Doc. No. ITV2-OM00112-B

Operation Manual

P R O D U C T N A M E

E/P Regulator
(10bit digital input type)

MODEL/ Series/ Product Number

ITV1000/2000/3000/2090-60 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

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.

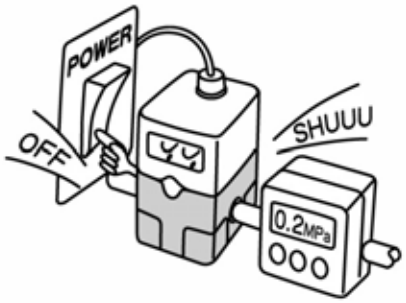
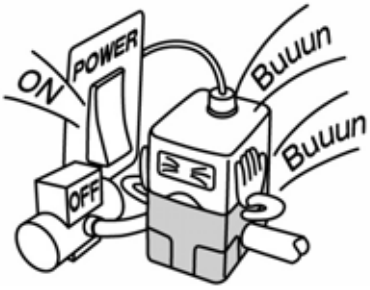
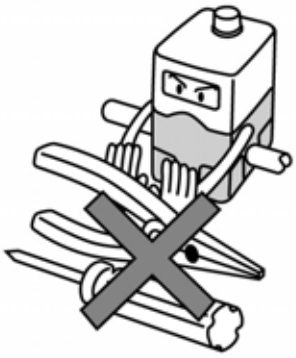
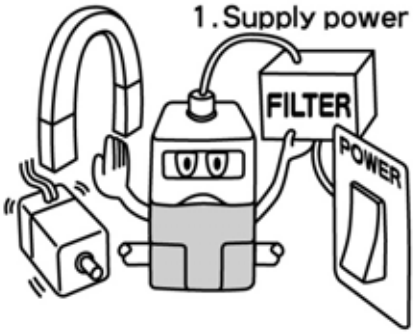
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

∗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.
	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.

Wiring method

⚠ Caution

① Proceed carefully, as incorrect wiring can cause damage.
② Use a DC power supply with sufficient capacity and a low ripple.
③ Turn off the power supply to remove and insert the connector.

CABLE FOR SINGNAL

WIRE COLOR(NOTE)	SINGNAL NAME
PINK-BLACK1	POWER SUPPLY (DC24V)
GREEN-BLACK2	POWER SUPPLY (DC0V)
BLUE	SIGNAL COMMON (NO POLARITY)
BLUE-BLACK2	MSB 10bit
GRAY-BLACK1	9bit
ORANGE-BLACK1	8bit
GREEN-BLACK1	7bit
PINK-BLACK1	6bit
BLUE-BLACK1	5bit
GRAY	4bit
ORANGE	3bit
GREEN	2bit
PINK	LSB 1bit

NOTE: WIRE COLOR WHEN OPTION CABLE CONNECTOR IS USED.

Setting method

Ex) In case that setting pressure is 0.3MPa on ITV2030(0.5MPa specification).

(0.3MPa/0.5MPa) × 1023 = 614 (Decimal)
Binary data of “614”(Decimal) is “10 0110 0110”.

VALUE	1	0	0	1	1	0	0	1	1	0
SIGNAL	MSB 10bit	9bit	8bit	7bit	6bit	5bit	4bit	3bit	2bit	LSB 1bit
INPUT	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF

By inputting 12-24VDC between common and each signal wire, input states becomes “ON”. (Common is no polarity.)

Error Indicating function

Error name	LED display	Contents of error	Countermeasure
System error	Er.E	Reading or writing errors occurred in EEPROM.	Please execute "Initialize (refer to P15)" when the ITVX does not operate normally after reconnecting the power supply. Please contact SMC, when the ITVX does not operate normally after initialization.
	Er.3	Reading and writing errors occurred in memory.	Please contact SMC when the ITVX does not operate normally after reconnecting the power supply.
Solenoid valve error	Er.4	Solenoid valve failure	Replace the solenoid valve. For the replacement procedure contact SMC.
Residual pressure error	Er.C	Out of range error of "Zero clear"	Please operate "Zero clear" within the range of +/- 5% F.S. Please operate "Zero clear" after the secondary pressure of the ITVX has reached atmospheric.

Zero clear

The display can be reset to zero by executing "Zero clear".
When "Zero clear" is executed with residual pressure in the secondary piping, the pressure is assumed to be zero. Please execute the operation of "Zero clear" with the supply pressure interrupted, and the piping of the secondary side removed.

No	Key operation	LED Display
①	Turn on the power supply with all the signal "ON"	
②	After 5 seconds, "cLr" is displayed. (NOTE1)	cLr (is displayed)
③	Only 1bit is turned off within five seconds after "cLr" is displayed. (NOTE2)	
④	"Zero clear" is executed, after 7 seconds.	

⑤	When the zero clear is normally executed, "Fin" is displayed.	Fin (is displayed)
	When the zero clear cannot be executed, "Er.6" is displayed. (NOTE3)	Er.6 (is displayed)
⑥	Please reenter the power supply to return to the normal operation.	

NOTE1: When another signal will be input by the time "cLr" is displayed, ITV shifts in a usual control mode.
NOTE2: When there is no operation within 5 seconds, ITV shifts in a usual control mode.
NOTE3: The adjustable range is within +/- 5% F.S from the state of the factory shipment. When outside of this range, "Er.6" is displayed and "Zero clear" will not be executed.

LED display

The range of the LED pressure display is different according to the pressure range and the unit of the display.

unit	ITV※010	ITV※030	ITV※050	ITV2090
MPa	.000～.120	.000～.600	.000～.A80	-
Kgf/cm^2	0.00～.120	0.00～6.00	0.00～A.80	-
bar	0.00～.120	0.00～6.00	0.00～A.80	-
PSI	0.0～18.0	0.0～84.0	0～156	-
kPa	0～120	0～600	0～A80	16～-96

NOTE1: When the digit overflows, the following of "9" are substituted by "A".
(example: The following of 999(kPa) are displayed as A00(kPa), and it shows 1000 kPa.)
NOTE2: When the display exceeds the lower bound value, "LLL" is displayed. (ITV2090)
NOTE3: When the display exceeds the upper bound value, "HHH" is displayed.
NOTE4: The unit can not be changed.

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：P7 Addition note
B：Clerical error correction

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