
OPERATION MANUAL

PRODUCT NAME: REGULATOR WITH THE PRESSURE GAUGE BUILT-IN

MODEL: ARG20-(F,N)01~(F,N)02(B,H)(G1,G2,G3,G4)(-1,N,Z)

ARG30-(F,N)02~(F,N)03(B,H)(G1,G2,G3,G4)(-1,N,Z)

ARG40-(F,N)02~(F,N)04(B,H)(G1,G2,G3,G4)(-1,N,Z)

○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.

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

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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 ISO 4414(※1), JIS B 8370(※2), 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) ISO 4414 Pneumatic fluid power—General rules relating to systems

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

WARNING

- ① **Suitability 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.
- ② **Equipment 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.
- ③ **Never 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 measures for sudden movements are taken.
- ④ **When 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.

Precautions for design



WARNING

- ① Externally there are plastic parts such as handle (polyacetal) and pressure gauge cover (polycarbonate). Organic solvents including synthetic fluid, chemicals including acetone, alcohol, ethylene chloride, sulphuric acid, nitrate, hydrochloric acid, cutting oil, kerosene, gasoline, lock material of screw are harmful. Don't use the regulator where containing those.
- ② Consult SMC if no leakage is allowed due to the environment, or operating fluid is not air
- ③ Protect from ultra violet ray and radiation heat by shield.
- ④ Safety device needs to be installed if output pressure exceeding set pressure lead to cause the breakage of outlet device and equipment or malfunction.



CAUTION

- ① Air consumption is 0.1L/min(ANR) or less for standard specification. If this is not acceptable, please consult SMC.

Selection



WARNING

- ① Mineral grease used for internal sliding surface and packing may leak to the outlet. Please contact SMC if this is a problem.
- ② Residual pressure (outlet pressure) is not released even if releasing inlet pressure. Select the regulator with pressure gauge built-in with back flow function. Without the function, residual pressure may not be eliminated.
- ③ Long absence of operation or operation with outlet circuit sealed or balance circuit may cause pressure fluctuation in outlet set pressure. Please consult SMC if this is a problem.
- ④ Set pressure of outlet pressure shall be 85% or less of inlet pressure. Pressure over 85% makes operation susceptible to flow and inlet pressure which lead to cause unstable operation.
- ⑤ Maximum set pressure range in the spec. has margin. Pressure set may be higher than the maximum value.
- ⑥ If regulator is used with circuit which require high exhaust sensitivity or set precision, please consult SMC.

Installation



CAUTION

- ① Connect the regulator ensuring the direction of "IN" and "OUT" for air direction or an arrow. Wrong connection lead to cause malfunction.
- ② Keep the space for maintenance and operation on the top, bottom and front face. The required space is shown on 「10. Dimensions」 (P12).
- ③ Don't drop nor apply impact during transportation or installation. gauge. These lead to cause precision failure of pressure .
- ④ Don't install where highly humid or temperature is high. Or pressure gauge may malfunction.

Adjustment



WARNING

- ① Adjust the pressure ensuring inlet pressure and outlet pressure. Excessive rotation may cause internal parts.
- ② Operate the pressure adjusting handle manually. Tools may break the handle.



CAUTION

- ① Check primary pressure before setting up.
- ② For the regulator with the pressure gauge, don't apply pressure over the maximum scale of the pressure gauge in order to protect the gauge.
- ③ Adjust pressure incrementally. Pressure may become lower than set pressure if adjusted by decreasing the value. Rotate the handle clockwise to raise the set pressure. Counterclockwise, reduce the pressure
- ④ Outlet pressure may rise if eliminate the inlet pressure after pressure setting and supply pressure again. The pressure becomes close to the set pressure after air is consumed in outlet.
- ⑤ Outlet pressure might change if uses for a long time. Please confirm set pressure regularly.

Piping



WARNING

- ① Flash or clean piping before piping to eliminate swarf, 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 1.5~2 threads of a screw and starts taping.
- ③ Hold the female screw side and screw in piping with recommended tightening torque. Insufficient tightening torque lead to cause loose piping or sealing failure. Excessive torque may lead to cause screw breakage. Tightening without holding female screw side applies excessive force to the piping bracket which lead to cause breakage.

Recommended torque unit: N·m

Screw	1/8	1/4	3/8	1/2	3/4
Torque	7~9	12~14	22~24	28~30	28~30

- ④ Don't apply any torsional moment, or bending moment except the weight of the regulator itself. External pipings need its support separately. Hard piping like steel tube is susceptible to excessive moment load or vibration. Insert the flexible tube to cancel the influence

Air Source



WARNING

- ① Use clean air. Compressed air containing chemicals, organic solvent, synthetic oil or corrosive gas may lead to cause breakage of parts or malfunction.
- ② The air containing the large amount of drain can result in operating failure. Therefore, mount a water removal equipment such as air dryer and drain catch at primary side of the air filter.

Maintenance



WARNING

- ① Maintenance or check should be done by following the procedure in the operation manual. Incorrect handling of the product may cause breakage or malfunction of the equipment or device.



CAUTION

- ① For First-aid for setting failure or leakage, check the internal valve sliding surface or the valve seat before giving first-aid treatment.

2. APPLICATION

This instrument aims at pressure controlling of air lines.

3. SPECIFICATIONS

Model	ARG20	ARG30	ARG40
Port size	1/8·1/4	1/4·3/8	1/4·3/8·1/2
Fluid	Air		
Proof pressure	1. 5MPa		
Max. operating pressure	1. 0MPa		
Set pressure range	0. 05~0. 85MPa		
Relieving pressure	Set pressure plus 0.05MPa {When relieving flow is 0.1L/min(ANR)}		
Ambient and fluid temperature	-5~60°C(Should be no freezing)		
Construction	Relieving style		
Weight (kg)	0. 31kg	0. 40kg	0. 57kg

4. HOW TO ORDER

ARG 20 - [] 01 [] G1 [] - []

● Options

Symbol	Description	Applicable model
Nil	—	—
注1) 1	Setting pressure 0.02~0.2MPa	ARG20~40
N	Non-relieving style	ARG20~40
注2) Z	Nameplate, Pressure gauge Unit: PSI	ARG20~40

When specifying more than one option, indicates symbols numerically then alphabetically.
 Note1) Pressure adjusting spring, pressure gauge (full span 0.3MPa) are different from standard spec.
 Note2) Thread: NPT.
 Z is applicable to only overseas because of new measurement law in Japan (SI unit)





● Accessories②

Symbol	Description	Applicable model
Nil	—	—
H	With set nut (Panel mounting)	ARG20~40

● Accessories①

Symbol	Description	Applicable model
Nil	—	—
B	With bracket (Set nut)	ARG20~40

● Pressure gauge mounting angle

Symbol	G1	G2	G3	G4
Mounting angle	0°	90°	180°	270°
Drawing of mounting angle				

Body size

20
30
40

Thread

Nil	Rc
N	NPT
F	G

Port size

01	1/8
02	1/4
03	3/8
04	1/2

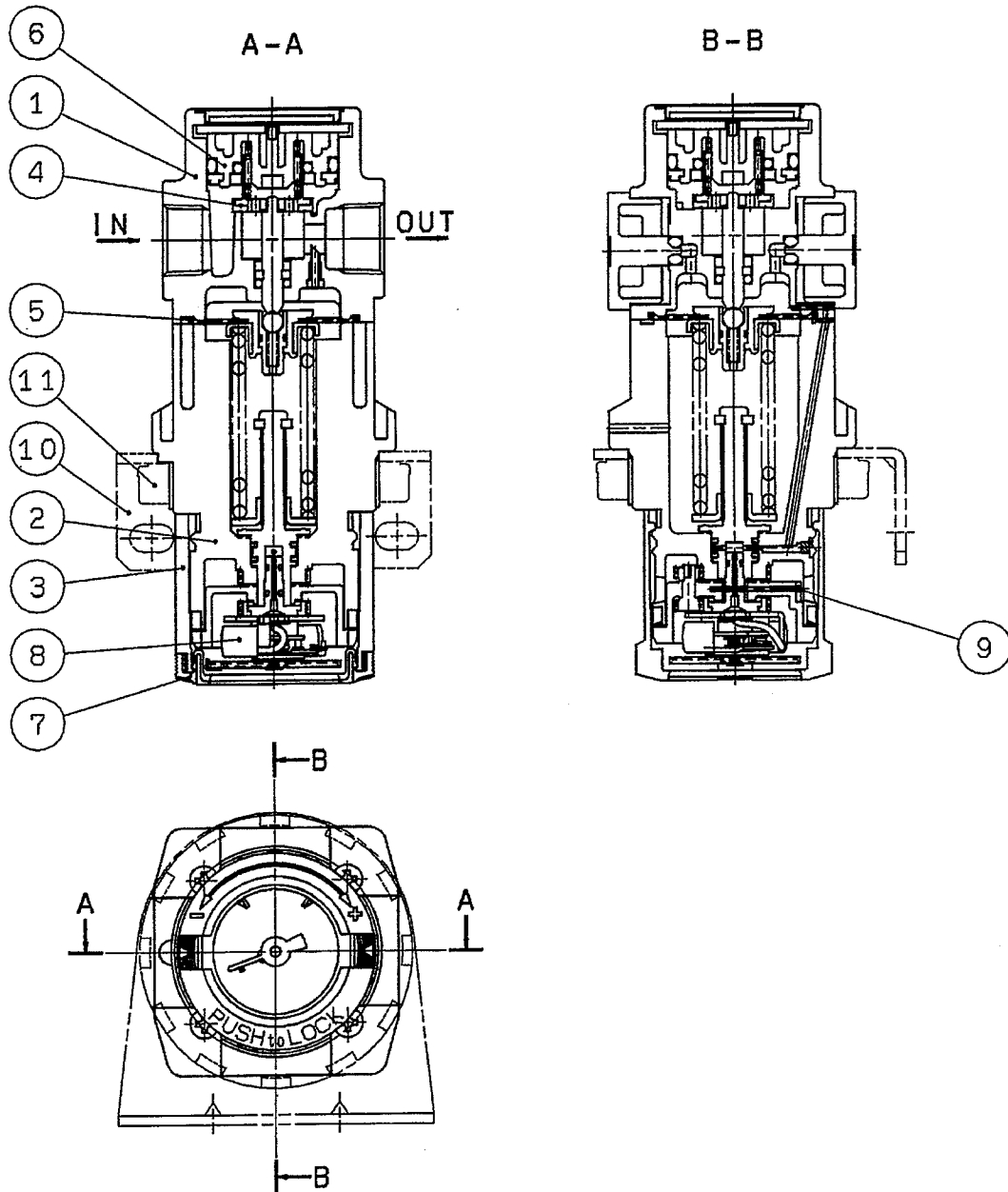
5. TROUBLESHOOTING

Refer to "6.CONSTRUCTION" (P6), "9.DISASSEMBLY DRAWING" (P10, P11).

TROUBLE		POSSIBLE CAUSE	REMEDY	Applicable model
Demarcation	Phenomenon			
Pressure	Pressure in not regulated	1. Opposite flow direction or installation of regulator.	1. Check flow direction and install the regulator correctly if wrong.	ARG20~ARG40
		2. Adjust spring is damaged.	2. Replace the adjust spring.	ARG20~ARG40
		3. Valve spring is damaged.	3. Replace the valve spring.	ARG20~ARG40
		4. Foreign materials caught in valve seat or valve "O" ring.	4. Remove valve guide and clean the valve seat or valve "O" ring. Grease up after washing the sliding surface of valve "O" ring.	ARG20~ARG40
		5. Valve rubber seat is damaged.	5. Replace the valve.	ARG20~ARG40
	Set pressure does not return to zero when pressure handle is	1. Foreign materials caught in valve seat or valve "O" ring.	1. Remove the valve guide to clean valve, valve seat and the valve "O" ring. Then, grease up the valve "O" ring and the sliding surface.	ARG20~ARG40
		2. Valve rubber seat is damaged.	2. Replace the valve.	ARG20~ARG40
		3. Valve spring is damaged.	3. Replace the valve spring.	ARG20~ARG40
		4. Valve adheres to the valve guide.	4. Wash the sliding surface of valve "O" ring and grease up.	ARG20~ARG40
	Air leaks	Air leaks from the bonnet exhaust port	1. Diaphragm is damaged.	1. Replace the diaphragm assembly.
2. Foreign material is caught in the relieving valve seat.			2. Clean the relieving valve seat, or replace the diaphragm assembly.	ARG20~ARG40
3. Foreign material is caught in the valve seat of valve "O" ring.			3. Remove the valve guide to clean valve, valve seat and the valve "O" ring. Then, grease up the valve "O" ring and the sliding surface.	ARG20~ARG40
4. Valve rubber seat is damaged.			4. Replace the valve.	ARG20~ARG40
5. Back pressure exceeding the set pressure is applied to the outlet.			5. Revise the air circuit so that back pressure does not exceed the set pressure.	ARG20~ARG40
Air leaks between the bonnet and the body		1. Loosened bonnet.	1. Fasten the bonnet.	ARG20~ARG40
		2. Diaphragm is damaged.	2. Replace the diaphragm assembly.	ARG20~ARG40
Air leaks from the pressure gauge (the handle)	1. Foreign materials are caught in the pressure gauge "O" ring.	1. Remove the pressure gauge, and clean the pressure gauge "O" ring. After cleaning, apply grease to the pressure gauge "O" ring.	ARG20~ARG40	
	2. The pressure gauge is damaged.	2. Replace the pressure gauge.	ARG20~ARG40	

Note) The grease used recommends Mitsubishi diamond multipurpose No.2.

6. CONSTRUCTION/PARTS LIST



COMPONENT PARTS

No.	Description	ARG20	ARG30	ARG40	Note
①	Body	Zinc die cast	Aluminium die cast		Painted platinum/silver
②	Bonnet	PBT			Painted black
③	Handle	POM			Painted black

OPTION/REPLACEMENT PARTS

No.	Description	Option	Material	ARG20	ARG30	ARG40	
④	Valve	—	BRASS BAR·HNBR	AR20P-410S	AR30P-410S	AR40P-410S	
⑤	Diaphragm assembly	—	Weatherproof NBR	AR20P-150AS	AR30P-150AS	AR40P-150AS	
		N	Weatherproof NBR	AR20P-150AS-N	AR30P-150AS-N	AR40P-150AS-N	
⑥	Valve guide assembly	—	POM·NBR	AR20P-050AS	AR30P-050AS	AR40P-050AS	
⑦	Pressure gauge cover	—	PC	ARG20P-400S	ARG30P-400S	ARG40P-400S	
⑧	Pressure gauge	—	—	GB2-10AS	GB3-10AS	GB4-10AS	
		1	0~0.3MPa	—	GB2-3AS	GB3-3AS	GB4-3AS
		Z	0~150PSI	—	GB2-P10AS	GB3-P10AS	GB4-P10AS
		1Z	0~45PSI	—	GB2-P3AS	GB3-P3AS	GB4-P3AS
⑨	Clip	—	Stainless steel wire	ARG20P-420S	ARG30P-420S	ARG40P-420S	
⑩	Note1) Bracket assembly	—	Steel plate·POM	ARG20P-270AS	ARG30P-270AS	ARG40P-270AS	
⑪	Set nut	—	POM	ARG20P-260S	ARG30P-260S	ARG40P-260S	

Note1) Bracket and set nut assembly.

Note2) The number in the table is corresponding to the number in structural drawing (above-mentioned figure) and 「9.Disassembly drawing」 (P10, P11)

7. HOW TO REPLACE

WARNING

Before replacement, ensure that the regulator is not pressurized.

Rotate the pressure adjusting handle to zero.

Replace referring to "9. DISASSEMBLY DRAWING" (P10, 11).

After replacement, ensure that specified function is satisfied and external leakage is not found before starting operation.

1) Diaphragm assembly

Applicable model	Process	Procedure	Tools	Check item				
ARG20 ARG30 ARG40	Disassembly	1) Remove the bonnet assembly. Rotate the set screw counterclockwise with cross pointed driver to remove the bonnet from the body.	Cross pointed driver	—				
		2) Remove parts in order of the pressure adjusting and the diaphragm assembly. Please be noted that the diaphragm assembly adheres to the bonnet if disassemble parts with the handle facing downwards.	—	—				
	Assembly	3) Mount the diaphragm assembly first and then pressure adjusting spring on the body.	—	Direction of diaphragm assembly				
		4) Mount the bonnet to the body. Mount the bonnet to the body, and settle it roughly with four(4) set screws with a cross pointed driver. Then, Tighten screws diagonally with the tightening the check item to settle.	Cross pointed driver	Tightening torque: <table border="1"> <tr> <td>ARG20</td> <td>2.15±0.3N·m</td> </tr> <tr> <td>ARG30</td> <td>2.35±0.3N·m</td> </tr> <tr> <td>ARG40</td> <td>3.5 ±0.3N·m</td> </tr> </table>	ARG20	2.15±0.3N·m	ARG30	2.35±0.3N·m
ARG20	2.15±0.3N·m							
ARG30	2.35±0.3N·m							
ARG40	3.5 ±0.3N·m							

2) Valve guide assembly, valve

Applicable model	Process	Procedure	Tools	Check item
ARG20 ARG30 ARG40	Disassembly	1) Remove the cap. Insert the small screw driver in the gap between the body and the cap and dig up the cap.	Small driver	—
		2) Remove the cover. Insert the circular pliers to two holes of the cover and rotate 45 degree, and lift it.	Circular pliers Nominal: 125	—
		3) Remove the valve guide assembly. Hold the valve guide with a small pliers, and lift.	Small pliers	—
		4) Remove the valve spring.	—	—
		5) Remove the valve.	—	—
	Assembly	6) Mount the valve. Mate the stem convex and the valve center hole.	—	Positioning the stem and the valve(centering)
		7) Mount the valve spring. Insert the valve spring to the valve hole.	—	—
		8) Mount the assembly of the valve guide and the cover. Mate the notch of the body cover hole and the detent of the cover. Then push the assembly of them. Insert the circular plier to two holes of the cover to rotate 45 degree to settle.	Circular pliers Nominal: 125	—
		9) Mount the cap. Mate the convex of the body cover and the concave of the cap, and push them in to settle. Ensure the end of the body and the cap are almost flat.	—	Orientation of the body and the cap. Body end and the cap are almost flat.

3) Bracket assembly, panel mount

Applicable model	Process	Procedure	Tools	Check item										
ARG20 ARG30 ARG40	Assembly	1) Mount the parts to the bracket(panel) Mate the bracket(panel) concave and the bonnet convex to mount the bracket.	—	—										
		2) Settle the bracket(panel) with set nut. Rotate the set nut clockwise with a hook spanner to settle the parts to the bracket(panel). See check item for tightening torque. Set nut knurling surface shall face the bracket. (ARG20~40) When mounting with bracket, set nut tightened manually is adequate fir general used.(ARG20~40)	ARG20/30/40 Hook spanner Nominal: <table border="1"> <tr> <td>ARG20</td> <td>52/55</td> </tr> <tr> <td>ARG30</td> <td>58/65</td> </tr> <tr> <td>ARG40</td> <td>65/70</td> </tr> </table>	ARG20	52/55	ARG30	58/65	ARG40	65/70	Tightening torque: <table border="1"> <tr> <td>ARG20</td> <td>2.5±0.2N·m</td> </tr> <tr> <td>ARG30</td> <td>3.5±0.3N·m</td> </tr> <tr> <td>ARG40</td> <td>4.0±0.4N·m</td> </tr> </table>	ARG20	2.5±0.2N·m	ARG30	3.5±0.3N·m
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ARG40	4.0±0.4N·m													

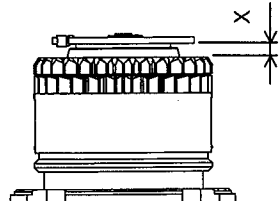
8. PROCEDURE OF THE PRESSURE GAUGE REPLACEMENT AND ANGLE ADJUSTMENT

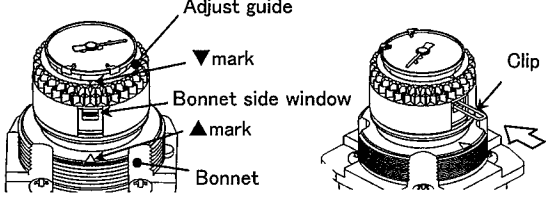
⚠ WARNING

Before replacement, ensure that the regulator is not pressurized.

Rotate the pressure adjusting handle to zero.

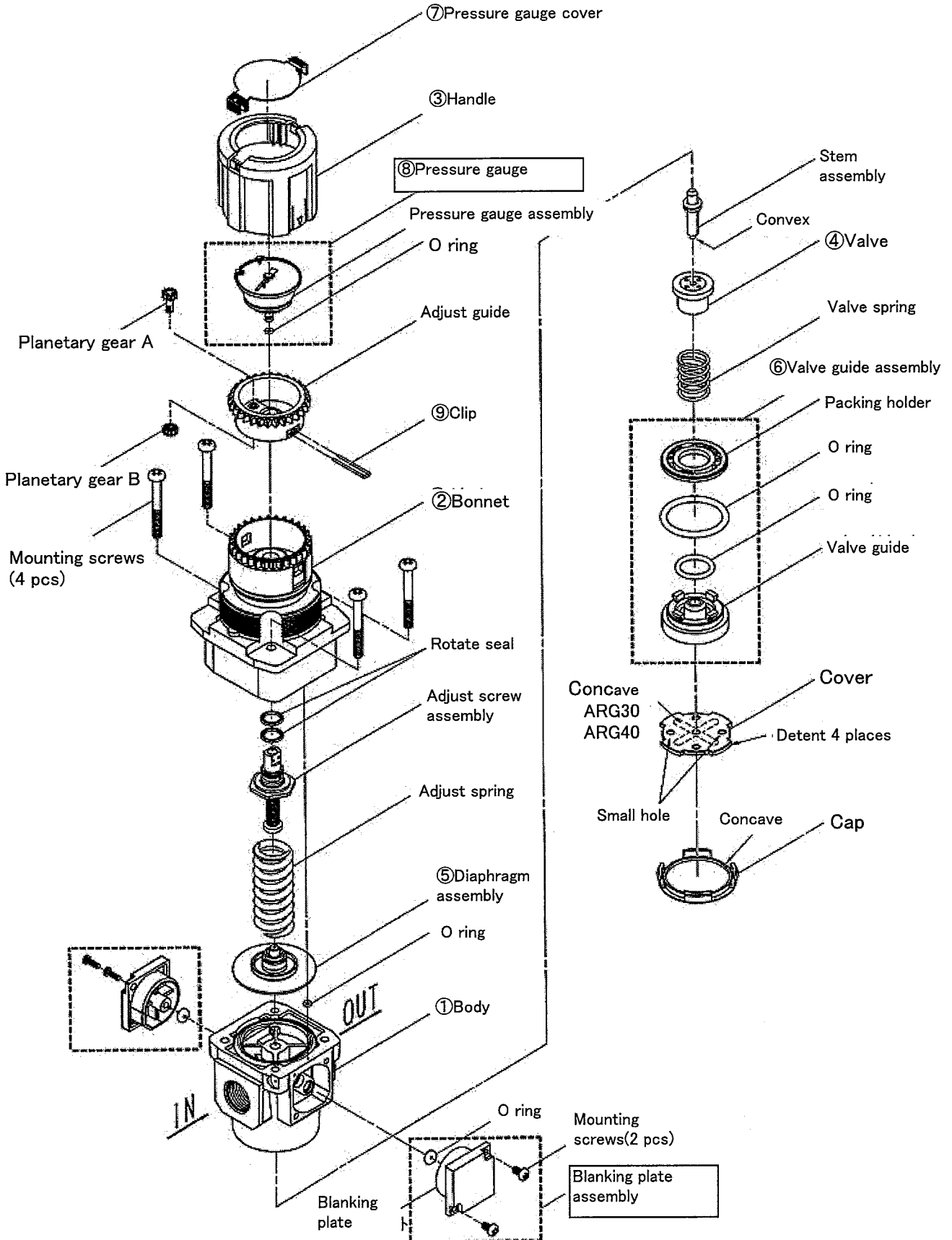
After replacement, ensure that specified function is satisfied and external leakage is not found before starting operation.

Applicable model	Process	Procedure	Tools	Check item							
ARG20 ARG30 ARG40	Disassembly	1) Preparation Release the pressure adjusting handle lock with the pressure adjusting handle completely loosened.	—	Orange line can be seen between the pressure adjusting handle and the bonnet.							
		2) Removal of the handle Pull out the handle to remove at the position where ▼mark of the handle and ▲mark of the bonnet meet.	—	—							
		3) Removal of the clip The clip becomes visible from the side window of the bonnet if ▲mark of the bonnet and ▼mark of the pressure adjusting guide meet. pull out the clip with tweezers. ※Retate the pressure adjusting guide clockwise when matching the mark.	Tweezers	—							
		4) Removal of the pressure gauge. Pill out the pressure gauge holding the outer circumference of the dial. ※ Don' touch the internal component of the pressure gauge (surrounded by broken line).It may damage the indication accuracy of the pressure gauge.	—	—							
	Assembly	5) Setting the pressure gauge Hold the outer circumference of the dial and set the gauge at specified angle, and push in the gauge lightly. For reference, table 1 shows the gap dimension between the bottom surface of the dial and the top surface of the pressure adjusting guide after mounting the pressure gauge. Note1) If the gauge does not enter by some interference when setting the pressure gauge, set the gauge by slightly rotating it in rotating direction. (The planetary gear of the pressure adjusting guide and the sun gear integrated in the pressure gauge interfere each other) Note2) Set the pressure gauge completely. Note3) The end of the pressure gauge has greased O ring. Attention should be taken so that dust and particle not enter to the pressure gauge.	—	 <table border="1"> <caption>FIG.1. Gap dimension</caption> <thead> <tr> <th></th> <th>ARG20</th> <th>ARG30</th> <th>ARG40</th> </tr> </thead> <tbody> <tr> <td>X dimension (Reference value)</td> <td>2.6mm</td> <td>3.3mm</td> <td>3.3mm</td> </tr> </tbody> </table>		ARG20	ARG30	ARG40	X dimension (Reference value)	2.6mm	3.3mm
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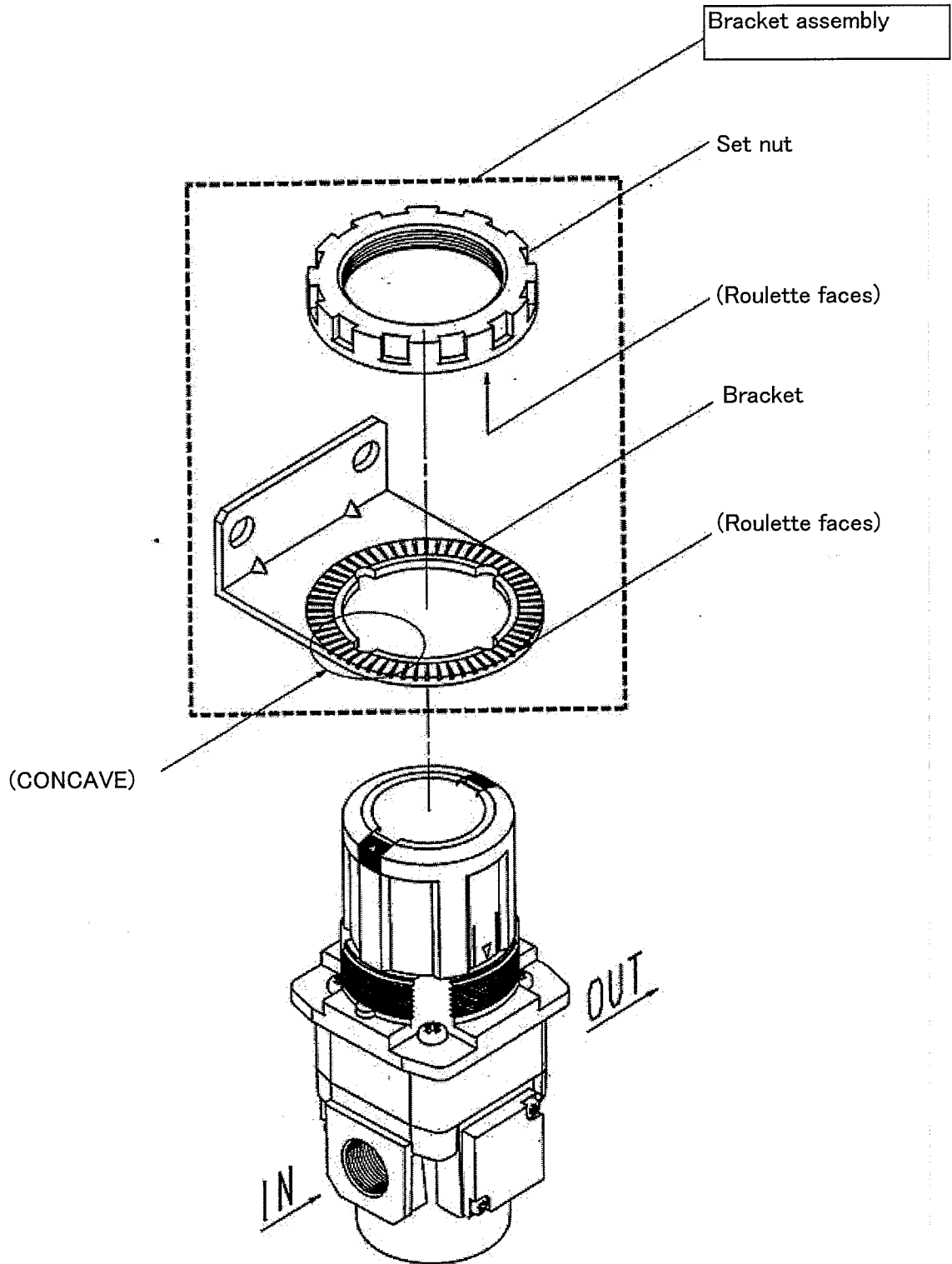
Applicable model	Process	Procedure	Tools	Check item
ARG20 ARG30 ARG40	Assembly	<p>6) Setting the clip. Insert the clip from the wide window of the bonnet where ▲ mark of the pressure adjusting guide and ▼ mark of the bonnet meet. Use something sharp like tweezers when inserting the clip to the end. If the clip is not inserted to the end the handle may not rotate after setting the handle.</p> <p>Note1) Clip is slightly tapered to the end to avoid falling off. Slightly open the end of the clip when setting the clip.</p> <p>Note2) Following causes are possible when the clip is stuck in the middle.</p> <p>① The pressure adjusting screw is lower than the original position. (Gap is made between the pressure adjusting nut and the pressure adjusting spring. When the pressure adjusting screw is completely loosened, the pressure adjusting screw may be lowered if excessive press force applied to the pressure adjusting screw.) Countermeasure... Turn the pressure adjusting guide approx. 5 times clockwise (pressure rise direction).</p> <p>② Pressure gauge is not properly set. Countermeasure... 5) See setting the pressure gauge.</p> 	Tweezers	—
		<p>7) Setting the handle Set the handle, and finish.</p>	—	—

9. DISASSEMBLY DRAWING

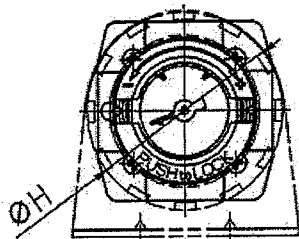
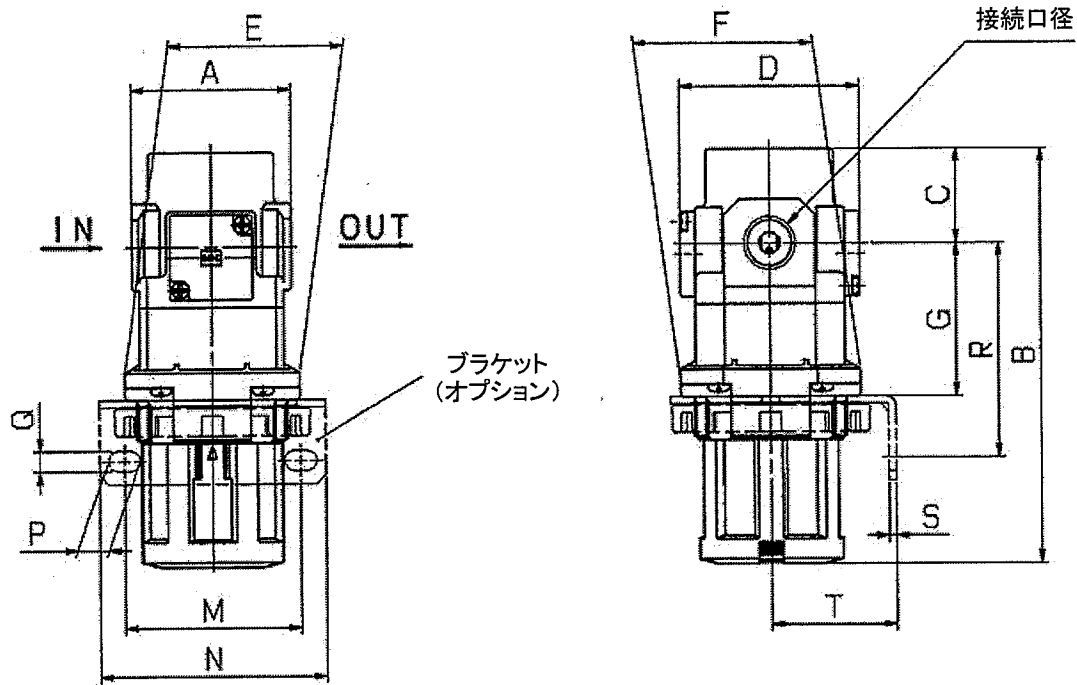
1) ARG20/30/40 Disassembly drawing.



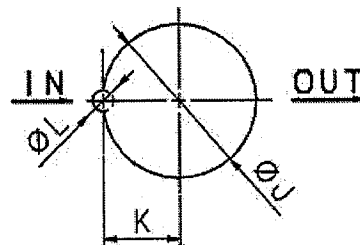
2) ARG20/30/40 Bracket assembly • Panel mounting disassembly drawing.



10. 外形寸法図



パネルカット寸法



板厚
ARG20~40 : Max. 3.5

外形寸法

型式	接続口径	標準仕様						オプション仕様								
		A	B	C	D	E	F	パネルマウント				ブラケット取付寸法				
								G	H	J	K	L	M	N	P	Q
ARG20	1/8・1/4	40	114	26.5	57	45	47	38	52.5	39.5	19.5	6	48	65	10.4	5.4
ARG30	1/4・3/8	53	138.5	31	59	58	58.8	50	65	50.5	25	7	58.5	75	10.5	6.5
ARG40	1/4・3/8・1/2	70	150.5	36	68	70	70	54	70	55.5	27.5	7	65.5	85	12.5	8.5

型式	オプション仕様 ブラケット取付寸法		
	R	S	T
ARG20	60	2.3	35
ARG30	70	2.3	45
ARG40	75	2.3	50