.	Reduce input signal to within the rated range and restart the power supply.
2	Er.2	Reading or writing errors occurred in EEPROM.	Please inform our company.
3	Er.3	Reading and writing errors occurred in memory.	Please inform our company.
4	Er.4	Solenoid valve failure.	Please consult separately for solenoid valve replacement and method.
5	Er.5	Over current errors in switch output	Ensure the load current is below 30 mADC and install appropriate load.
6	Er.6	Power supply voltage exceeds rated range	Ensure power supply voltage is within 13-28VDC install suitable power supply.