OPERATION MANUAL

E/P REGULATOR

MODEL NAME

ITV1000, ITV2000, ITV3000 series

Series

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Safety instructions

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
⚠ **WARNING**	Operator error could result in serious injury or loss of life.
⚠ **CAUTION**	Operator error could result in injury or equipment damage.

⚠ WARNING

①The 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.

②Only 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.

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

A. Inspection and maintenance of machinery / equipment should only be performed once safety of personnel and equipment is confirmed.

B. 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.

C. Before machinery / equipment is restarted, ensure safety before applying power.

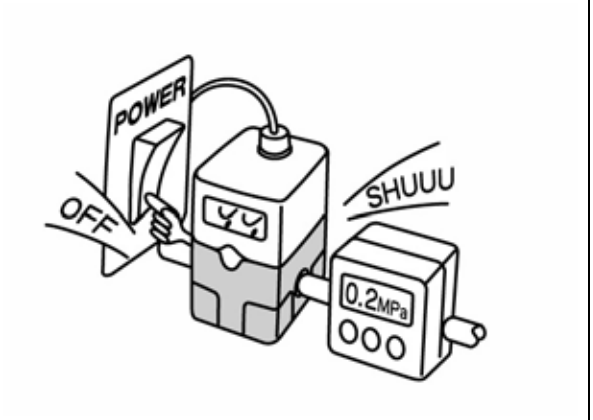
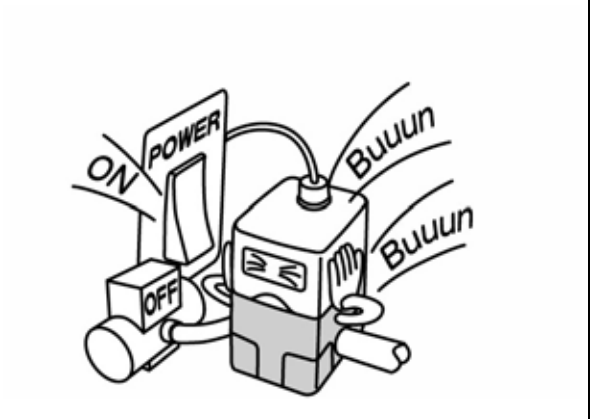
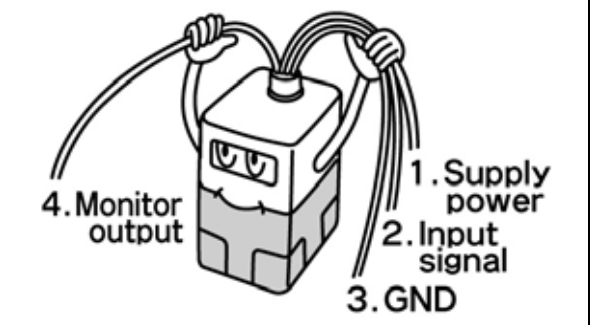
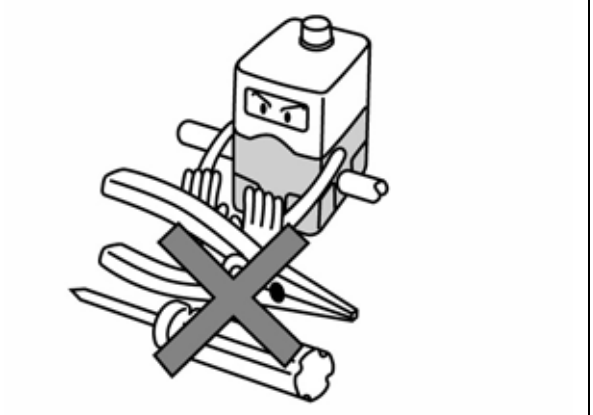
④Contact SMC if the product is to be used in any of the following conditions.

A. Conditions and environments beyond the given specifications, or if product is used outdoors.

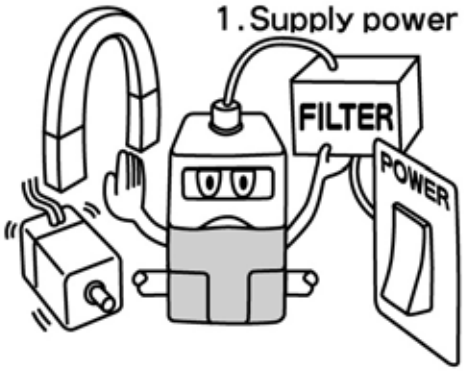
B. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, clutch and brake circuit in press applications, or safety equipment.

C. An application which has the possibility of having negative effects on people, property, or animals requiring special safety analysis.

Handling precautions

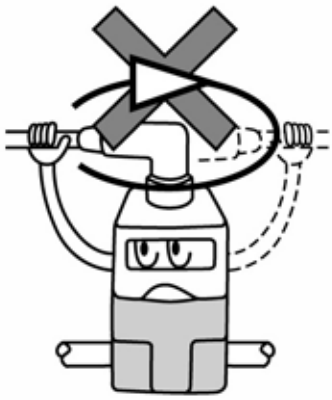
⚠ CAUTION	
	If power to this product is cut off due to a power failure, etc. when it is in a controlled state, residual pressure will be retained temporarily. Handle carefully when operating with output pressure released to the atmosphere, as air will continue to flow out.
	If supply pressure to this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



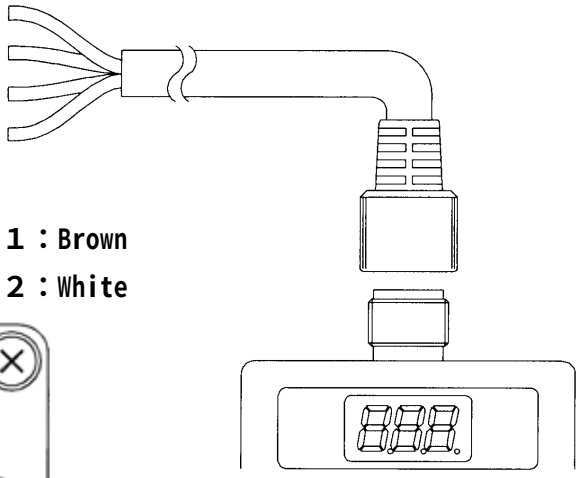
Please note that the right angled cable connector does not rotate and is limited to only one entry direction.

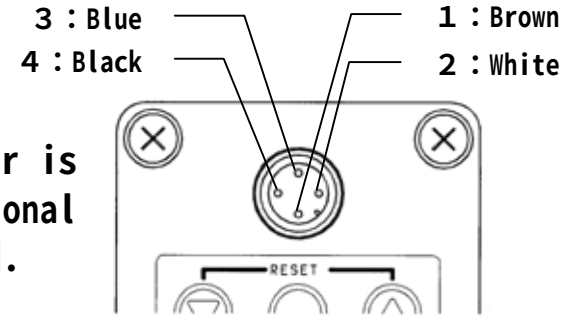
Wiring method

⚠ 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



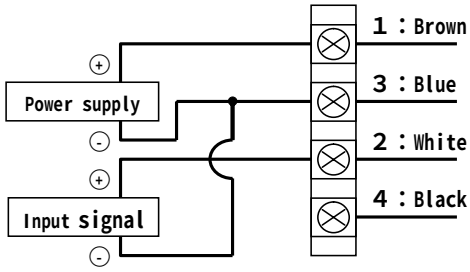


Note) The wire color is for when optional cable is used.

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)

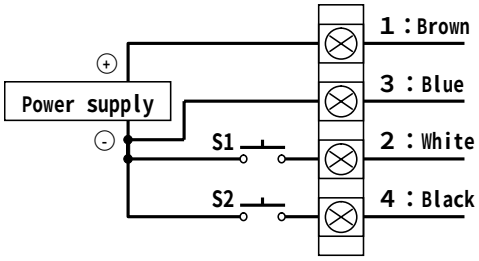


Preset input type (ITV※0※※-4)

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

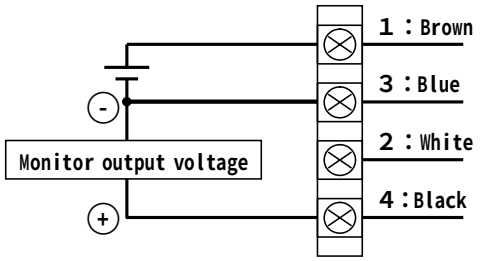
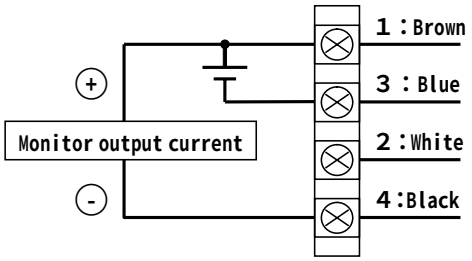
Fig.1 Relation between preset pressure and switch

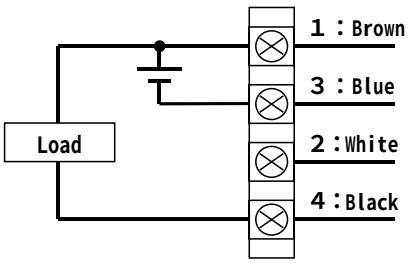
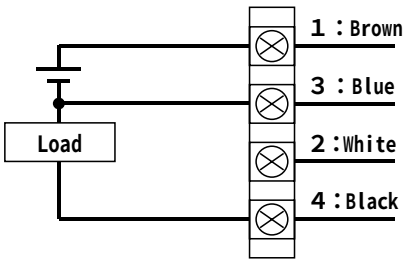
Preset pressure	P_1	P_2	P_3	P_4
S1	OFF	ON	OFF	ON
S2	OFF	OFF	ON	ON



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)	Analogue output・Current (sink) type (ITV※0※※-※4)
	
Only use a equipment with a minimum load impedance of 1kΩ.	Only use equipment with a maximum load impedance of 250Ω.

Switch output・NPN type (ITV※0※※-※2)	Switch・PNP type (ITV※0※※-※3)
	
When a current of 30mADC or more is applied, the over current circuit is archived, “Er.5” is displayed and the operation stops.	When a current of 30mADC or more is applied, the over current circuit is archived, “Er.5” is displayed and the operation stops.

Setting method

⚠ CAUTION

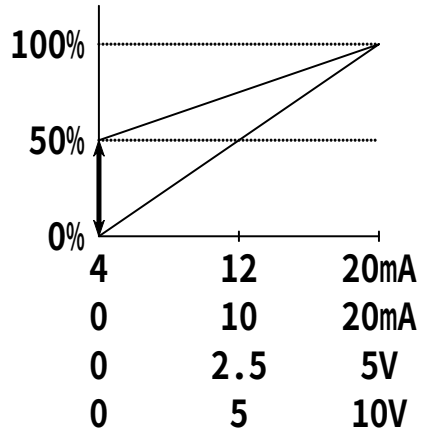
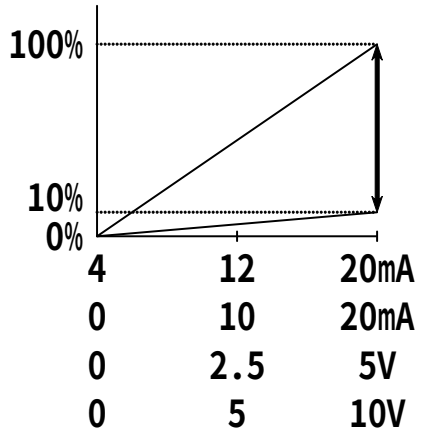
① If the incorrect key is pressed or incorrect information is displayed during setting, power must be shut off and the procedure started again.
② It is recommended that the settings are changed without supply pressure. The product operates immediately maximum and minimum pressures are set and the ＜ＳＥＴ＞ key is pressed.
③ The minimum pressure is output when air is supplied to the inlet, even if the input signal has not been entered.

Preset input type (ITV※0※※-4)

No	Key operation	LED Display
①	Unlock keys (refer to P11)	
②	Press ＜ＳＥＴ＞ key	
③	Set P_1 by using the △ and ▽ keys.	P_1⇔0.00 (displayed alternately) Change the value by using △ and ▽ keys.
④	Press ＜ＳＥＴ＞ key	
⑤	Set P_2 by using the △ and ▽ keys.	P_2⇔0.00 (displayed alternately) Change the value by using △ and ▽ keys.
⑥	Press ＜ＳＥＴ＞ key	
⑦	Set P_3 by using the △ and ▽ keys.	P_3⇔0.00 (displayed alternately) Change the value by using △ and ▽ keys.
⑧	Press ＜ＳＥＴ＞ key	
⑨	Set P_4 by using the △ and ▽ keys.	P_4⇔0.00 (displayed alternately) Change the value by using △ and ▽ keys.
⑩	Press ＜ＳＥＴ＞ key	Return to (current) pressure display.
⑪	Lock keys (refer to P11)	

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 P11)	
②	Press ＜S E T＞ key	
③	Set the minimum pressure by using the △ and ▽ keys.	F_ 1⇔0.00 (displayed alternately) Change the value by using △ and ▽ keys. *Adjusting range: Refer to figures below and note 1 to 4
④	Press ＜S E T＞ key	
⑤	Set the maximum pressure by using the △ and ▽ keys.	F_ 2⇔0.90 (displayed alternately) Change the value by using △ and ▽ keys. *Adjusting range: Refer to figures below and note 1 to 4
⑥	Go to no. ⑪ for monitor output: analogue output (voltage and current) type.	
⑦	Press ＜S E T＞ key	
⑧	Set the P_1 by using the △ and ▽ keys.	P_ 1⇔0.00 (displayed alternately) Change the value by using △ and ▽ keys.
⑨	Press ＜S E T＞ key	
⑩	Set the P_2 by using the △ and ▽ keys.	P_ 2⇔0.90 (displayed alternately) Change the value by using △ and ▽ keys.
⑪	Press ＜S E T＞ key	Return to (current) pressure display.
⑫	Lock keys (refer to P11)	

Minimum pressure (F_1) adjusting range	Maximum pressure (F_2) adjusting range
	

(Note 1): F_1 is adjustable in a range from 0 to 50% of the rated value.
(Note 2): F_2 is adjustable in a range from 10 to 100% of the rated value.
(Note 3): The difference between F_1 and F_2 is adjustable in a range of 10% of the rated value.
(Note 4): The adjustment like making the relation of F_1>F_2 is not available.

Manual adjustment of gain and sensitivity

Normal operation does not require the adjustment of gain and sensitivity. However, if adjustment is required to reduce the noise level, adjust gain and sensitivity until a more stable output pressure is reached.

<table>
<tr><th>No</th><th>Key operation</th><th>LED Display</th></tr>
<tr><td>①</td><td>Unlock keys (refer to P11)</td><td>(current) pressure display</td></tr>
<tr><td>②</td><td>Press ▽ key for 3 seconds or more.</td><td></td></tr>
<tr><td>③</td><td></td><td> is displayed for approx. 2 seconds and (current) pressure is displayed afterwards</td></tr>
<tr><td>④</td><td>Press ＜S E T＞ key</td><td></td></tr>
<tr><td rowspan="11">⑤refer to P7-P8</td><td colspan="2">Current・Voltage input type</td><td>Preset input type</td></tr>
<tr><td colspan="2"> is displayed</td><td> is displayed</td></tr>
<tr><td colspan="2">Press ＜S E T＞ key</td><td>Press ＜S E T＞ key</td></tr>
<tr><td colspan="2"> is displayed</td><td> is displayed</td></tr>
<tr><td colspan="2">Press ＜S E T＞ key</td><td>Press ＜S E T＞ key</td></tr>
<tr><td>Analogue output type</td><td>Switch output type</td><td> is displayed</td></tr>
<tr><td rowspan="5"></td><td> is displayed</td><td>Press ＜S E T＞ key</td></tr>
<tr><td>Press ＜S E T＞ key</td><td> is displayed</td></tr>
<tr><td> is displayed</td><td>Press ＜S E T＞ key</td></tr>
<tr><td>Press ＜S E T＞ key</td><td rowspan="2"></td></tr>
<tr><td></td></tr>
<tr><td>⑥</td><td>Set gain by using the △ and ▽ keys.</td><td> Change the value by using the △ and ▽ keys.</td></tr>
<tr><td>⑦</td><td>Press ＜S E T＞ key</td><td></td></tr>
<tr><td>⑧</td><td>Set sensitivity by using the △ and ▽ keys.</td><td> Change the value by using the △ and ▽ keys.</td></tr>
<tr><td>⑨</td><td>Press ＜S E T＞ key</td><td>(current) pressure is displayed</td></tr>
<tr><td>⑩</td><td colspan="2">Go to no. ⑬, if setting is finished.</td></tr>
<tr><td>⑪</td><td>Press ＜S E T＞ key</td><td></td></tr>
<tr><td>⑫</td><td>Return to No. ⑤.</td><td></td></tr>
<tr><td>⑬</td><td>Press ▽ key for 3 seconds or more.</td><td></td></tr>
<tr><td>⑭</td><td></td><td> is displayed for approx. 2 seconds and (current) pressure is displayed afterwards</td></tr>
<tr><td>⑮</td><td>Lock keys (refer to P11)</td><td></td></tr>
</table>

Relation between setting of gain and response time

Response time	Quick ←									→ Slow
Setting of gain	GL.9	GL.8	GL.7	GL.6	GL.5	GL.4	GL.3	GL.2	GL.1	GL.0

Relation between setting and sensitivity

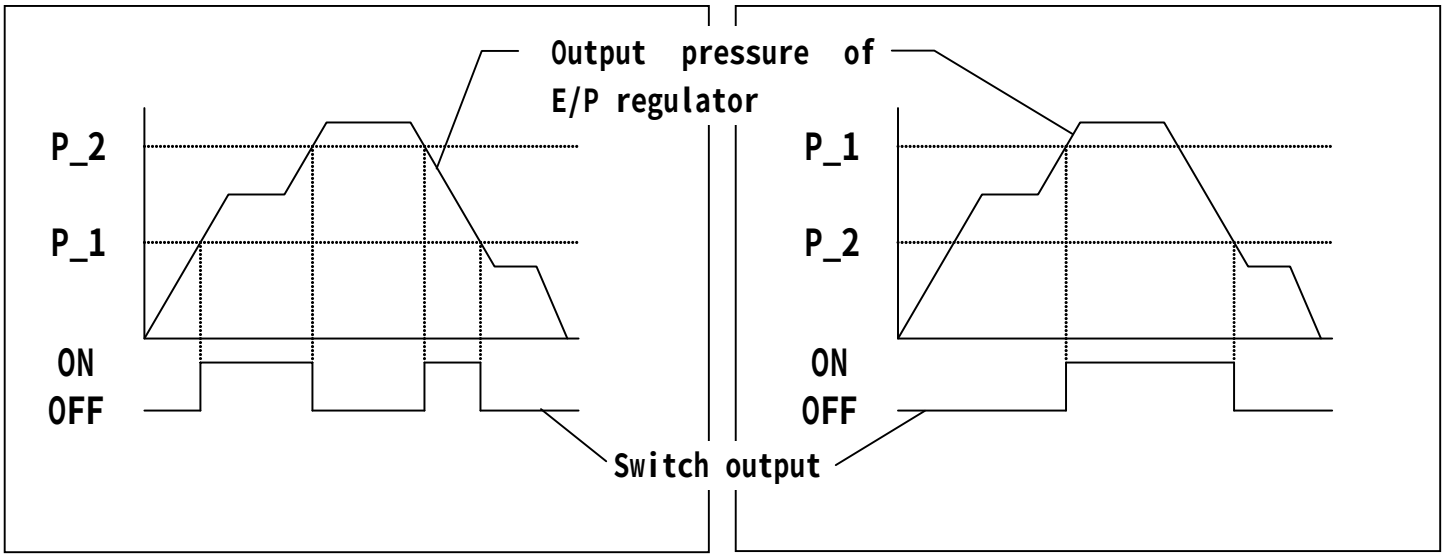
Sensitivity	Sharp ←		→ Dull
Setting of sensitivity	SL.0	SL.1	SL.2

Switch output

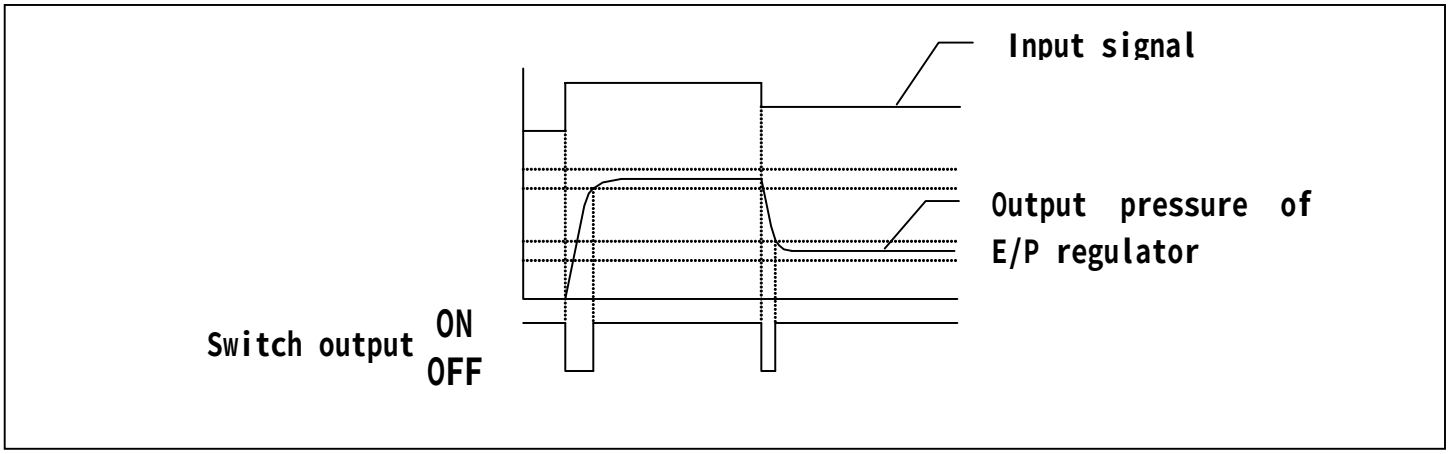
The following operation types are available by setting P_1 and P_2.
Note). This function is available for monitor output: switch output type (ITV※0※※-※2 and ITV※0※※-※3).

■ P_1＜P_2 ：
Window comparator mode

■P_1≧P_2 ：
Hysteresis mode



■ P_1＝P_2＝0 ： Out of range mode
(The switch output turns on when set pressure is achieved.)



Key locking function

⚠ CAUTION
The keys are locked after turning the power on and can not be operated.

Unlocking the keys

No	Key operation	LED Display
①		(current) pressure is displayed
②	Press ▽ key for 2 seconds or more.	LOC is displayed
③		LOC flashes on the display
④	Press ＜ＳＥＴ＞ key	
⑤		UNL 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.	UNL is displayed
③		UNL flashes on the display
④	Press ＜ＳＥＴ＞ key	
⑤		LOC is displayed for approx. 1 second
⑥	Keys are locked	(current) pressure is displayed

※④ Press ▽ key to cancel.

Reset function

Reset method

No	Key operation	LED Display
①	Unlock keys (refer to P11)	
②	Press the △ and ▽ keys simultaneously for 3 seconds or more.	(Current) pressure is displayed
③		rES is displayed for approx. 1 second
④	The setting is reset	

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) are not reset.

Error indicating function

Error 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 and writing errors occurred in EEPROM.	Contact SMC.
3	Er.3	Reading and writing errors occurred in memory.	Contact SMC.
4	Er.4	Solenoid valve failure.	Replace the solenoid valve. For the replacement procedure contact SMC.
5	Er.5	Over current errors in output	Prevent over current errors by ensuring the load meets the specification.

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.