No.IR10-OM00006

Operation Manual

PRECISION REGURETOR

PRODUCT NAME

IR1000-F01-DI100467・IR1010-F01-DI100467

MODEL/ Series

SMC Corporation

Table of Contents

Safety

Be sure to read this operation manual before handling, and understand the contents to operate the product properly.

Keep this operation manual carefully to be able to refer to it whenever it is required, and ensure to give it to an end user.

These safety instructions are intended to prevent hazardous situation and/or equipment damage.

These instructions indicate the level of potential hazard by labeling ”Caution”, “Warning” or “Damage”. To ensure safety, be sure to observe ISO4414 (Note 1), JIS B 8370 (Note 2) and other safety practices.

⚠ DANGER

In extreme conditions, there is a possibility of serious injury or loss of life.

⚠ WARNING

Operator error could result in serious injury or loss of life.

⚠ CAUTION

Operator error could result in injury or equipment damage.

(Note 1) ISO 4414 Pneumatic fluid power-Recommendations for the application of equipment to transmission and control system.

(Note 2) JIS B 8370 Pneumatic system axiom

⚠ 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 provided by a person in charge of design and specification after analyzing and/or testing to meet your specific requirements. A guarantee of the expected performance and safety is in charge of a person who decides the compatibility for the system. System should be constructed by reviewing all specifications and considering possible failure of machinery according to the latest catalog and material.

2. **Only trained personal 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 component until safety is confirmed.**
   A. Inspection and maintenance of machinery / equipment should only be performed after confirmation of safe locked-out control positions.

   B. When equipment is removed, confirm the safety process as mentioned above. Cut supply pressure for the equipment, turn off the power, and exhaust all residual compressed air in the system.

   C. Before machinery / equipment is restarted, take care safety of surroundings.

4. **Contact SMC if the product is to be used in any of the following conditions or environments.**
   A. Conditions and environments beyond the given specifications, or if product is used outdoors.

   B. Installation on equipment in conjunction with atomic energy, railway, aviation, vehicles, medical equipment, food and beverage, recreation equipment, emergency stop circuits, press applications, or safety equipment.

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

Introduction

Series IR1000 precision type regulator is superior in relief characteristics and constant pressure is kept in the case of flowing backward.

IR10∗0-F01-DII00467 is designated special for Sensatronic to be applied for respirator.

1. Specification

Model	IR1000-F01-DII00467	IR1010-F01-DII00467
Max. supply pressure [bar]	Max. 1.0	
(Note1) Min. supply pressure [bar]	Setting pressure + 0.5	
Setting pressure [bar]	0. 05～2	0.1～4
Setting sensitivity	(Note2) within 0.2% of full span	
Repeatability	(Note2) within ±0.5% of full span	
(Note3) Air consumption	Less than 5 ℓ/min (ANR) (at supply pressure of 10bar)	
Fluid	Air ・ Oxygen	
Ambient & fluid Temperature	-10~50℃ (With no freezing)	
Storage Temperature	-20~70℃ (With no freezing)	
Port size	G1/8	
Pressure gauge port size	G1/8	
Weight	0.14 kg	

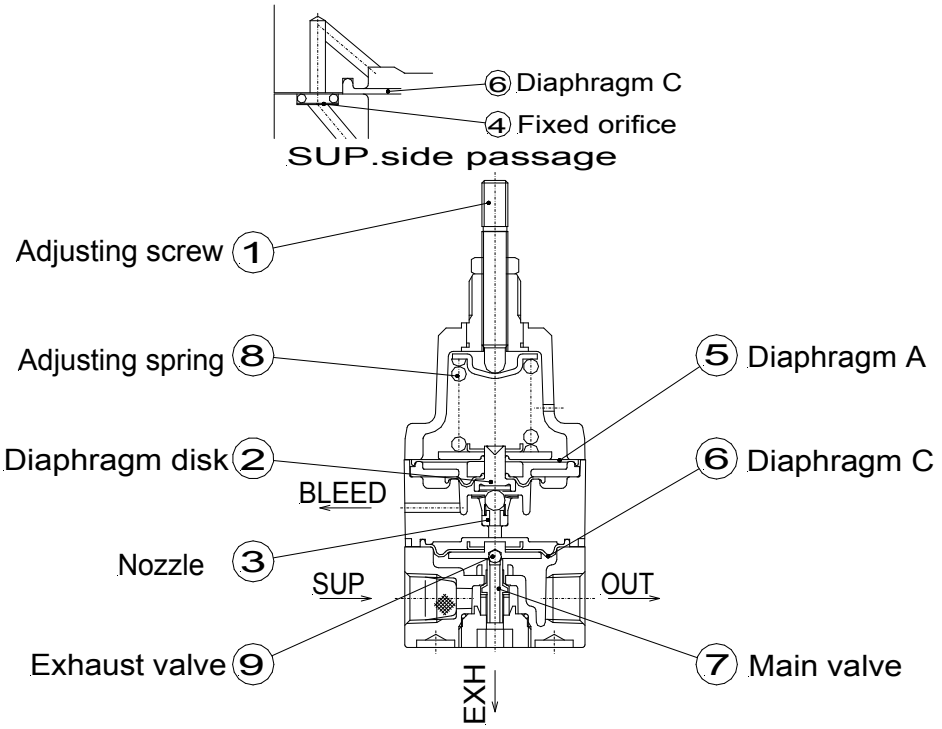
(Note 1) With the condition of no flow on the output side. The min. differential pressure from setting pressure should be always +0.5bar.

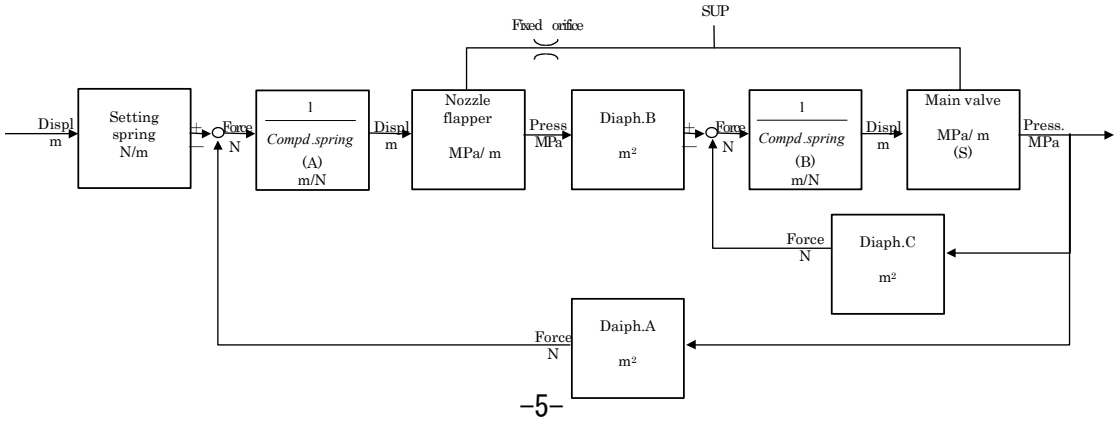
(Note 2) Full span specifies the max. setting pressure of product. (eg. IR1000: 2bar)

(Note 3) Air is normally being exhausted to the atmosphere.

2. Structure and operating principles

When the Adjusting screw①is turned, the nozzle③ is closed by the diaphragm disk②, allowing the supply air that flows in from the upstream side to pass through the fixed orifice④ and to acts on diaphragm C⑥ as nozzle back pressure, the main valve⑦ is pushed down by the generated force and the supply pressure flows out to the downstream side. The air pressure that flows in acts on bottom side of diaphragm C⑥ and while opposing the force generated by nozzle back pressure, it also acts on diaphragm A⑤opposing the compression force of the setting spring⑧ and balance with set pressure. When the output pressure raises above the setting pressure, diaphragm A⑤ is pushed up which makes the interval between the diaphragm disk② and the nozzle③ widens, the nozzle back pressure drops, the pressure balance of upper/bottom part of diaphragms C⑥ collapses. Then as the main valve⑦ closes, the exhaust valve⑨ opens at the same time and the excess pressure from the downstream side is discharged to the atmosphere. In this way fine pressure variations are detected by the nozzle/flapper type pilot mechanism, and precise pressure adjustment is performed. Deviation due to pressure difference between in/outside of bourdon tube is transmitted to the sector through the rod to rotate the pinion engaging the sector. The indicting needle and scale display the pressure value.





SMC

No.

3. How to order

I R 1 0 ※ 0 - F 0 1 – D I I 0 0 4 6 7

Special order

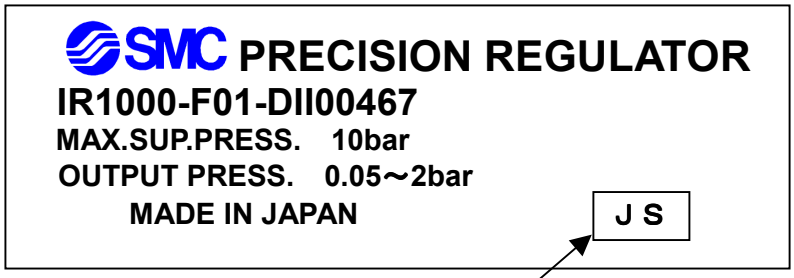
Connecting port
01 : 1/8

Connect screw
F : G

Settting pressure
0 : 0.05～2bar
1 : 0.1～4bar

4. Production lot number symbol

The production lot symbol is described to product name plate.



Production lot number

J S

Symbol of year

J : 2005
K : 2006
L : 2007
M : 2008
N : 2009
A : 2010
B : 2011
C : 2012
:

Symbol of month

O : January
P : February
Q : March
R : April
S : May
T : June
U : July
V : August
:

5. Precautions

Warning Handling

(1) If the system is expected to be dangerous when the Precision regulator, please consider system with safety circuit to avoid danger.

Warning Operating Environment

(1) Do not operate in locations having an atmosphere of corrosive gases, chemicals, sea water, water or steam, or where there will be contact with the same.
(2) Do not operate in locations where vibration or impact occurs.
(3) In locations which receive direct sunlight, provide a protective cover, etc.
(4) In locations near heat sources, block off any radiated heat.
(5) In locations where there is contact with spatter from water, oil or solder, etc., implement suitable protective measures.

Warning Air supply

(1) These products are designed for use with compressed air or oxygen.
Contact SMC if any other fluid will be used.
(2) Do not use compressed air which includes chemicals, synthetic oils containing organic solvents, salt, or corrosive gases, etc., as this can cause damage of malfunction.
(3) If drains is not removed from air filters and mist separators, it can flow out to the downstream side and lead to the malfunction of pneumatic equipment. In cases where the management of drainage removal will be difficult, the use of filters with auto drains is recommended

Warning Maintenance

(1) Incorrect handling of compressed air or oxygen is hazardous. Follow the product specification. Element replacement and maintenance shall be performed by person with knowledge and experience on pneumatic equipment.
(2) Rubber parts including diaphragm, “O” ring and packing are worn out.
Annual inspection or component replacement every 3 years is recommended.
(3) Please do the exhaust of the drain, washing the element, and the exchange, etc. surely regularly. Please go to the standard though it differs according to the use state every one month or three every months.

Caution Operation

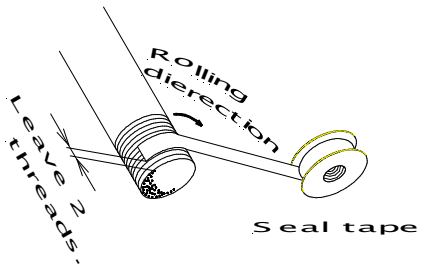
(1) Do not use a precision regulator outside the range of its specifications as this can cause failure. (Refer to specifications.)
(2) When mounting is performed, make connections while confirming port indications.
(3) If a directional switching valve (solenoid valve, mechanical valve, etc.) is mounted on the supply side of the regulator and repeatedly switched ON and OFF, wear of the nozzle/flapper section will be accelerated and a discrepancy in the setting value may occur. Therefore, avoid using a directional switching valve on the supply side. In the event a directional switching valve will be used, install it on the output side of the regulator.
(4) Air/oxygen is normally discharged from the bleed port (the hole on the side of the body's mid-section). This is a necessary consumption of air based on the construction of the precision regulator, and is not an abnormality.
(5) Be sure to tighten the lock nut after pressure adjustment.

Caution Air supply

(1) If the supply pressure line contains drainage or dirt, etc., the fixed throttle can become clogged leading to malfunction, and therefore, in addition to an air filter (SMC Series AF) be sure to use a mist separator (SMC Series AM, AFM). Refer to SMC's "Compressed Air Cleaning Systems" catalog regarding air quality.
(2) Never use a lubricator on the supply side of the regulator, as this will positively cause the fixed throttle to become clogged and lead to malfunction. If lubrication is required for terminal devices, connect a lubricator on the output side of the regulator.

Caution Piping

(1) Preparation before piping
Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove cutting chips, cutting oil and other debris from inside the pipe.
(2) Wrapping of pipe tape
When connecting pipes and fittings, etc., be sure that cutting chips from the pipe threads and sealing material do not get inside. Further, when pipe tape is used, leave 1.5 to 2 thread ridges exposed at the end of the pipe/fitting.



SMC

No.

6. Troubleshooting

Caution

For troubles in the table below, replacement by the component is recommended.

Non-conformance occurred due to repalcement with spare part is not guaranteed.

Phenomenon	Checking item	Causes	Countermeasures
Pressure is not output	Air is not exhausted from bleed hole.	Fixed orifice is clogged	Replace the component or fixed orifice.
Excess air leaks From exhaust hole.	Air leaks 1.2 L/min (ANR) or more while there is no reason of flowing backward.	Adhering dust to the sealing part of the main valve.	Remove the dust at the seat by replacing by the component or removing the valve guide.
		Diaphragm is damaged.	Replace the diaphragm assembly. (Refer to the following list.)

Model	Diaphragm A/B assembly model	Diaphragm C assembly Model
IR1000	P362010-15	P362010-16
IR1010		

∗ Refer to the construction chart of page 4 for alphabet sign of diaphragm.

Revision history

SMC Corporation

URL http://www.smcworld.com

Phone

AUSTRIA / (43) 2262-62 280
BELGIUM / (32) 3-355 1464
CZECH REP. / (420) 5-414 24611
DENMARK / (45) 70 25 29 00
FINLAND / (358) 9-859 580
FRANCE / (33) 1-64 76 1000
GERMANY / (49) 6103 4020
GREECE / (30) 1- 342 6076
HUNGARY / (36) 1-371 1343
IRELAND / (353) 1-403 9000
ITALY / (39) 02-92711
NETHERLANDS / (31) 20-531 8888
NORWAY / (47) 67 12 90 20
POLAND / (48) 22-548 50 85
PORTUGAL / (351) 2 610 89 22
SPAIN / (34) 945-18 4100
SWEDEN / (46) 8-603 0700
SWITZERLAND / (41) 52-396 3131
TURKEY / (90) 212 221 1512
UNITED KINGDOM / (44) 1908-56 3888