



## Installation and Maintenance Manual

### High Pressure E/P Regulator ITVH Series (ITVH2020-\*\*\*\*\*)



## 1 Safety Instructions

This manual contains essential information for the protection of users and others from possible injury and/or equipment damage.

- Read this manual before using the product, to ensure correct handling, and read the manuals of related apparatus before use.
- Keep this manual in a safe place for future reference.
- These instructions indicate the level of potential hazard by label of "Caution", "Warning" or "Danger", followed by important safety information which must be carefully followed.
- To ensure safety of personnel and equipment the safety instructions in this manual and the product catalogue must be observed, along with other relevant safety practices.

<b>Caution</b>	Indicates a hazard with a low level of risk, which if not avoided, could result in minor or moderate injury.
<b>Warning</b>	Indicates a hazard with a medium level of risk, which if not avoided, could result in death or serious injury.
<b>Danger</b>	Indicates a hazard with a high level of risk, which if not avoided, will result in death or serious injury.

#### Electromagnetic compatibility:

This product is class A equipment intended for use in an industrial environment. There may be potential difficulties in ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbances.

### Warning

- 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 can be used in various operating conditions, their compatibility with the specific pneumatic system must be based on specifications or after analysis and/or tests to meet specific requirements.

- 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 personnel.

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

1) Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out control positions.

2) When equipment is to be removed, confirm the safety process as mentioned above. Switch off air and electrical supplies and exhaust all residual compressed air in the system.

3) Before machinery/equipment is re-started, ensure all safety measures to prevent sudden movement of cylinders etc. (Supply air into the system gradually to create back pressure, i.e. incorporate a soft-start valve).

- Do not use this product outside of the specifications. Contact SMC if it is to be used in any of the following conditions:**

1) Conditions and environments beyond the given specifications, or if the product is to be used outdoors.

2) Installations in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverage, recreation equipment, emergency stop circuits, press applications, or safety equipment.

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

### Caution

- Ensure that the air supply system is filtered to 5 microns.

## 2 Specifications

Model		ITVH Series
Minimum supply pressure	0.5 MPa or (Set pressure+0.2 MPa) whichever is higher.	
Maximum supply pressure	3.0 MPa	
Set pressure range (Note1)	0.2~2.0 MPa	
Supply voltage	24 VDC ±10%	
Current consumption	0.12 A or less	
Input Signal	Current type (Note2)	4~20 mA, 0~20 mA (sink type)
	Voltage type	0~5 VDC, 0~10 VDC
	Preset input type	Maximum 4 Steps
Input Impedance	Current type	500 Ω or less
	Voltage type	6~6.5 kΩ
	Preset input type	APPROX. 4.7kΩ
Output Signal (Note3)	Analogue output	1~5 VDC, 4~20 mA (sink type)
	Switch output	NPN type, PNP type
Linearity	+/- 1% F.S. or less	
Hysteresis	1% F.S. or less	
Repeatability	+/- 1% F.S. or less	
Sensitivity	+/- 1% F.S. or less	
Temperature characteristics	+/- 0.12% F.S./ °C or less	
LED display	Accuracy	+/- 2% F.S. or less, +/- 1digit
	Minimum unit (Note4)	MPa:0.01, kgf/cm <sup>2</sup> : 0.1, bar:0.1, psi:1
Operating temperature	0~50°C (without condensation)	
Weight	Approx. 630 g (without options)	

(Note 1) Pressures of 0.2 MPa or less cannot be controlled.

(Note 2) 2-wire type 4 to 20 mA is not available.

A power supply voltage (24 VDC) is required.

(Note 3) Select either analogue output or switch output. Further, when switch output is used, select either NPN or PNP output. When measuring analogue output of 1 to 5 VDC with a load impedance less than 100 kΩ, the analogue output may not achieve the output accuracy of +/- 6% F.S. or less.

(Note 4) The setting (Zero/Span, Preset input, Switch output) can be adjusted by each minimum display unit. The unit cannot be changed.

## 3 Installation

### 3.1 Installation

#### Warning

- Do not install the product unless the safety instructions have been read and understood.
- This product is pre-set at the factory and must not be dismantled by the user. Contact your local SMC office for advice.
- Ensure, when installing this product, that it is kept clear of power lines to avoid noise interference.
- Ensure that load surge protection is fitted when inductive loads are present (i.e. solenoid, relay etc.).
- Ensure precautions are in place if the product is used in a 'free flow output' condition. Air will continue to flow continuously.
- Do not use a lubricator on the input side of this product. If lubrication is necessary, place the lubricator on the 'output' side.
- Ensure all air is exhausted from the product before maintenance.
- The length of the connector cable should be 10 m maximum.

### 3.2 Environment

#### Warning

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact. Check the product specifications.
- Do not mount in a location exposed to radiant heat.

## 3 Installation (continued)

### 3.3 Piping

#### Warning

- Before piping make sure to clean up chips, cutting oil, dust etc.
- When installing piping or fittings, ensure sealant material does not enter inside the port. When using seal tape, leave 1.5 to 2 threads exposed on the end of the pipe/fitting.
- Tighten fittings to the specified tightening torque.

Thread	Tightening Torque (Nm)
M5	1.5 to 2
1/4	8 to 12
3/8	15 to 20

- When connecting piping to a product, refer to its instruction manual to avoid mistakes regarding the supply port, etc.

Port 1 : Supply port  
Port 2 : Output port  
Port 3 : Exhaust port

### 3.4 Lubrication

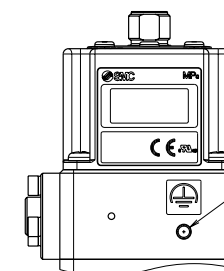
#### Caution

- Do not use a lubricator on the supply side of this product, as this can cause malfunction. When lubrication of terminal equipment is necessary, connect a lubricator on the output side of this equipment.

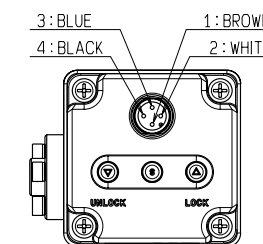
## 4 Wiring

#### Caution

- Connect the F.G. terminal to Ground at the front of the product.
- Proceed carefully, as incorrect wiring can cause damage.
- Use a DC power supply with sufficient capacity and a low ripple.
- Turn off the power supply to remove and insert the connector.
- Never rotate the right angled type connector as it is not designed to rotate.



Ground the F.G. terminal at the front of the main body.  
If the field ground fluctuates due to noise, it may affect the operation of the product.

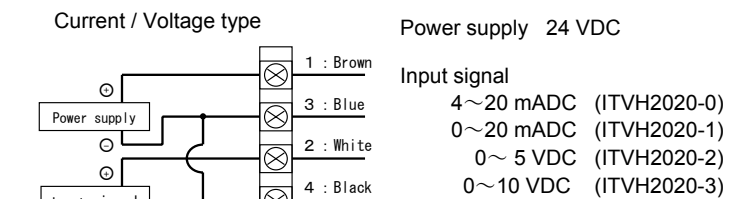


Current / Voltage type		
1	Brown	Power supply
2	White	Input Signal
3	Blue	GND (Common)
4	Black	Monitor output

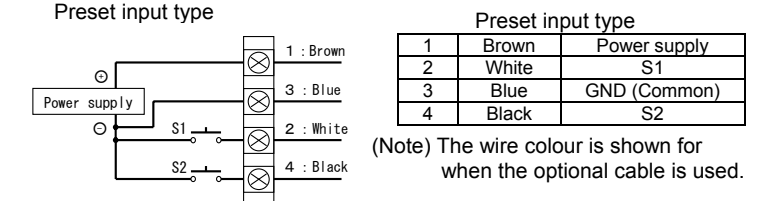
(Note) The wire colour is shown for when the optional cable is used.

## 4 Wiring (continued)

### Wiring diagram



### Wiring diagram

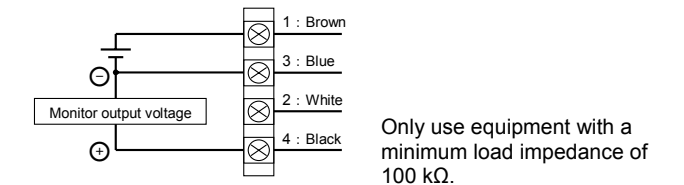


Preset pressure	P_1	P_2	P_3	P_4
S1	OFF	ON	OFF	ON
S2	OFF	OFF	ON	ON

For safety reasons, it is recommended that one of the preset pressures be set to 0 MPa.

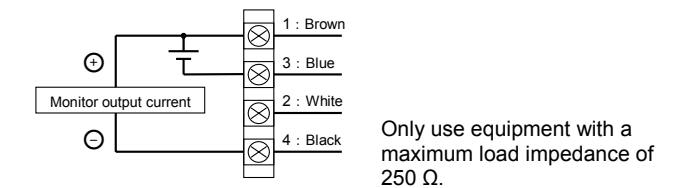
### Monitor output wiring diagram

#### Analogue output - Voltage type (ITVH2020-\*1)



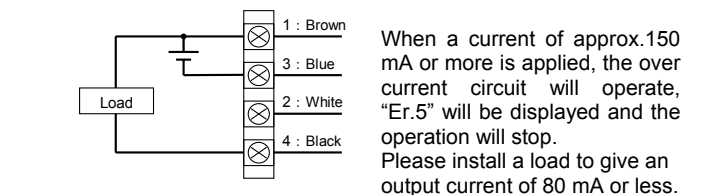
### Monitor output wiring diagram

#### Analogue output - Current (Sink) type (ITVH2020-\*4)



### Monitor output wiring diagram

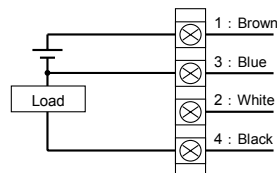
#### Switch output - NPN type (ITVH2020-\*2)



## 4 Wiring (continued)

Monitor output wiring diagram

Switch output - PNP type (ITVH2020-\*3)



When a current of approx. 150 mA or more is applied, the over current circuit will operate, "Er.5" will be displayed and the operation will stop. Please install a load to give an output current of 80 mA or less.

## 5 How to Order

Refer to the catalogue for this product.

## 6 Outline Dimensions (mm)

Refer to the catalogue for this product.

## 7 Maintenance and Inspection

### ⚠ Caution

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- If handled improperly, compressed air can be dangerous. Maintenance of pneumatic systems should be performed only by qualified personnel.
- Before performing maintenance, turn off the power supply and be sure to cut off the supply pressure. Confirm that the air is released to atmosphere.
- After installation and maintenance, apply operating pressure and power

to the equipment and perform appropriate functional and leakage tests to make sure the equipment is installed correctly.

- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.

## 8 Limitations of Use

### ⚠ Caution

- If the electric power supply is shut off while pressure is being applied, the pressure will be maintained on the output side. However, this output pressure is held only temporarily and is not guaranteed. If exhausting of this pressure is desired, shut off the power after reducing the set pressure, and discharge the air using a residual pressure exhaust valve, etc.
- If power to this product is cut off due to a power failure, etc. when it is in a controlled state, output 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 while the power is still on, the internal solenoid valve will continue to operate and a humming noise may be generated. Disconnect the power supply when the supply pressure is shut off, as the life of the product may be shortened.
- Do not block three exhaust ports on this product.
- This product does not have a shut-off valve function. If air pressure is supplied without electric power being applied, the output pressure may increase to a pressure equivalent to the exhaust port when output pressure is generated. Operate the system to shut off the supply pressure when not operating the product.
- The product is adjusted for each specification at the time of shipment from the factory. Do not perform unnecessary disassembly or removal of parts as it will cause failure.

## 9 Contacts

<b>AUSTRIA</b>	(43) 2262 62280-0	<b>LATVIA</b>	(371) 781 77 00
<b>BELGIUM</b>	(32) 3 355 1464	<b>LITHUANIA</b>	(370) 5 264 8126
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# SMC Corporation

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