DOCUMENT No.: AR※－OMF００４８

OPERATION MANUAL

PRODUCT NAME : (E,N)ARJ210－M5(BG)(－1S)

MODEL : ARJ310－※01(BG)(－1S)

ARJ310F－※01(BG)－03～07(－1S)

○Read this operation manual carefully to understand before installation and operation.
○Pay extra attention on the clause concerning the safety.
○Keep this operation manual available whenever necessary.

CONTENTS

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1. PRECAUTIONS FOR SAFETY

Precautions shown here are to ensure the product is used correctly and safely, and to prevent hazard and damage inflicting upon people from occurring. These precautions are divided into three categories, "Caution", "Warning", and "Danger" to indicate the degree of possible hazard and damage, and urgency.
As all these are important for safety, never fail to follow them in addition of ISO4414, JIS B8370, and other safety regulations.

⚠ Caution : Possible harmful effects are expected to be on people and possible loss is expected only of objects when wrong operation occurred.

⚠ Warning : Possible loss or serious injury of people is expected when wrong operation occurred.

⚠ Danger : Imminent danger that possible loss or serious injury of people is expected without evacuation.

※1) ISO4414 Pneumatic fluid power–Recommendations for the application of equipment to transmission and control systems.

※2) JIS B 8370 Common regulations for pneumatic systems.

⚠ WARNING

①Suitability of pneumatic equipment should be determined by a designer of the pneumatic system or a person who prescribes its specifications.

Since the product shown here is used in various operating conditions, its suitability to a system should be determined by the pneumatic system designer or the person prescribes its specifications based on necessary analysis and tests. The person who determined the suitability of the system is responsible for the performance at a certain point of time and safety assurance of this system.
A system should be constructed by referring to the latest product information and catalogues, discussing all the contents of specifications, and considering possibilities of equipment failure.

②Equipment should be handled by those who have sufficient knowledge and experience

Compressed air fluid could be hazardous if it is handled incorrectly. Assembly, operation and maintenance of machinery and equipment for which pneumatic apparatuses are used should be performed by those who have sufficient knowledge and experience.

③Never handle the machinery or equipment, or never take out the apparatus until safety is confirmed

a. Check and maintenance of machinery or equipment should be performed after it is confirmed that dropping or uncontrollable running prevention measures are taken for the equipment on which the product is mounted.
b. Apparatuses should be taken out after it is confirmed equipment corresponding to air supply, that is an energy source, should be turned off; and compressed air in the system should be exhausted.
c. Re-starting of machinery or equipment should be done with ample care after it is confirmed that prevention measure s for sudden movement are taken.

④When the product is used in the following conditions or environment, considerations for safety measures should be given along with consultation to our company

a. Outdoor usage, or usage in conditions or environment outside of the specifications indicated.
b. Usage for nuclear power, railroad, air navigation, vehicle, medical equipment, appliances contacting food and beverage, entertainment apparatuses, emergency shutdown circuits, clutch/break circuits for pressing, and safety devices.
c. Usage for applications which especially require safety because considerable effects to people and properties are expected.

Design · Selection

⚠ Warning

① **Check set pressure range before operation.**
The product explained on this operation manual is designed to be used in compressed air system. Pressure and temperature out of specifications may result in breakage and operating failure of the product.

② **Equip with protective equipment.**
If output over setting pressure may cause damage and operating failure of the machine and equipment installed outlet side.

③ **Exhaust of outlet pressure.**
There is possibility that outlet pressure can't be exhausted properly (that's residual pressure is made) when inlet pressure is exhausted with outlet pressure set low. If it is necessary to ensure exhaust of outlet pressure,equip with specific circuit not to make residual pressure.

④ **Operation with sealed or balance outlet circuit.**
Contact SMC before operation because there is possibility that the product is not available in these circuit.

⑤ **Set pressure of outlet pressure shall be 85% or less of inlet pressure within specified set pressure range.**

⑥ **Do not use the product as check type regulator installed between solenoid valve and actuator.**Otherwise, breakage and operating failure could be resulted.

⚠ Caution

① Do not give impact and vibration directly to installed pressure gauge.

② Contact SMC if pressure gauge is installed at the place with pressure pulsation or its operating frequency is high.

Installation · Adjustment

⚠ Warning

① **Operation manual**
Before installation and operation, read the operation manual carefully to understand the content of it and keep it available whenever necessary.

② **Keep space enough for maintenance..**

③ **Be sure to use specified screw type and tightening torque for it.**
When tightening the screw, apply recommended torque shown on following table.

Rc, R, NTP, G	Recommended torque
M5	1.5～2.0N·m
1/8	7～9N·m

Hold width across flat of the screw for tightening. And tightening with installed to panel or bracket may damage the screw.

④ Adjust the pressure ensuring inlet pressure and outlet pressure with checking the value indicated on pressure gauge. Excessive rotation of adjusting screw may cause internal parts.

⑤ Rotate adjusting screw by hand. Rotation by tool may damage the product..

⚠ Caution

① Keep following procedure to perform setting of pressure properly..
a) Rotate adjusting screw to raise outlet pressure and rotate counterclockwise to reduce.
b) Adjust pressure incrementally.
c) Installation of the product in counter direction may cause malfunction.
ARJ210: Two M5 ports on hexagonal part of body shall be located to out side
ARJ310/ARJ310F: Follow the mark ↱. The mark indicates inlet and outlet of air.

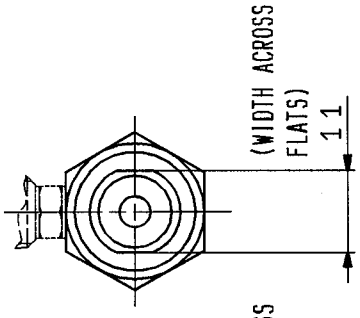
② Unlocking is required to adjust pressure. After adjustment, lock again.
Setting by incorrect procedure may damage handle and cause deviation of secondary pressure.
(How to lock)
Loosen lock nut for unlocking and tighten it for locking.

<Pressure gauge>

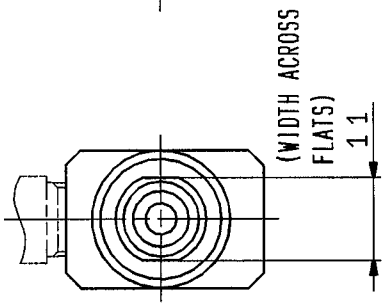
① Don't drop nor apply impact during transportation or installation. gauge.
These lead to cause precision failure of pressure.
② Mount pressure gauge perpendicular to floor so that zero could face downward.
③ Don't install where highly humid or temperature is high. Or pressure gauge may malfunction.
④ Be sure to hold width across flat with spanner for screwing pressure gauge.
Screwing with any other part held may damage the pressure gauge and cause air leakage.

Piping

① Hold spanner flat (length: 11) of valve guide for IN side piping and hexagonal part of body for OUT side piping and tighten by recommended torque (1.5～2N·m for M5 and 7～9N·m for R1/8). Excessive torque and tightening with any other part held may damage piping.



ARJ210-M5
Spanner flat of lower side of IN



ARJ310/ARJ310F
Spanner flat of lower side of IN

Do not give excessive bending moment to the product during piping and operation of handle. The product may be damaged. And when installing the product to panel or bracket, hold hexagonal part of body and tighten panel nut.

⚠ Caution

① Flash or clean piping before piping to eliminate flaw, cutting oil, solid foreign material.
Remaining of these lead to cause malfunction.
② When screw in piping or fitting, avoid entering of chips and sealing materials from piping screws into the inside of equipment. Or malfunction is led to occur. When use sealing tapes, leave 2 threads of a screw and starts taping.

Air source

⚠ Warning

① **Applicable fluid**
Do not use a fluid other than compressed air without contact to SMC.
② **Applicable air**
Compressed air including organic solvent, synthetic oil, chemical, salt, corrosive gas and etc. may result in damage and operating failure of the product.

Environment

⚠ **Warning**

① Do not use at the place with exposure to corrosive gas, chemical, salty water, water and steam.

② When using at the place with direct sun light applied, put countermeasure on the product to shut off the sun light.

⚠ **Warning**

① Do not use at the place where impact or vibration is given.

② Do not use at the place near heat source or with exposure to heat radiation.

Maintenance

⚠ **Warning**

① As compressed air has potential danger, maintenance or check should be done by following specifications of the product by the person who has sufficient knowledge and experience of pneumatic equipment.

② Preliminary check for maintenance
Prior to removal of the product for maintenance, be sure to cut off power supply and pressure, exhaust compressed air from piping and confirm the product is under the condition released to atmosphere.

③ Check after maintenance
After installation and repair of the product, apply compressed air and power supply to the product and confirm it works properly and has excessive leakage. If the leakage which can be heard occurs or proper operation of the product is not obtained, confirm installation is done correctly before operation.

④ Do not modify the product.

Caution for handling one touch fitting

① Connection and disconnection of tube from one touch fitting

1) Connection of tube

a) Cut tube with no flaw on its external face short to adequate length perpendicularly by using tube cutter TK-1, 2, 3. Do not use pliers, nipper, scissors and other cutting tools because cut face of tube may be made diagonal and deformed and pull out of tube and air leakage from connection part are caused. And let cut tube have some extra length.

b) Hold hexagonal part of tube when connecting to fitting.

c) Grip tube and push into the end of fitting slowly.

d) After reaching the end of fitting, pull tube with light force to confirm tube doesn't pull out. If tube doesn't reach the end of fitting, air leakage and coming out of tube are caused.

2) Disconnection of tube

a) Hold hexagonal part of tube when disconnecting to fitting.

b) Push release bush with pushing collar evenly.

c) Disconnect tube with pushing release bush to prevent it from returning. Insufficient push force to release bush makes tube caught more deeply and hard to be disconnected.

d) If reusing disconnected tube once, cut caught part of tube. The use of the caught part causes air leakage and makes tube hard to be disconnected.

② When connecting one touch fitting, hold width across flat on its body near thread by adequate size spanner. Inadequate size spanner may damage the width across flat.

③ How to tighten M5 screw
After tightening by hand. Tighten approx. 1/6 more by using specific tool.
Excessive tightening may break thread, deform gasket, and finally cause air leakage.
And insufficient tightening may loosen screw and cause air leakage.

Caution for using other manufacturer's tube

⚠ **Caution**

① If using tube made by other manufacturer, not SMC, confirm outside diameter accuracy of tube satisfies following specifications.

1) Nylon tube: ±0.1mm
2) Soft nylon tube: ±0.1mm
3) Polyurethane tube: +0.15mm, −0.2mm

Do not use the tube which doesn't satisfy specifications above.
Such a tube prevents connection to fitting and causes air leakage and pull out of tube after connection.

2. APPLICATION

This product aims at controlling pressure of air line.

3. SPECIFICATIONS

Model		ARJ210	ARJ310	ARJ310F
Port size for connection	IN side	M5×0.8(Female) and 1/8 (Male)	M5×0.8(Female) and 1/8 (Male)	M5×0.8(Female) and 1/8 (Male)
	OUT side	M5(Female)	1/8 (Female)	ϕ4, ϕ6 for mm size
		M5(Female)		ϕ5/32, ϕ1/4 for inch size
Port size for pressure		M5(Female)	1/8 (Female)	1/8 (Female)
Fluid		Air		
Proof pressure		1.2MPa		
Max. operating pressure		0.8MPa		
Set pressure range		0.2 to 0.7 MPa for standard		
		0.05 to 0.2 MPa (for low pressure. Upper limit of set pressure range is 0.2MPa)		
Ambient and fluid temperature		-5 to 60 degree C		
Weight (g)		Approx. 60	Approx. 65	Approx. 65

4. HOW TO ORDER

※ N E — ARJ — 2 — 10 — -M5 — ※ B G BG — — ※ 1 S 1S

ARJ: Miniature regulator

2: Body size

Model

10	Relief type(standard)

Thred type of IN side

NIL	For Japan, Asia	R(Male), M5(Female)
N	For U.S	NPT(Male), M5(Female)
E	For Europe	G(Male), M5(Female)

Port size of IN,OUT,Gauge side

M5	IN	1/8 (Male),M5×0.8(Female)
	GAUGE	M5×0.8(Female)
	OUT	M5×0.8(Female)

Accessory

NIL	—
B	Bracket
G	Pressure Gauge

Semi-Standard

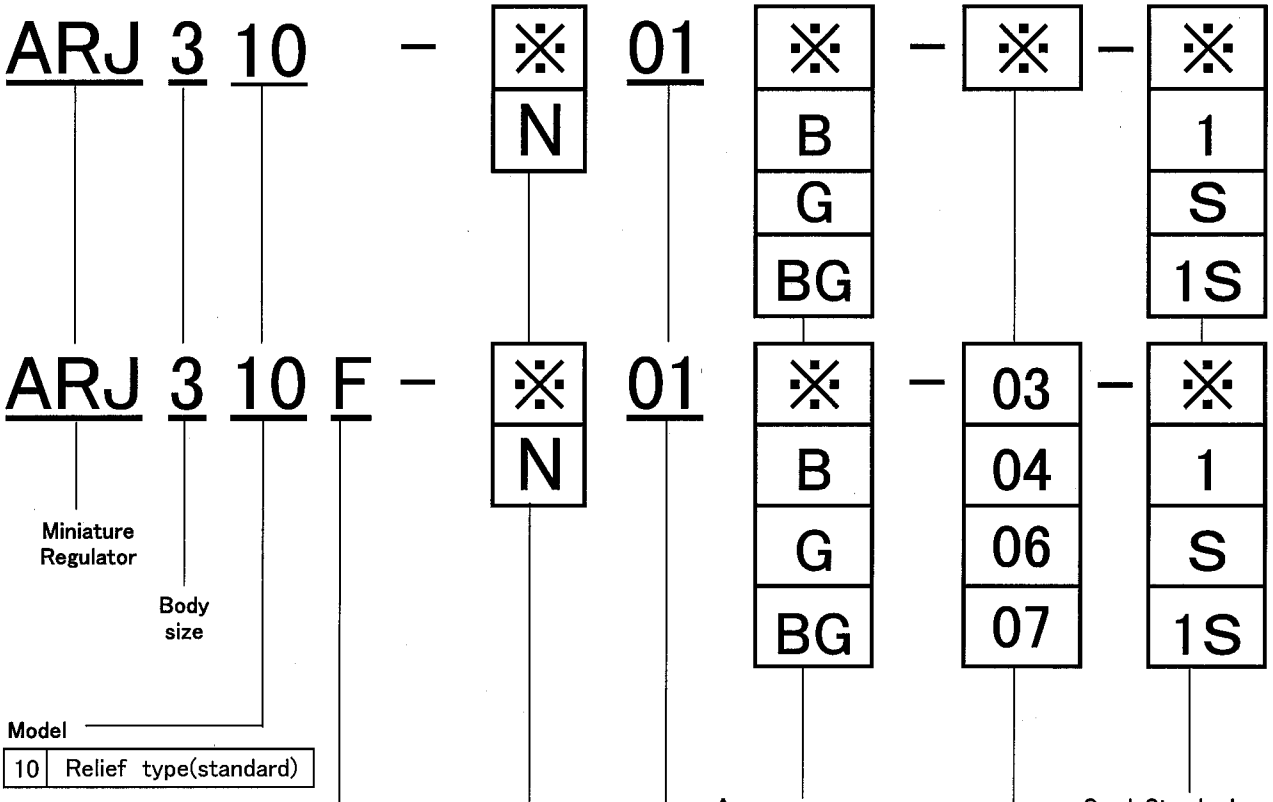
NIL	0.7MPa (standard)
1	0.2MPa
S	With Sealant

* For set pressure range up to 0.2MPa, pressure gauge attached is for 1MPa. And seal is not available for EARJ210 because of its thread type, PF.

①Part No. Accessory

Part Name	Part No.	Model
Bracket	134856	Common to ARJ210/ARJ310/ARJ310F
Pressure gauge	G27-10-M5-X201	ARJ210-M5/EARJ210-M5
	G27-P10-M5-X201	NARJ210-M5

2) ARJ310 / ARJ310F:



①Part No. Accessory

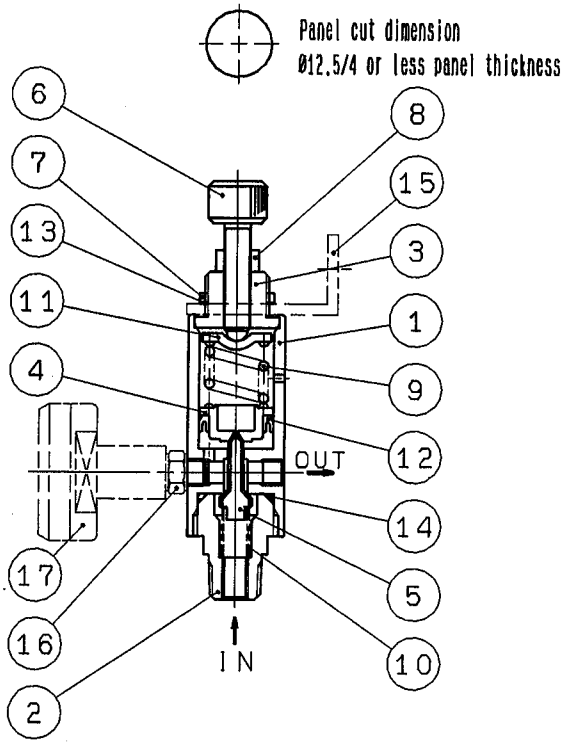
Part Name	Part No.	Model
Bracket	134856	Common to ARJ210/ARJ310/ARJ310F
Pressure gauge	G15-10-01	ARJ310-01/ARJ310F-01
	G15-P10-N01	ARJ310-N01/ARJ310F-N01

5. Troubleshooting

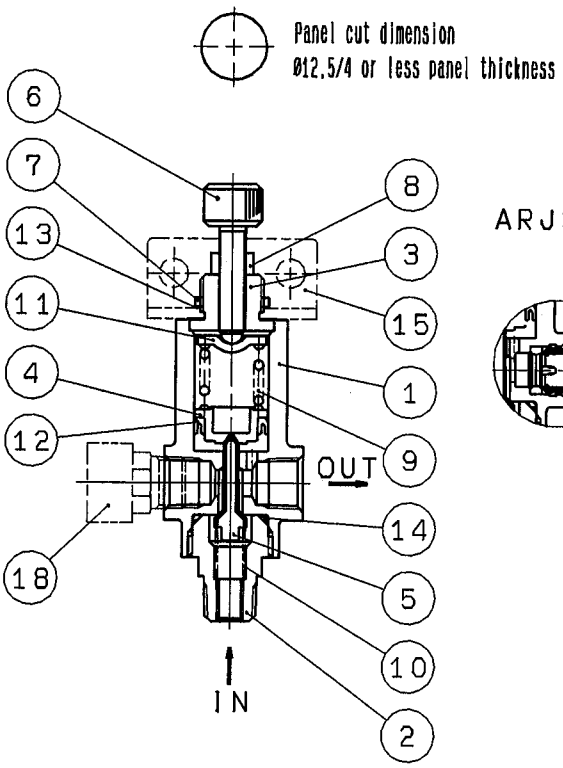
TROUBLE	POSSIBLE CAUSE	REMEDY
Pressure is not regulated.	1. Opposite flow direction or opposite installation of regulator 2. Breakage of adjusting spring 3. Breakage of valve spring 4. Foreign materials caught in valve seat. 5. Damaged rubber lining on valve	1. Check flow direction and install the regulator correctly if wrong 2. Replace the adjusting spring. 3. Replace the valve spring. 4. Remove valve guide and clean the valve seat. 5. Replace the valve assembly.
Freely rotating adjusting screw makes it impossible to adjust pressure.	1. Breakage of bonnet.	1. Replace the bonnet.
Set pressure does not return to zero when pressure regulating handle is loosened.	1. Foreign materials caught in valve seat or valve "O" ring 2. Damaged rubber lining on valve 3. Breakage of valve spring	1. Remove valve guide and clean the valve and the valve seat. 2. Replace the valve. 3. Replace the valve spring.
Air leaks small hole on hexagonal side of body. (Less than 100cm^3/min is allowable.)	1. Breakage of piston packing. 2. Foreign materials caught in relief seat of valve. 3. Damaged rubber lining on valve.	1. Replace the piston packing. 2. Remove the valve guide and clean the valve and relief seat of the valve. 3. Replace the valve.
Air leaks between body and valve guide.	1. Damaged on O ring. 2. Breakage of valve guide. 3. Breakage of body.	1. Replace the O ring. 2. Replace the valve guide. 3. Replace the body.
Panel nut rotating freely prevents mounting.	1. Breakage of bonnet.	1. Replace the bonnet.

6. CONSTRUCTION／PARTS LIST

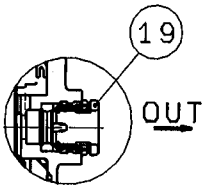
ARJ210-M5BG



ARJ310-01BG



ARJ310F



Component Parts

No.	Description	No.	Description
1	Body	11	Spring holder
2	Valve guide	12	Mini Y packing
3	Bonnet	13	Lock washer
4	Piston	14	O ring
5	Valve	15	Bracket
6	Adjusting screw	16	Nipple
7	Panel nut	17	Pressure gauge
8	Lock nut	18	Pressure gauge
9	Adjusting spring	19	Cassette
10	Valve spring	—	—

7. Replacement Parts

No.	Description	Material	Part no.	Remark
2	Valve guide	Brass	134816	R1/8
			134826-N	NPT1/8
			134827	G1/8
			134816-S	R1/8 with sealant
			134826-NS	NPT1/8 with sealant
5	Valve	Brass	134819-30	For ARJ210
		H NBR	1348124	For ARJ310/ARJ310F
10	Valve spring	Stainless steel	134824	—
14	O ring	NBR	ϕ14×ϕ11×W1.5	—