SMC

DOCUMENT No.:AR※-OMG0039-A

OPERATION MANUAL

PRODUCT NAME : AIR REGULATOR, MANIFOLD REGULATOR

MODEL ARM10-□□□-□□

ARM10F-□-□□□-□□

ARM11A□□-□□□-□□□

ARM11B□□-□□□-□□□

- 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.

SMC CORPORATION

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 catagories, "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 : Imminebt dager that possible loss or serious injury of people is expected without evacuation.

※1)ISO 4414 Pneumatic fluid powor-General rules relating to systems

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

⚠ WARNING

①Suitability of penumatic equipment should be determined by a designer of the penumatic 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 pnuumatic 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 certina point of time and safety assurnace 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 fi 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 sustem 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, consideratins 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 appratuses, emergency shutdown circuits, cluthc/break circuits for pressing, and safety devices.
c. Usage for applications which espacially require safety because considerable effects to people and properties are expected.

2. COMMON PRECAUTIONS

Design & Selection

⚠ Warning

①Confirm specifications.
Products represented in this manual are designed for use in compressed ari applications only, unless other wise indicated. Do not use the products outside their design parameters. Contact SMC when using the products in applications other than compressed air.

②Confirm set pressure.

Place safety devices in areas where the output pressure ishigher than the set pressure of the regulator. Else, it may cause damage to the equipment on secondary side or a malfunction.

③Residual pressure after exhaust of inlet pressure
Note that outlet pressure can't be removed (it may have residual pressure) in some cases where inlet pressre is exhausted with outlet pressure set to low

④Use in the circuit where outlet is enclosed or in balance circuit
Contact SMC before use to confirm availability of the products in these circuit.

Installation

⚠ Warning

①Do not instal unless the opration manual have been read and understood.

②Maintenance
When installing the products, allow acces for maintenance.

③Tightening torque
When installing the products, follow the listed torque specifications.

Piping

⚠ Caution

Tube insertion and removal fromo one-touch fittings
1)Installing tube

①Cut the tube perpendicularly, being careful not to damage the outside surface. Use SMC tube cutter "TK-1", "TK-2" or "TK-3". Do not cut the tube with pilers, nippers, scissors, etc. other wise, the tube will be deformed and troubles may result.

②Grasp the tube, slowly push it into the one-touch fittings until it comes to a stop.

③Pull the tubing back gently to make sure it has a positive seat. Insufficient installation may cause air leakage or tube releasing.

2)Removing tube

①Push in evenly on the release button.
②Pull out the tube while keeping the release button depressed. If the release button is not held down, the tube cannot be withdrawn.
③To ensure the tubing, cut off the previously lodged portion of the tube.

Use of tubing other htant SMC's brand

⚠ Caution

When usign a brand of tubing other than SMC, be careful of the tolerance of the tube's O.D. shown below.

1)Nylon tubing $\leqq \pm 0.1$mm
2)Soft nylon tubing $\leqq \pm 0.1$mm
3)Polyurethane tubing $\leqq +0.15$mm
$\leqq -0.2$mm

When the tolerance of the tube's O.D. is out of range mentioned above, donot use the buing. Tubing can not be connected and it causes air leakage or tubing may come out.

Air source

⚠ Warning

①Use clear air.
If the compressed air supply is contaminated with chemicals, sythetic mateirals containing organic solvent, salnity, corrosive gas, etc., damage to the pneumatic equipment may occur.

⚠ Caution

①Install air filter.

Install ari filter with filtration of 5 μ m or less near inlet of the regulator.

②Install other air cleaning equipment such as aftercooler, air dryer and drain catch as necessary.

Compressed air containing a lot of drain may cause pressure switch and other pneumatic equipment as well as the regulator to have maulfunction.

③Place mist separator at inlet of reuglator for the environment where carbon dust frequently occur.

If a lot of carbon dust comes from compressor, a part of the carbon dust may attach inside of the regulator and cause it to have malfucntion. For detail of quality of compressed air, refer to "Compressed air claning system".

Environment

⚠ Warning

①Do not use in an environment where the product is directly exposed to corrosive gases, chemicals, salt water, water or steam.

②Do not expose the product to dierect sunlight for an extended period of time. If the product has to be maounted in an area where exposure to direct sunlight can not be avoided, the use of a protective cover is recommended.

③Do not mount the product in a location where it is subject to srong vibrations and.or shock. Check the product specifications for above ratings.

④Do not mount the product in a location where it is exposed to readiant heat.

Maintenance

⚠ Warning

①Maintenance procedure are outline in this manual. Not followingproper procedures could cause to the product to malfunction and could lead to damage to the equipment or machine.

②Maintenance

If handled improperly, compressed air can be dangerous. Assembly, handling and repair of pneumatic systems should be performed by qualified

③Shut-down before maintenance

sure the supply pressure is shut off and all residual air pressure is released from the systemt to be worked on.

④Start-up after maintenance

Apply operating pressure and power to the equipment and check for proper operation and possible air leakage. If operation is abnormal, verify product set-up parameters.

⑤Do not make any modification to the product.

Adjustment

⚠ Warning

Regulator

①Set up the regulator while verifying th epressure that is indicated on inlet and outlet pressure gauges. Turning the handle excessively could damage the internal parts.

②Opearte pressure adjusting handle manually. Use of any tool may damage the regulator.

⚠ Caution

Regulator

①Make sure to check inlet pressure before setting the pressure.

②The range for setting outlet pressure is 85% or less of inlet pressure.

③Relese lock of pressure adjusting handle before starting adjustment. Adjustment in improper order may damage the handle and cause flactuation of outlet pressure.

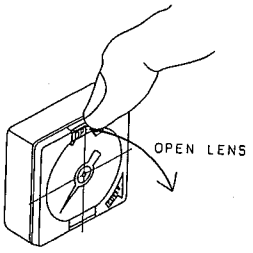
④Turn the handle clockwise for increase of outlet pressure and counterclockwise for decrease of outlet pressure. (Set pressure turning the handle in pressure incremental direction.)

⚠ Caution

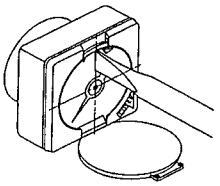
Indicator of pressure gauge

Indicator of pressure gauge can be moved by removal of lens in the manner shown below.

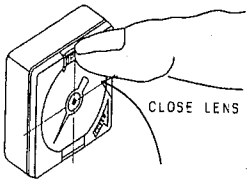
①Open lens in direction arrow pointed by craw of finger.



②Move the indicator by a kind of flat driver.



③Close and push the lens until it has snap fit.



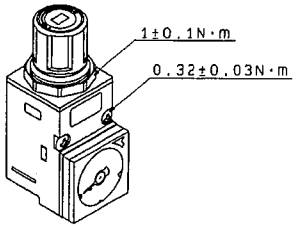
3. VARIOUS BLOCKS／INDIVIDUAL PRECAUTIONS

⚠ **Warning**

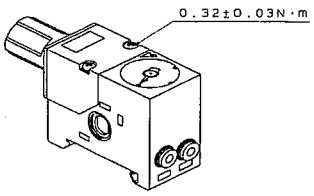
Keep tightening torque specified for each screw as shown below..

Excessive torque may damage block and switch as well as the screw. And insufficient torque may cause looseness of the screw.

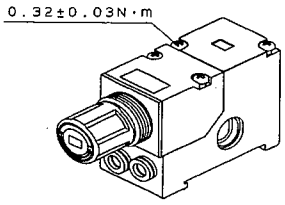
①Holding screw and panel nut for single reuglator



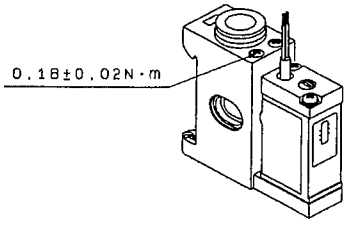
②Holding screw for reugulator assembly mounted on regulator block



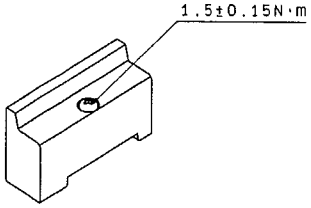
③Holding screw for blanking plate on regulator block and for pressure gauge



④Holding screw for common supply block with pressure switch and for pressure switch mounted on pressure swich block



⑤Clamp screw for DIN rail of end block



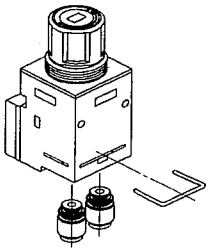
⚠ **Caution**

Replacement of one-touch fitting

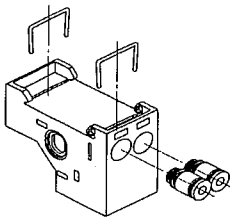
One-touch fitting is a cassette type fitting and can be replaced easily.

One-touch fitting is hold by clip which is inserted in direction shown below not to come off. Therefore, first remove the clip by a kind of flat driver and enable the fitting to be disconnected. For installation, insert the fitting until it comes to a sto

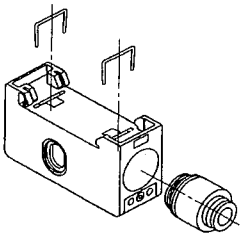
①Single regulator



②Regulator block



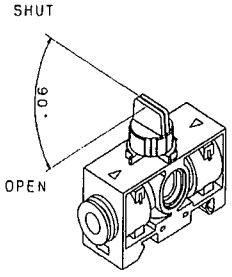
③Various common supply block



⚠ **Caution**

Supply of pressure for 3 way valve type common supply block

Keep the handle at the position of OPEN or SHUT for supply of pressure. Since allowing sligh air leakage, this product can't be used for the purpose of sealing pressure.



4. PRESSURE SWITCH／INDIVIDUAL PRECAUTIONS

Design & Selection

⚠ Warning

①Operate the swtich only within the specified supply voltage limits.
If supply voltage exceeds the rated voltage, the swtich may have malfunction or coul dbe damaged. It could also become a fire hazard.

②Do not exceed the max. allwoable load specification.
A load exceeding the max. load specification can lead to immediate damage to the swithc or could shorten its operating life span considerably.

③Do not use the switch outside the specified pressure range.
Damage to the swtich may occur if the pressure sensor is subjected to the pressure higher than its design parameters.

Installation

⚠ Warning

①Do not continue to use the equipment and check for the cause of the problem if air leakage is present or increasing or the equipment isnot operating
Verify proper installation after air and powre is connected. The switch should be checked for proper operation and possible air leakage immediately after the initial installation.

②Do not apply tensile force to cable.
Do not handle the swtich with holding by the cable because tensile force is applied to the cable and the cord could result in breakage. Handle with holding by the body.

③Do not drop and apply excessive force to the swtich for handling.
Any damage to the swtich, internal or external, coul d cause the switch to malfunction.

Pressure source

⚠ Warning

①Do use corrosive gas and liquid for the switch.
The use of the switch with corrosive fluid, gas or liquid, could damage the switch.

②Do not use vacuum for the switch.
The use of vacuum causes the switch to absorb outside air and to become unable to operate.

Adjustment

⚠ Caution

①Set pressure scale is the value when pressure increase.

②Note that when the switch is used to detect ON pressure, ON signal is outputted by pressure larger than set pressure referred on scale plate by

③Pressure indicated on scale plate is just reference. Know exact value on pressure gauge.

Wiring

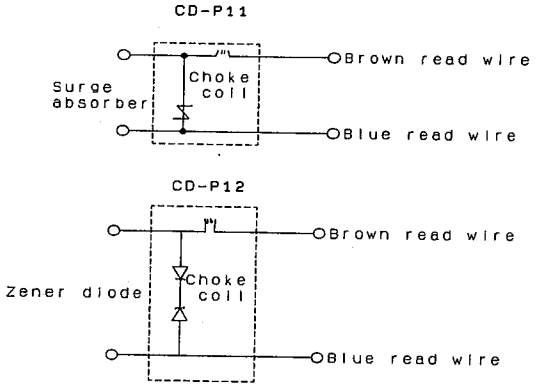
⚠ Warning

①Connect load with the swtich.
Do not supply power for the swtich before connecting load there.

②Use a contact protective box.
If the load moved by the switch is an inducitive load or has lead wire of 5m or longer, use contact protective box specified below.

Part no. of box	Voltage	Length of lead wire
CD-P11	AC100V	0.5m connected with switch
CD-P12	DC24V	0.5m connected with load

③Internal circuit of contact protective box



④Connection of contact protective box
Connect contact protective box with the switch by using lead wire with indication "SWITCH" of the box and lead wire of the switch.
Locate these two products near each other as much as possible by lead wire within 1m.

⑤Dimensions of lead wire
Outer: ϕ 3.4
Insulation: ϕ 1.1
Conductor: ϕ 0.64

Environement

⚠ Warning

①Do not use the switch in explosive environement. In its standard configuration, the switch is not explosion proof. The presence of explosive gas excludes the applicaton of the switch.

②Do not usein magnetic environment.
The malfunction of the switch could result from mangnetic force.

③Do not use in the place where water or oil may splash
The switch is not enclosed and allows water and oil to enter into its inside, corrode electrical circuit and finally cause malfunction and breakage of the switch.

④Do not use in the environment with exposure to vibration.
The switch could have failure and dispersion of setting.

5. APPLICATION

The product described in this manual aims at pressure controlling of air lines.

6. SPECIFICATIONS

①Regulator/ARM10type

Regulating type		Direct operation
Piston type		Diaphragm
Relieving construction	Standard	Relief type
	Semi-standard	Non-releif type
Reverse flow mechanism		Yes(Unbalanbed type)
Tube O.D. of IN		φ4, 6, 5/32, 1/4
Tube O.D. of OUT		φ4, 6, 5/32, 1/4
Proof pressure		1.5MPa
Max. operating pressure		1.0MPa
Set pressure range	Standard	0.05～0.7MPa
	Semi-standard	0.05～0.35MPa (Low pressure type)
Fluid		Air
Ambient and fluid temperature		5～60℃
Weight		60g

②Regulator/ARM10Ftype

Regulating type		Direct operation
Piston type		Diaphragm
Relieving construction	Standard	Relief type
	Semi-standard	Non-releif type
Reverse flow mechanism		Yes(Unbalanbed type)
Tube O.D. of IN		φ6, 8, 10, 1/4, 5/16, 3/8
Tube O.D. of OUT		φ6, 8, 10, 1/4, 5/16, 3/8
Proof pressure		1.5MPa
Max. operating pressure		1.0MPa
Set pressure range	Standard	0.05～0.7MPa
	Semi-standard	0.05～0.35MPa (Low pressure type)
Fluid		Air
Ambient and fluid temperature		5～60℃
Weight		72g

③Manifold regulator/ARM11A/Common auppry spec.

(Regulator block･Common supply block･3 way valve type common supply block)

Regulating type		Direct operation
Piston type		Diaphragm
Relieving construction	Standard	Relief type
	Semi-standard	Non-releif type
Reverse flow mechanism		Yes(Unbalanbed type)
Tube O.D. of IN		φ6, φ8, φ10, φ1/4, φ5/16, φ3/8
Tube O.D. of OUT		φ4, φ6, φ5/32, φ1/4
Proof pressure		1.5MPa
Max. operating pressure		1.0MPa
Set pressure range	Standard	0.05～0.7MPa
	Semi-standard	0.05～0.35MPa (Low pressure type)
Fluid		Air
Ambient and fluid temperature		5～60℃

Pressure switch (Common supply block with pressure switch, 3 way valve type common supply block + Pressure switch block)

Contact type		Direct operation		
Contact construction		Diaphragm		
Contact composition		1a		
Switching type		Piston type (magnet build-in)		
Electrical entry		Grommet type		
Wire length	Standard	0.5m		
Proof pressure		1.0MPa		
Max. operating pressure		0.7MPa		
Set pressure range		0.1～0.6MPa		
Hysteresis		0.08MPa		
Repeatability		±0.05MPa		
Fluid		Air		
Ambient and fluid temperature		-5～60℃		
Max. contact capacity		AC2VA, DC2W		
Operating voltage AC, DC		24V or less	48V	100V
Max. operating current range		50mA	40mA	20mA
Impact resistance		30G		

④Manifold regulator/ARM11B/Individual supply spec.

Regulating type		Direct operation
Piston type		Diaphragm
Relieving construction	Standard	Relief type
	Semi-standard	Non-releif type
Reverse flow mechanism		Yes(Unbalanbed type)
Tube O.D. of IN		φ4, φ6, φ5/32, φ 1/4
Tube O.D. of OUT		φ4, φ6, φ 5/32, φ 1/4
Proof pressure		1.5MPa
Max. operating pressure		1.0MPa
Set pressure range	Standard	0.05～0.7MPa
	Semi-standard	0.05～0.35MPa (Low pressure type)
Fluid		Air
Ambient and fluid temperature		5～60℃

7. HOW TO ORDER

①Regulator/ARM10type

A R M 1 0 – [0 6] [B] – [1] [Z]

① ② ③ ④

①Fitting type for IN and OUT

Mounting position	IN side				OUT side			
Fitting type	Straignt		Elbow		Straignt		Elbow	
Symbol	φ4	φ6	φ4	φ6	φ4	φ6	φ4	φ6
06	●				●			
07		●			●			
08		●				●		
18			●				●	
19				●			●	
20				●				●
25	●						●	
26		●					●	
27		●						●
32			●		●			
33				●	●			
34				●		●		
Symbol	φ5/32	φ1/4	φ5/32	φ1/4	φ5/32	φ1/4	φ5/32	φ1/4
56	●				●			
57		●			●			
58		●				●		
68			●				●	
69				●			●	
70				●				●
75	●						●	
76		●					●	
77		●						●
82			●		●			
83				●	●			
84				●		●		

②Accessory

Symbol	None	Bracket (Note1)	Pressure gauge (Note2)	Panel nut
NIL	●			
B		●		(●)
G			●	
P				●
BG		●	●	(●)
GP			●	●

(Note1)Panel nut is attached as well.
(Note2)Not applicable to copper free spec.

③Semi standard

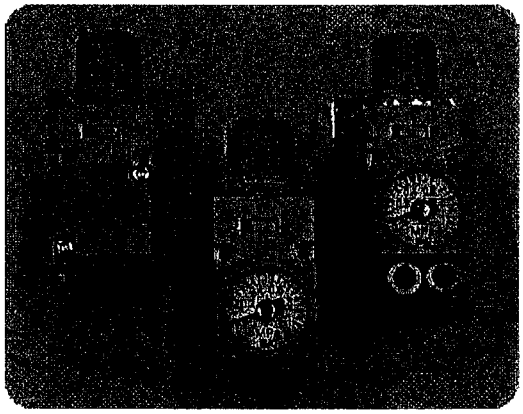
Symbol	None	Set pressure of 0.35MPa	Non-relief	Lub.Free
NIL	●			
1		●		
2			●	
3				●
4		●	●	
5		●		●
6			●	●
7		●	●	●

(Note1)Attached pressure switch has full span 0.4MPa.
(Note2)Pil free spec. is realized by elmination of grease from parts in contact with fluid.

④Unit

Symbol	Content
NIL	Unit indicated on name plate and pressure gauge is MPa
Z	Unit indicated on name plate and pressure gauge is Mpa

(Note1)Z is applicable to only overseas because of new measure ment law in Japan(S1 unit)



②Regulator/ARM10Ftype

A R M 1 0 F [1] – [0 6] [B] – [1] [Z]

① ② ③ ④ ⑤

①IN·OUTposition

Symbol	IN		OUT	
	Bottom	Top	Bottom	Top
1	●		●	
2		●		●
3	●			●
4		●	●	

④Semi standard

Symbol	None	Set pressure of 0.35MP	Non-relief	Lub.Free
NIL	●			
1		●		
2			●	
3				●
4		●	●	
5		●		●
6			●	●
7		●	●	●

(Note1)Attached pressure switch has full span 0.4MPa.
(Note2)Pil free spec. is realized by elmination of grease from parts in contact with fluid.

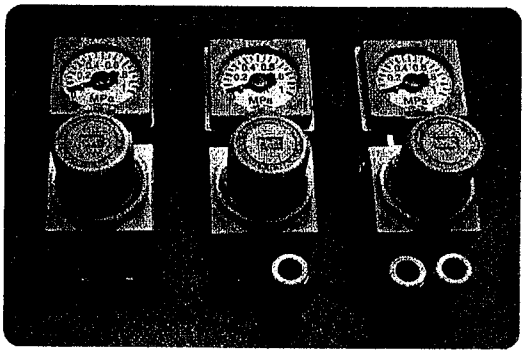
②Fitting type for IN and OUT

Mounting position	IN side				OUT side			
Fitting type	Straignt		Elbow		Straignt		Elbow	
Symbol	φ4	φ6	φ4	φ6	φ4	φ6	φ4	φ6
06	●				●			
07		●			●			
08		●				●		
18			●				●	
19				●			●	
20				●				●
25	●						●	
26		●					●	
27		●						●
32			●		●			
33				●	●			
34				●		●		
Symbol	φ5/32	φ1/4	φ5/32	φ1/4	φ5/32	φ1/4	φ5/32	φ1/4
56	●				●			
57		●			●			
58		●				●		
68			●				●	
69				●			●	
70				●				●
75	●						●	
76		●					●	
77		●						●
82			●		●			
83				●	●			
84				●		●		

⑤Unit

Symbol	Content
NIL	Unit indicated on name plate and pressure gauge is MPa
Z	Unit indicated on name plate and pressure gauge is Psi

(Note1) Z is applicable to only overseas because of new measure ment law in Japan(S1 unit)



③Manifold regulator/ARM11A/common supply block spec.

A R M 1 1 A [A] [1] – [1] [0 7] – [A] [1] [Z]

① ② ③ ④ ⑤ ⑥ ⑦

①Handle position

Symbol	Handle
A	Top
B	Side
C	Bottom

②IN・OUT position

Symbol	IN		OUT	
	Bottom	Top	Bottom	Top
1	●		●	
2		●		●
3	●			●
4		●	●	

③No.of station of regulator block

Symbol	STN.
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
M	10

④Fitting type (for IN and OUT)

Mounting position	IN						OUT			
Fitting type	Straight			Elbow			Straight		Elbow	
Symbol	φ6	φ8	φ10	φ6	φ8	φ10	φ4	φ6	φ4	φ6
07	●						●			
08	●							●		
09		●					●			
10		●						●		
11			●				●			
12			●					●		
19				●					●	
20				●						●
21					●				●	
22					●					●
23						●			●	
24						●				●
26	●								●	
27	●									●
28		●							●	
29		●								●
30			●						●	
31			●							●
33				●			●			
34				●				●		
35					●		●			
36					●			●		
37						●	●			
38						●		●		
Symbol	φ1/4	φ5/16	φ3/8	φ1/4	φ5/16	φ3/8	φ5/32	φ1/4	φ5/32	φ1/4
57	●						●			
58	●							●		
59		●					●			
60		●						●		
61			●				●			
62			●					●		
69				●					●	
70				●						●
71					●				●	
72					●					●
73						●			●	
74						●				●
76	●								●	
77	●									●
78		●							●	
79		●								●
80			●						●	
81			●							●
83				●			●			
84				●				●		
85					●		●			
86					●			●		
87						●	●			
88						●		●		

(Note1) If position of handle is same as one of piping using elbow, the ellbow shall be mounted on the back(DIN rail side)

⑤Accessory

Symbol	Pressure gauge		Supply block type				Supply block mounting position		
	None	Attached	Common supply block	Common supply block with pressure switch	3 way valve type common supply block	3 way valve type common supply block + Pressure switch block	Side L (Left)	Side R (Right)	Side B (Both sides)
NIL	●		●				●		
A	●			●			●		
B	●				●		●		
C	●					●	●		
D	●		●					●	
E	●			●				●	
F	●				●			●	
G	●					●		●	
H	●		●						●
J		●	●				●		
K		●		●			●		
L		●			●		●		
M		●				●	●		
N		●	●					●	
O		●		●				●	
P		●			●			●	
Q		●				●		●	
R		●	●						●

(Note1) Not applicable to copper free spec.
(Note2) Pressure switch inapplicable for oil-free.

⑥Semi-standard

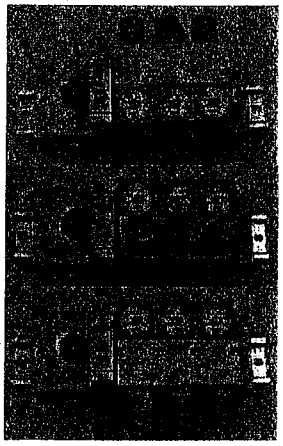
Symbol	None	Set press of 0.35MPa	Non-relief	Lub.Free
NIL	●			
1		●		
2			●	
3				●
4		●	●	
5		●		●
6			●	●
7		●	●	●

(Note1) Attached pressure switch has full span 0.4MPa.
(Note2) Pil free spec. is realized by elmination of grease from parts in contact with fluid.

⑦Unit

Symbol	Content
NIL	Unit indicated on name plate and pressure gauge is MPa
Z	Unit indicated on name plate and pressure gauge is Psi

(Note 1) Z is applicable to only overseas because of new measurement law in Japan (SI unit). Also dual indication of MPa and Psi is adopted for Z.



④Manifold regulator/ARM11B/Individual

A R M 1 1 B [A] [1] – [1] [0 6] – [A] [1] [Z]

① ② ③ ④ ⑤ ⑥ ⑦

①Handle position

Symbol	Handle
A	Top
B	Side
C	Bottom

②IN·OUT position

Symbol	IN		OUT	
	Bottom	Top	Bottom	Top
1	●		●	
2		●		●
3	●			●
4		●	●	

③No.of station of regulator block

Symbol	STN.
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
M	10

③Fitting type for IN and OUT

Mounting position	IN side				OUT side			
Fitting type	Straignt		Elbow		Straignt		Elbow	
Symbol	φ4	φ6	φ4	φ6	φ4	φ6	φ4	φ6
06	●				●			
07		●			●			
08		●				●		
18			●				●	
19				●			●	
20				●				●
25	●						●	
26		●					●	
27		●						●
32			●		●			
33				●	●			
34				●		●		
Symbol	φ5/32	φ1/4	φ5/32	φ1/4	φ5/32	φ1/4	φ5/32	φ1/4
56	●				●			
57		●			●			
58		●				●		
68			●				●	
69				●			●	
70				●				●
75	●						●	
76		●					●	
77		●						●
82			●		●			
83				●	●			
84				●		●		

(Note1) If position of handle is same as one of piping using elbow, the ellbow shall be mounted on the back(DIN rail side)

⑤Accessory

Symbol	None
NIL	Without pressure gauge
A	With pressure gauge
(Note2)※Not applicable to copper free spec.	

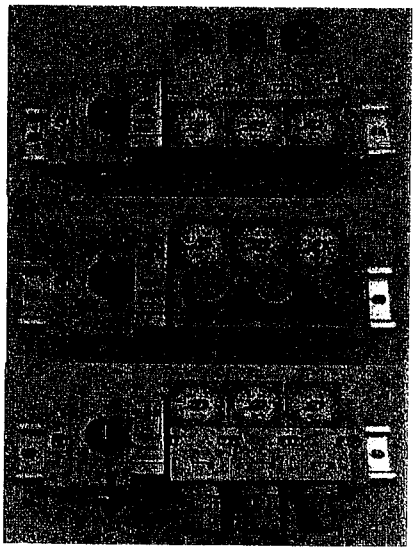
⑥Semi-standard

Symbol	None	Set press of 0.35MPa	Non-relief	Lub.Free
NIL	●			
1		●		
2			●	
3				●
4		●	●	
5		●		●
6			●	●
7		●	●	●

(Note1)Attached pressure switch has full span 0.4MPa.
(Note2)Pil free spec. is realized by elmination of grease from parts in contact with fluid.

⑦Unit

Symbol	Content
NIL	Unit indicated on name plate and pressure gauge is MPa
Z	Unit indicated on name plate and pressure gauge is Psi
(Note1) Z is applicable to only overseas because of new measure ment law in Japan(S1 unit)	



8. TROUBLESHOOTING

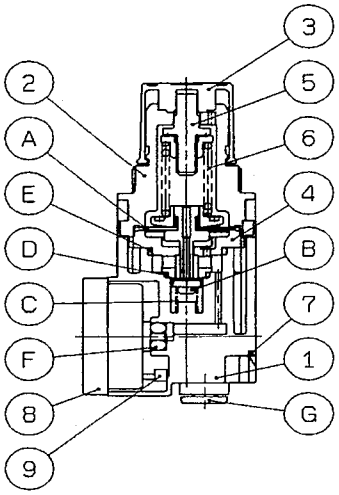
Refer to Fig.1(shown in next page)

TROUBLE		POSSIBLE CAUSE	REMEDY	Appricable model
Demarcation	Phenomenon			
Pressure	Pressure is not regulated.	1. Opposite installation of IN and OUT tube.	1. Check installting direction of tube and if installed opposite, reinstall it.	ARM10 ARM10F ARM11
		2. Foreign materials caugth in valve seat or its "O" ring.	2. Remove bonnet, diaphragm assembly and valve seat assembly and wash valve seat and its "O" ring.	
		3. Damaged rubber lining on valve or O ring of valve seat.	3. Replace the valve seat or the "O" ring.	
	Set pressure does not return to zero when pressure handle is loosened.	1. Foreign materials caught in valve seat or its "O" ring.	1. Remove bonnet, diaphragm assembly and valve seat assembly and wash valve seat and its "O" ring.	
		2. Damaged rubber lining on valve or O ring of valve seat.	2. Replace the valve seat or the "O" ring.	
Air leakage	Air leaks the bonnet exhaust port (near the handle).	1. Damged diaphragm.	1. Replace the diaphragm assembly.	
		2. Foreign materials caught in valve seat or its "O" ring..	2. Remove bonnet, diaphragm assembly and valve seat assembly and wash valve seat and its "O" ring.	
		3. Damaged rubber lining on valve or O ring of valve seat.	3. Replace the valve seat or the "O" ring.	
		4. Application of back pressure exceeding the set pressure to the outlet.	pressure does not exceed the set pressure	
	Air leaks between bonnet and body.	1. Damaged diaphragm.	1. Replace the diaphragm assembly.	
		2. Foreign materials caught in valve seat or its "O" ring..	2. Remove bonnet, diaphragm assembly and valve seat assembly and wash valve seat and its "O" ring.	
	Air leaks between fitting and body.	1. Foreign materials caught in "O" ring of fitting.	1. Remove the fitting assembly and wash its "O" ring.	
		2. Damaged "O" ring of fitting	2. Replace the "O" ring.	
	Air leaks between fitting and tube.	1. Foreign materials caught in packing inside fitting.	1. Remove the fitting assembly and wash the packing inside it.	
		2. Damaged surface of tube.	2. Replace the tube.	
		3. Improper connection between fitting and tube.	3. Check mounting condition of tube and if mounted improperly, remount the tube to the fitting.	
	Air leaks between body (manifold) and blanking plate (pressure gauge).	1. Foreign materials caught in "O" ring of body (manifold).	1. Remove blanking plate (pressure gauge) from the body (manifold) and wash its "O" ring.	
		2. Damaged "O" ring of fitting.	2. Replace "O" ring of the body (manifold).	
	Air leaks between body and manifold block.	1. Foreign materials caught in gasket of manifold block..	1. Remove the body and replace its gasket.	ARM11
		2. Damaged gasket of manifold block..	2. Replace the gasket.	
	Air leaks between bocks.	1. Foreign materials caught in "O" ring of bush of blocks.	1. Remove the bush and wash its "O" ring.	
		2. Damaged "O" ring of bush of blocks	2. Replace "O" ring of the bush.	

Note) The grease needs to be applied on washed "O" ring and gasket except for lub. free spec. Recommended grease is Mitsubishi diamond multipurpose No.2.

9. CONSTRUCTION/PARTS LIST

①Regulator/ARM10type



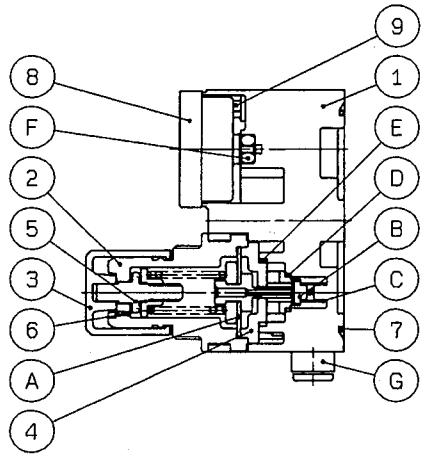
Componet parts

No.	Description	Material
1	Body	PBT
2	Bonnet	PBT
3	Handle	POM
4	Valve seat	POM
5	Pressure adjusting screw assembly	Steel for structual member
6	Pressure adjusting spring	steel wire
7	Clip for regulator	Stainless steel
8	Blanking plate assembly	—
9	Square nut	Steel plate

Replacement parts

No.	Description	Material	Part no.
A	Diaphragm assembly	Weather proof NBR・POM	136126A
B	Valve	HNBR・aluminum alloy	136127-30
C	Valve spring	Stainless steel	136131
D	Oring	NBR	136146
E	Oring	NBR	136147
F	Oring	NBR	136148
G	Fitting assembly	—	Refer to P15

①Regulator/ARM10Ftype



Componet parts

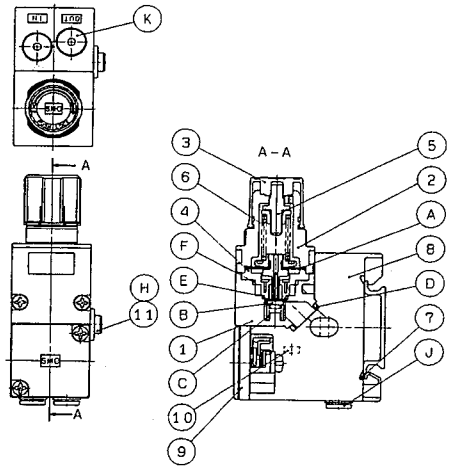
No.	Description	Material
1	Body	PBT
2	Bonnet	PBT
3	Handle	POM
4	Valve seat	POM
5	Pressure adjusting screw assembly	Steel for structual member
6	Pressure adjusting spring	steel wire
7	Clip for regulator	Stainless steel
8	Blanking plate assembly	—
9	Square nut	Steel plate

Replacement parts

No.	Description	Material	Part no.
A	Diaphragm assembly	Weather proof NBR・POM	136126A
B	Valve	HNBR・aluminum alloy	136127-30
C	Valve spring	Stainless steel	136131
D	Oring	NBR	136146
E	Oring	NBR	136147
F	Oring	NBR	136148
G	Fitting assembly	—	Refer to P15

9. CONSTRUCTION/PARTS LIST

③Manifold regulator/ARM11A/Common auppry spec.



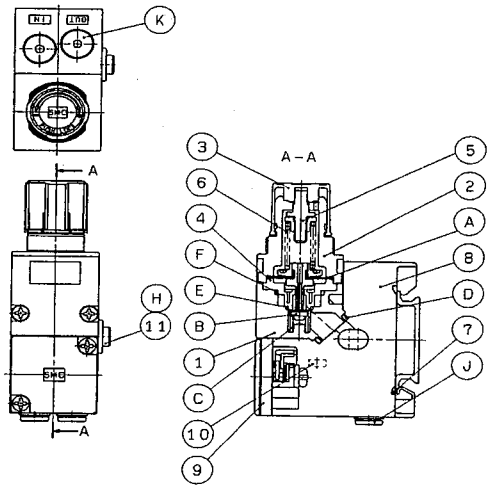
Componet parts

No.	Description	Material
1	Body for regulatorblock	PBT
2	Bonnnet	PBT
3	Handle	POM
4	Valve seat	POM
5	Pressure adjusting screw assembly	Steel for structual member
6	Pressure adjusting spring	Steel wire
7	Clip for regulator	Stainless steel
8	Manifold block	PBT
9	Blanking plate assembly	—
10	Square nut	Steel plate
11	Common supply bush	POM

Replacement parts

No.	Description	Material	Part no.
A	Diaphragm assembly	Weathrer proof NBR・POM	136126A
B	Valve	HNBR・aluminum alloy	136127-30
C	Valve spring	Stainless steel	136131
D	Gasket	HNBR	136137-30
E	Oring	NBR	136146
F	Oring	NBR	136147
G	Oring	NBR	136148
H	Oring	NBR	136149
J	Fitting assembly	—	Refer to P15
K	Port plug	PBT・HNBR	VVQ0000-58A

④Manifold regulator/ARM11B/Common auppry spec.



Componet parts

No.	Description	Material
1	Body for regulatorblock	PBT
2	Bonnnet	PBT
3	Handle	POM
4	Valve seat	POM
5	Pressure adjusting screw assembly	Steel for structual member
6	Pressure adjusting spring	Steel wire
7	Clip for regulator	Stainless steel
8	Manifold block	PBT
9	Blanking plate assembly	—
10	Square nut	Steel plate
11	Individual supply bush	POM

Replacement parts

No.	Description	Material	Part no.
A	Diaphragm assembly	Weathrer proof NBR・POM	136126A
B	Valve	HNBR・aluminum alloy	136127-30
C	Valve spring	Stainless steel	136131
D	Gasket	HNBR	136137-30
E	Oring	NBR	136146
F	Oring	NBR	136147
G	Oring	NBR	136148
H	Oring	NBR	136149
J	Fitting assembly	—	Refer to P15
K	Port plug	PBT・HNBR	VVQ0000-58A

⑤One-touch fitting for regulator

VVQ1000-50A-L1 C4-X17

One-touch fitting for regulator

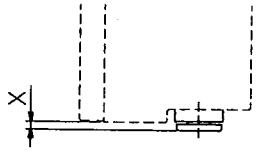
Fitting type	
Symbol	Type
Nil	Straight
L1	Elbow

Fitting size	
Symbol	size
C4	φ4
C6	φ6
N3	φ5/32
N7	φ1/4

Option	
Symbol	Specifications
Nil	Standard
X17	Oil-free

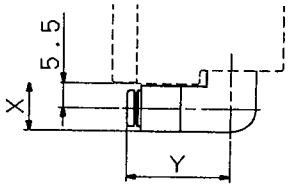
1)Regulator/ARM10type

Straight type



Fitting size	X
Ø4,Ø5/32	2
Ø6	2
Ø1/4	6

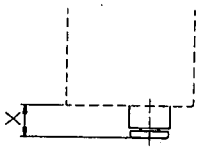
Elbow type



Fitting type	X	Y
Ø4,Ø5/32	10.5	21.5
Ø6	10.5	22
Ø1/4	10.6	24.5

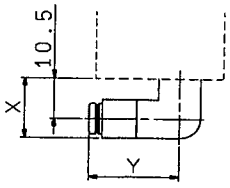
1)Regulator/ARM10Ftype

Straight type



Fitting type	X
Ø4,Ø5/32	7
Ø6	7
Ø1/4	11

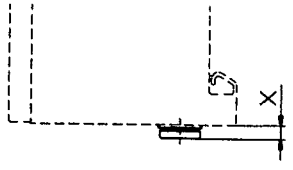
Elbow type



Fitting type	X	Y
Ø4,Ø5/32	15.5	21.5
Ø6	15.5	22
Ø1/4	15.6	24.5

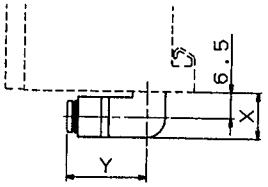
3)Manifold regulator/ARM11type

Straight type



Fitting size	X
Ø4,Ø5/32	3
Ø6	3
Ø1/4	7

Elbow type



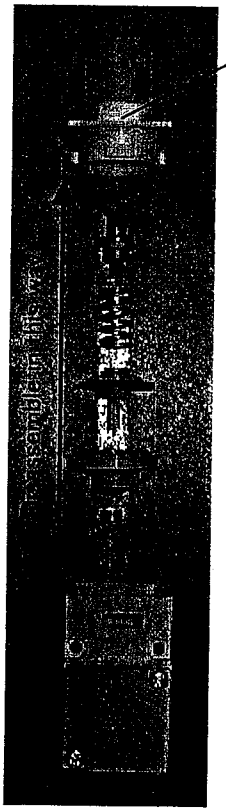
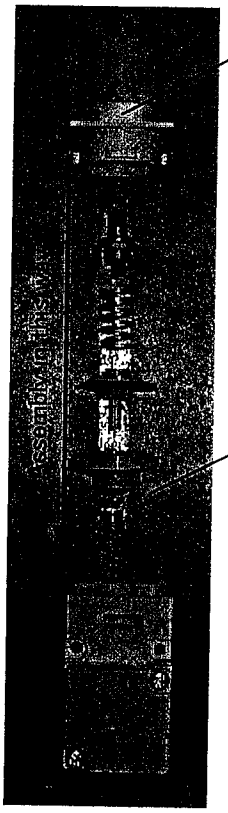
Fitting size	X	Y
Ø4,Ø5/32	11.5	19
Ø6	11.5	19.5
Ø1/4	11.6	22

10.REPLACEMENT PROCEDURE

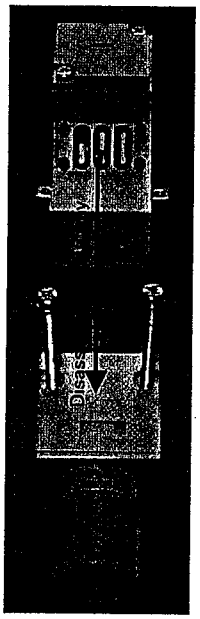
⚠ WARNING

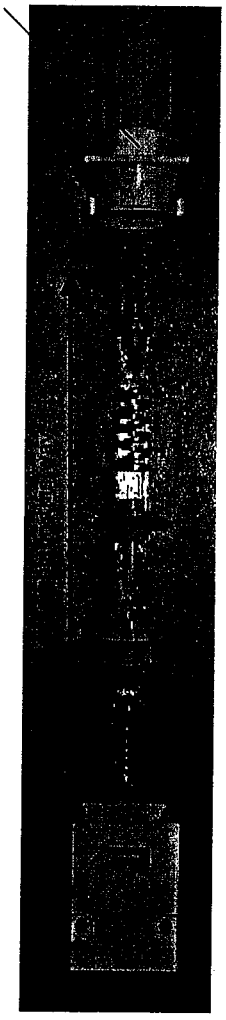
Before replacement, ensure that the regulator is not pressurized.

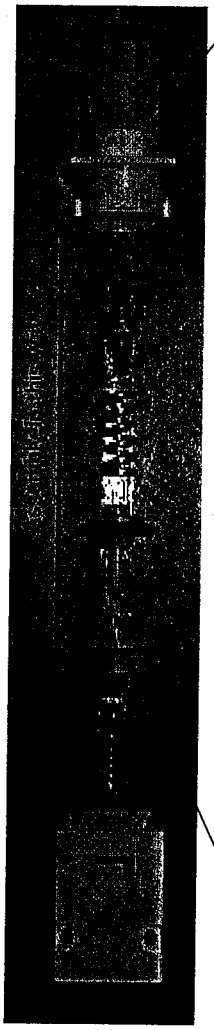
Rotate the pressure adjusting handle counterclockwise fully and to return it to zero. operation.

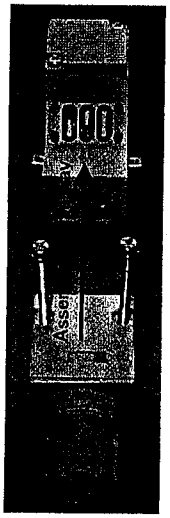
Model	ARM10,ARM10F	
Description	Regulator	
Content	Wash and replacement of diaphragm, rubber part, valve and valve spring	
Process	Disassembly	Assembly
Procedure	① Rotate bonnet counterclockwise by holding its spanner flat by spanner to disconnect. (Remain pressure adjusting screw and spring mounted on ② Remove diaphragm assembly. ③ Remove valve seat assembly by holding by snap ring pliers. ④ Remove valve and valve spring.	① Mount valve spring and valve by pincette. ② Mount valve seat assembly (with two "O" rings mounted) by snap ring pliers so that static pressure part of valve seat and OUT passage could be in proper position. ③ Hold the valve seat assembly accessing from side opening to prevent it from coming off. ④ Moung diaphragm assembly. ⑤ Mount bonnet which has pressure adjusting screw and spring installed to body and rotate it by holding spanner flat by spanner clockwise to connect with the body.
Tools	Spanner (18mm in width), Snap ring pliers, Pincette	
Check item	-	① Presence of "O" ring. ② Position of static pressure part of valve seat and OUT passage.
Referntial photo		

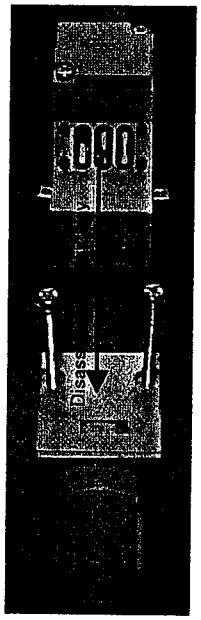
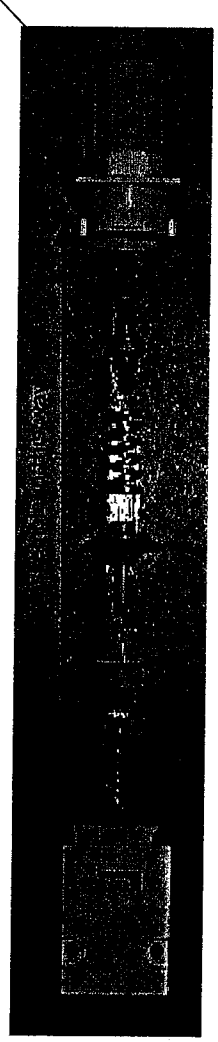
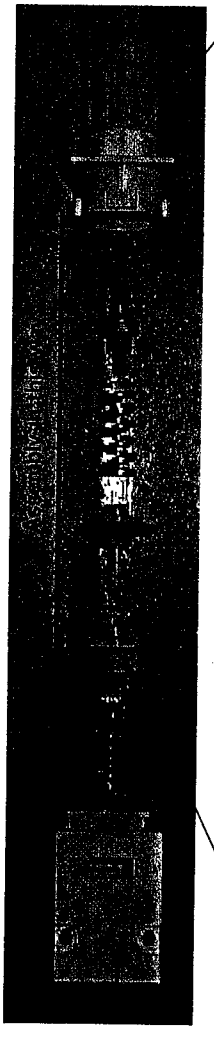
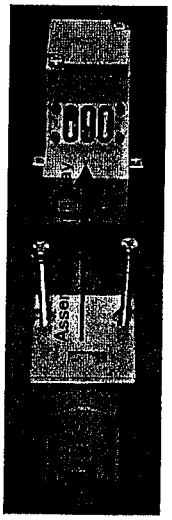
Model	ARM11□A, ARM11□C	
Description	Regulator block (Handle position: Top or bottom	
Content	Wash and replacement of gasket, diaphragm, rubber part, valve and valve spring	
Process	Disassembly	Assembly
Procedure	① Loosen and remove round screws of regulator assembly by Phillips driver to become the regualtor assembly able to be disconneted manually. ② Rotate bonnet counterclockwise by holding its spanner flat by spanner to disconnect. (Remain pressure adjusting screw and spring mounted on the ③ Remove diaphragm assembly manually. ④ Remove valve assembly with held by snap ring pliers. ⑤ Remove valve and valve spring.	① Mount valve spring and valve by pincette. ② Mount valve seat assembly (with two "O" rings mounted) by snap ring pliers so that static pressure part of valve seat and character "A" on body. ③ Hold the valve seat assembly accessing from side opening to prevent it from coming off. ④ Moung diaphragm assembly. ⑤ Mount bonnet which has pressure adjusting screw and spring installed to body and rotate it by holding spanner flat by spanner clockwise to connect with the body. ⑥ Mount regulator assembly on manifold block and hold it by tightening two round screws by Phillips driver.
Tools	Phillips driver, Spanner (18mm in width), Snap ring pliers, Pincette	
Check item	–	① Presence of "O" ring. ② Position of static pressure part of valve seat and character "A" on body. ③ Tightening torque of round screw: 0.32±0.03N·cm
Referntial photo	Rotate counterclockwise by holding spanner flat by spanner to disconnect.	Rotate clockwise by holding spanner flat by spanner to connect. ①Mounted condition of "O" ring.. ②Position of static pressure part and OUT passage.

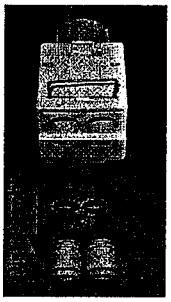
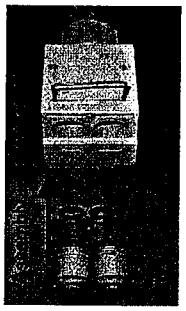


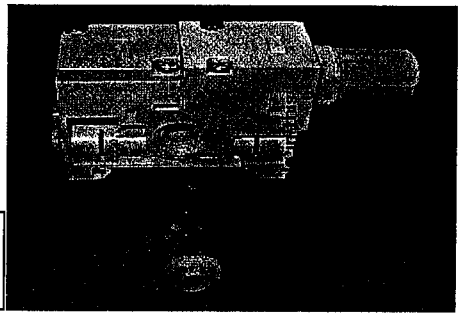
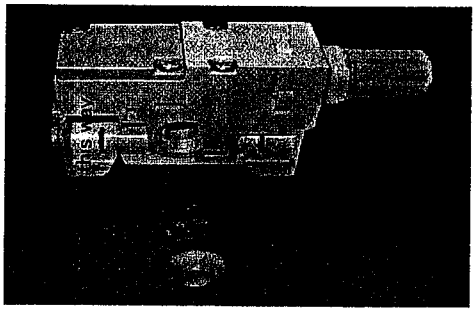


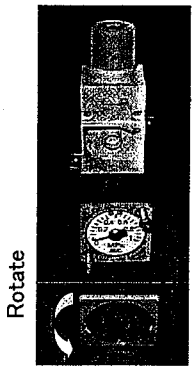
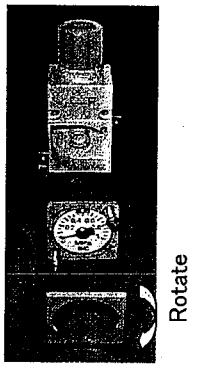


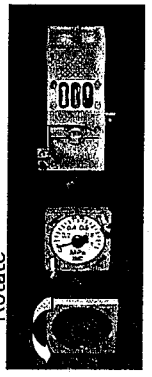
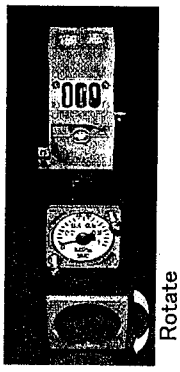


Model	ARM11□B	
Description	Regulator block (Handle position: Front type	
Content	Wash and replacement of gasket, diaphragm, rubber part, valve and valve spring	
Process	Disassembly	Assembly
Procedure	① Loosen and remove round screws of regulator assembly by Phillips driver to become the regualtor assembly able to be disconneted manually. ② Rotate bonnet counterclockwise by holding its spanner flat by spanner to disconnect. (Remain pressure adjusting screw and spring mounted on the ③ Remove diaphragm assembly manually. ④ Remove valve assembly with held by snap ring pliers. ⑤ Remove valve and valve spring.	① Mount valve spring and valve by pincette. ② Mount valve seat assembly (with two "O" rings mounted) by snap ring pliers so that static pressure part of valve seat and character "A" on body. ③ Hold the valve seat assembly accessing from side opening to prevent it from coming off. ④ Moung diaphragm assembly. ⑤ Mount bonnet which has pressure adjusting screw and spring installed to body and rotate it by holding spanner flat by spanner clockwise to connect with the body. ⑥ Mount regulator assembly on manifold block and hold it by tightening two round screws by Phillips driver.
Tools	Phillips driver, Spanner (18mm in width), Snap ring pliers, Pincette	
Check item	–	① Presence of "O" ring. ② Position of static pressure part of valve seat and character "B" on body. ③ Tightening torque of round screw: 0.32±0.03N·cm
Referntial photo	Rotate counterclockwise by holding spanner flat by spanner to disconnect.  	Rotate clockwise by holding spanner flat by spanner to connect.   ①Mounted condition of "O" ring ②Position of static pressure part and OUT passage.

Model	ARM10,ARM10F,ARM 11	
Description	Regulator, Manifold block	
Content	Wash, air blowing and replacement of gasket, diaphragm, rubber part, valve and valve spring	
Process	Disassembly	Assembly
Procedure	① Remove clip with held by flat small driver. ② Pull fitting assembly out manually.	① Push fitting assembly until it comes to a stop to mount. ② Push clip until it comes to a stop to mount.
Tools	Small flat rvier	
Check item	–	① Confirmation that the fitting assembly reaches mounting end for it. ② Confirmation that the clip reaches mounting end for it.
Referntial photo		

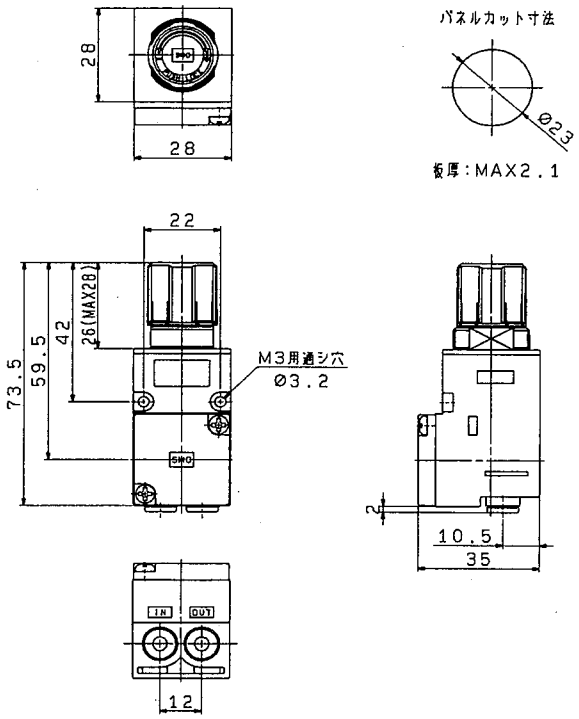
Model	ARM11	
Description	Regulator block	
Content	Wash and replacement of "O" ring of bush	
Process	Disassembly	Assembly
Procedure	① Remove bush with held by flat small driver. ② Remove "O" ring from the bush.	① Mount "O" ring to bush. ② Push the bush until it comes to a stop to mount.
Tools	Small flat rvier	
Check item	–	① Confirmation that the bush reaches mounting end for it.
Referntial photo	Hold here by driver. 	

Model	ARM10,ARM10F	
Description	Regulator	
Content	Wash and replacement of "O" ring of pressure gauge	
Process	Disassembly	Assembly
Procedure	① Remove cover assembly by rotating counterclockwise manually. ② Loosen and remove two round screw by Phillips driver. ③ Remove pressure gauge assembly. ④ Remove "O" ring.	① Mount "O" ring. ② Mount pressure gauge assembly. ③ Hold the pressure gauge assemlbly by tightening two round screws by Phillips driver. ④ Mount cover assembly by rotating clockwise manually. (Mind direction of cover and position of locating mark and detent.)
Tools	Phillips driver	
Check item	-	① Presence of "O" ring ② Tightening torque of round screw: 0.32±0.03N・cm
Referntial photo		

Model	ARM11	
Description	Regulator block	
Content	Wash and replacement of "O" ring of pressure gauge	
Process	Disassembly	Assembly
Procedure	① Loosen and remove round screws form regualtor assembly by Phillips driver to becomes the regulator assembly able to be disconnected. ② Remove cover assembly by rotating counterclockwise manually. ③ Remove two round screws from pressure assembly by Phillips driver. ④ Remove pressure gauge assembly. ⑤ Remove "O" ring.	① Mount "O" ring to bush. ② Mount pressure gauge assembly. ③ Hold the pressure gauge assemlbly by tightening two round screws by Phillips driver. ④ Mount cover assembly by rotating clockwise manually. (Mind direction of cover and position of locating mark and detent.) ⑤ Mount regulator assembly to manifold block and hold it by tightening two round screws by
Tools	Phillips driver	
Check item	-	① Presence of "O" ring ② Tightening torque of round screw: 0.32±0.03N・cm
Referntial photo		

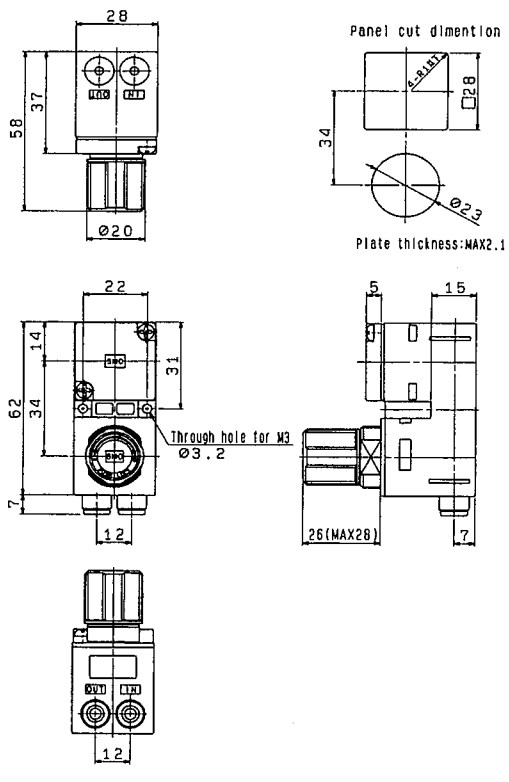
11. DIMENSIONS

①Regulator/ARM10type

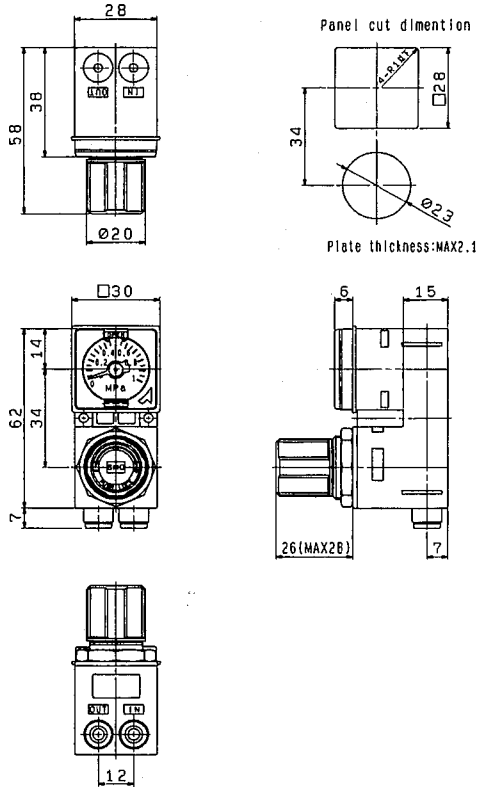


②Regulator/ARM10Ftype

ARM10F1-06



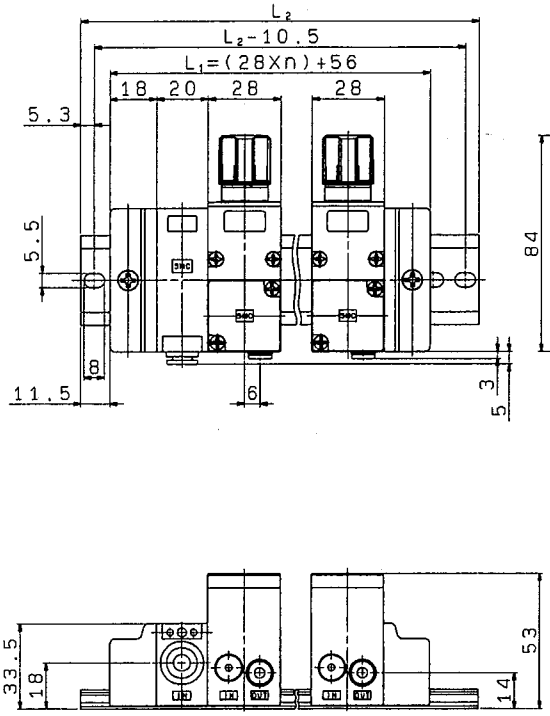
ARM10F1-06GPC



③Manifold regulator／common air supply spec.

ARM11AA1－＊12

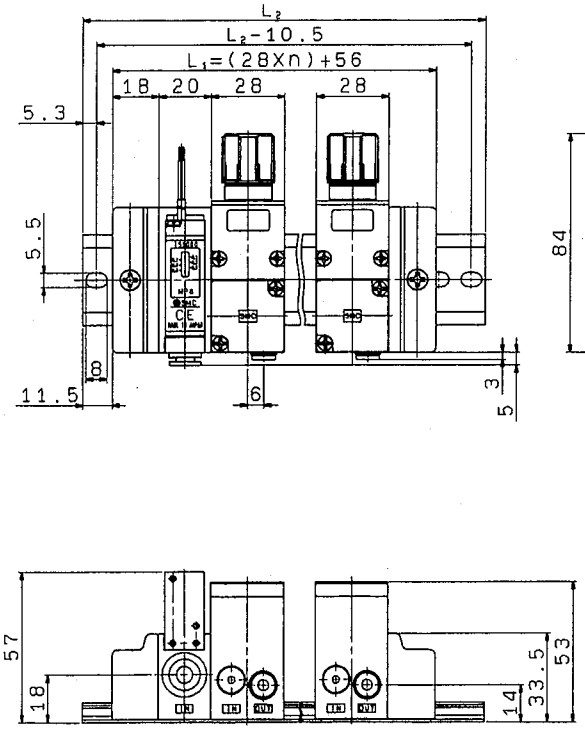
Handle position top spec／common supply block



stn.	Din rail no.(for side L,R)	L₂Dimention
1	AXT100-DR-9	123
2	AXT100-DR-11	148
3	AXT100-DR-13	173
4	AXT100-DR-16	210.5
5	AXT100-DR-18	235.5
6	AXT100-DR-20	260.5
7	AXT100-DR-22	285.5
8	AXT100-DR-25	323
9	AXT100-DR-27	348
M	AXT100-DR-29	373

ARM11AA1－＊12－A

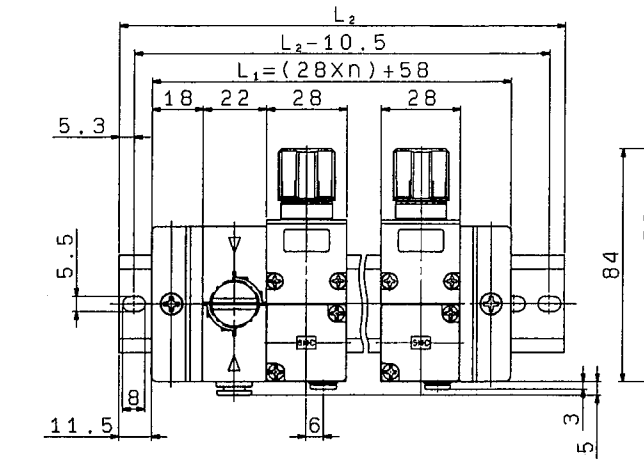
Handle position top spec／common supply with pressure switch

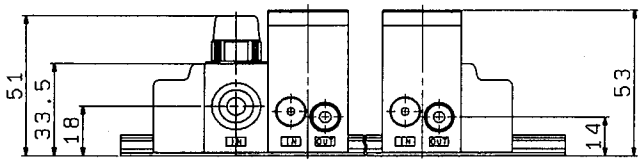


stn.	Din rail no.(for side L,R)	L₂Dimention
1	AXT100-DR-9	123
2	AXT100-DR-11	148
3	AXT100-DR-13	173
4	AXT100-DR-16	210.5
5	AXT100-DR-18	235.5
6	AXT100-DR-20	260.5
7	AXT100-DR-22	285.5
8	AXT100-DR-25	323
9	AXT100-DR-27	348
M	AXT100-DR-29	373

ARM11AA1－＊12－B

Handle position top spec／3 way valve type common supply block

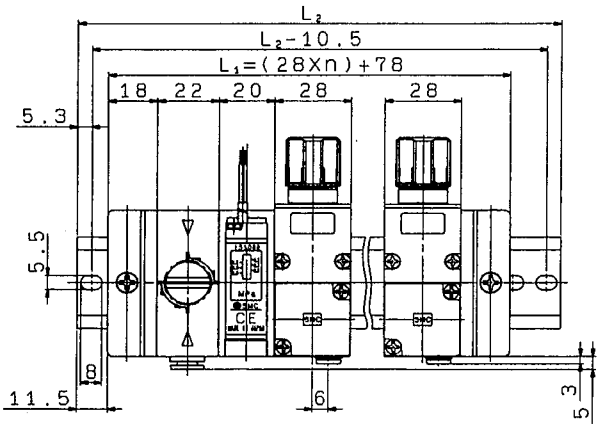


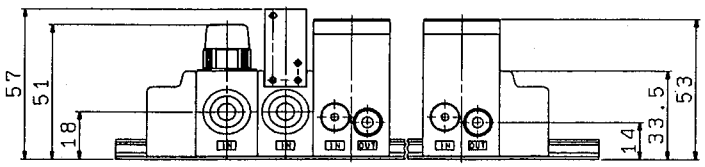


Stn.	Din rail no.(for side L,R)	L2Dimention
1	AXT100-DR-9	123
2	AXT100-DR-11	148
3	AXT100-DR-13	173
4	AXT100-DR-16	210.5
5	AXT100-DR-18	235.5
6	AXT100-DR-20	260.5
7	AXT100-DR-22	285.5
8	AXT100-DR-25	323
9	AXT100-DR-27	348
M	AXT100-DR-29	373

ARM11AA1－＊12－C

Handle position top spec／3 way valve type common supply block+pressure switch block

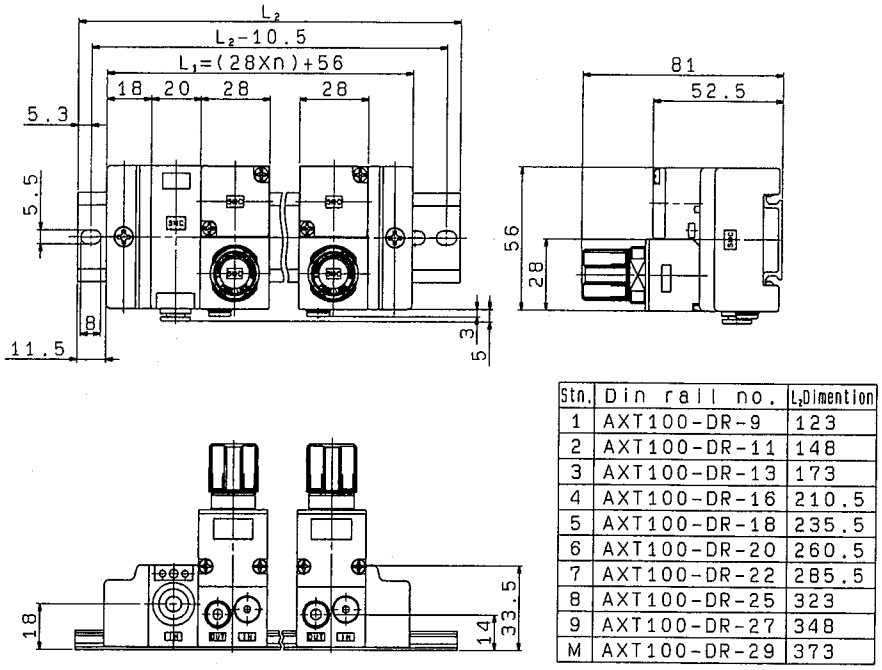




Stn.	Din rail no.(for side L,R)	L2Dimension
1	AXT100-DR-11	148
2	AXT100-DR-13	173
3	AXT100-DR-15	198
4	AXT100-DR-17	223
5	AXT100-DR-19	248
6	AXT100-DR-22	285.5
7	AXT100-DR-24	310.5
8	AXT100-DR-26	335.5
9	AXT100-DR-28	360.5
M	AXT100-DR-31	398

ARM11AB1－＊12

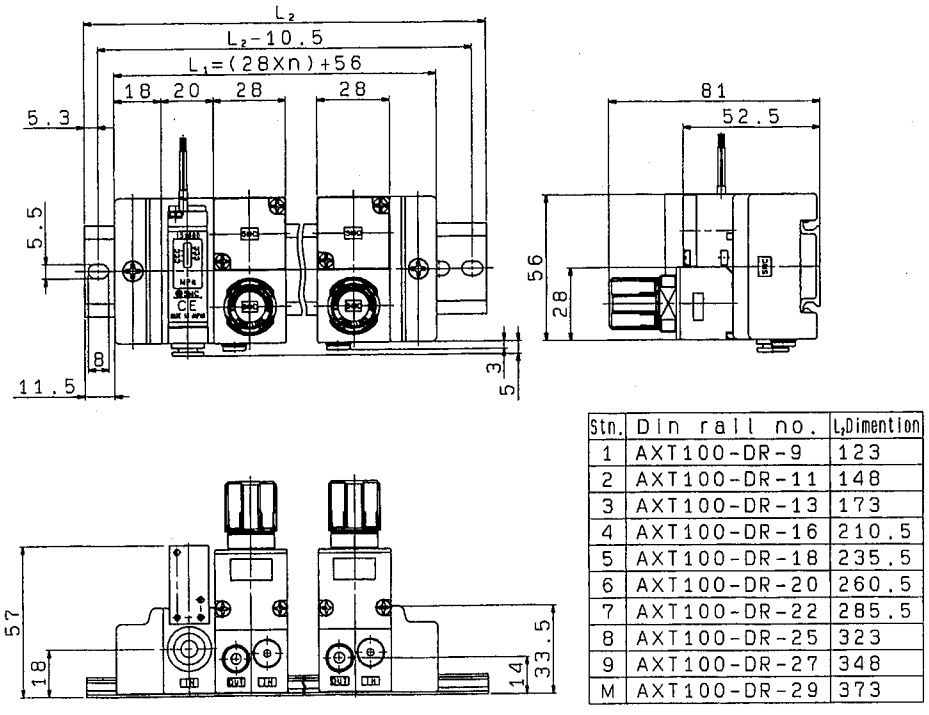
Handle position front spec.／common supply block



Stn.	Din rail no.	L₂Dimention
1	AXT100-DR-9	123
2	AXT100-DR-11	148
3	AXT100-DR-13	173
4	AXT100-DR-16	210.5
5	AXT100-DR-18	235.5
6	AXT100-DR-20	260.5
7	AXT100-DR-22	285.5
8	AXT100-DR-25	323
9	AXT100-DR-27	348
M	AXT100-DR-29	373

ARM11AB1－＊12－A

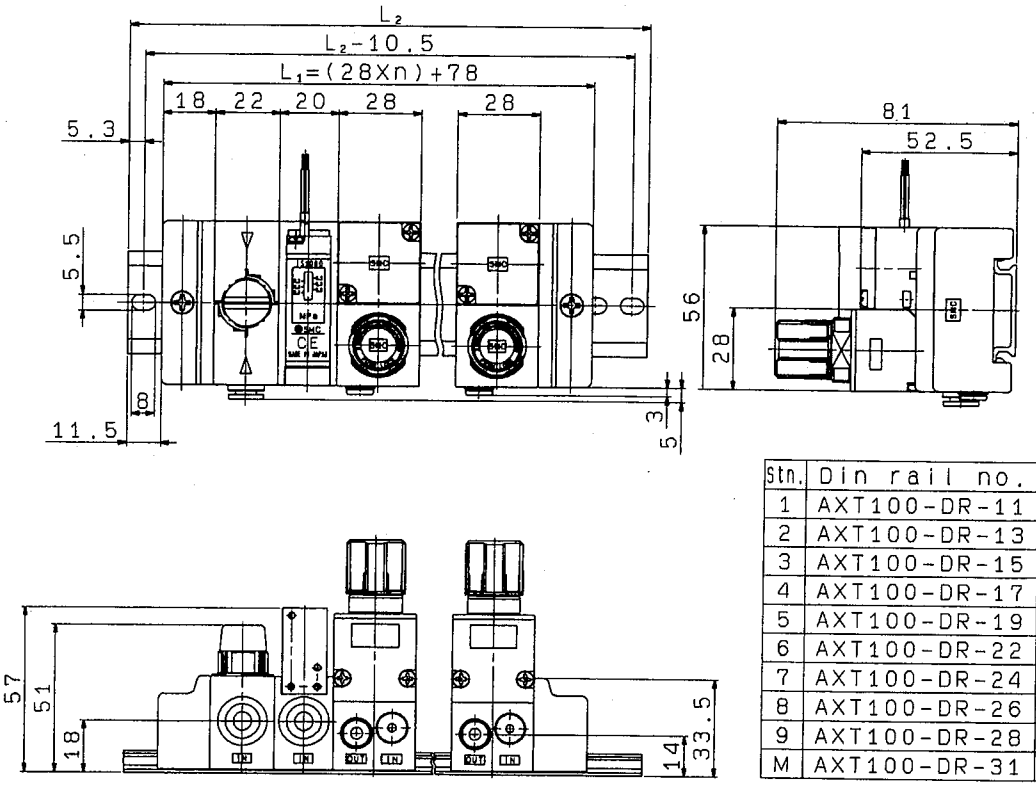
Handle position front spec.／common supply with pressure switch



Stn.	Din rail no.	L₂Dimention
1	AXT100-DR-9	123
2	AXT100-DR-11	148
3	AXT100-DR-13	173
4	AXT100-DR-16	210.5
5	AXT100-DR-18	235.5
6	AXT100-DR-20	260.5
7	AXT100-DR-22	285.5
8	AXT100-DR-25	323
9	AXT100-DR-27	348
M	AXT100-DR-29	373

ARM11AB1－＊12－B

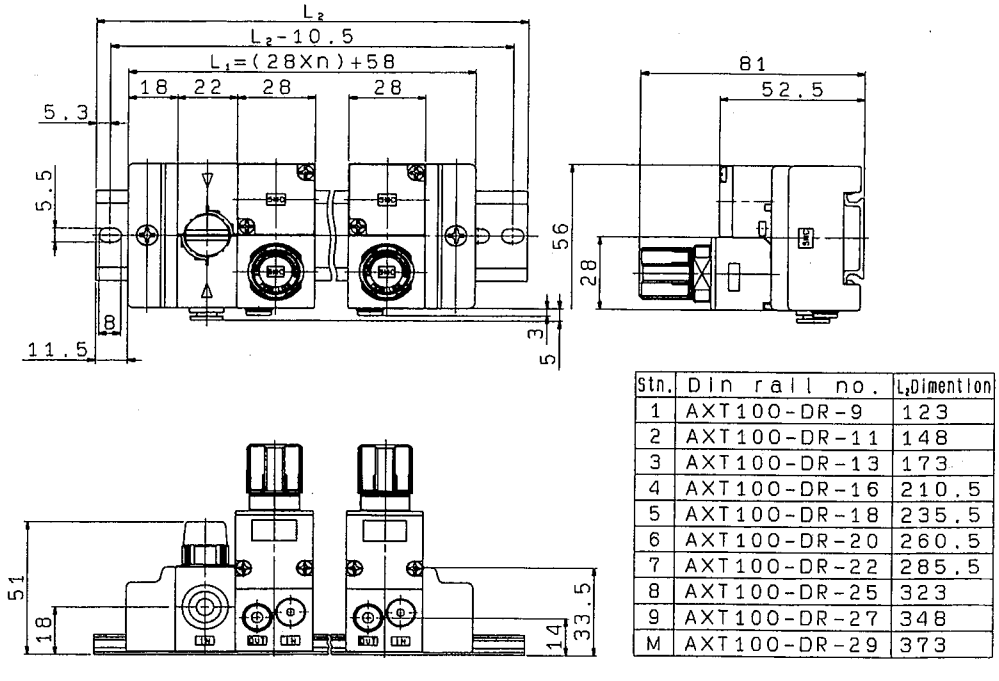
Handle position front spec.／3 way valve type common supply block



Stn.	Din rail no.	L₂Dimention
1	AXT100-DR-11	148
2	AXT100-DR-13	173
3	AXT100-DR-15	198
4	AXT100-DR-17	223
5	AXT100-DR-19	248
6	AXT100-DR-22	285.5
7	AXT100-DR-24	310.5
8	AXT100-DR-26	335.5
9	AXT100-DR-28	360.5
M	AXT100-DR-31	398

ARM11AB1－＊12－C

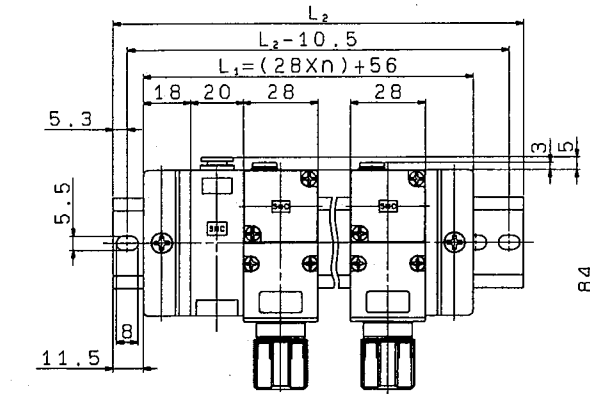
Handle position front spec.／3 way valve type common supply block+pressure switch block

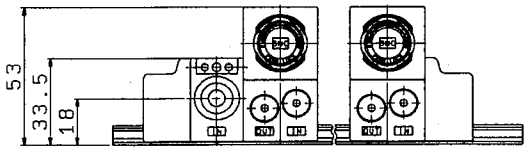


Stn.	Din rail no.	L₂Dimention
1	AXT100-DR-9	123
2	AXT100-DR-11	148
3	AXT100-DR-13	173
4	AXT100-DR-16	210.5
5	AXT100-DR-18	235.5
6	AXT100-DR-20	260.5
7	AXT100-DR-22	285.5
8	AXT100-DR-25	323
9	AXT100-DR-27	348
M	AXT100-DR-29	373

ARM11AC2－＊12

Handle position bottom spec.／common supply block

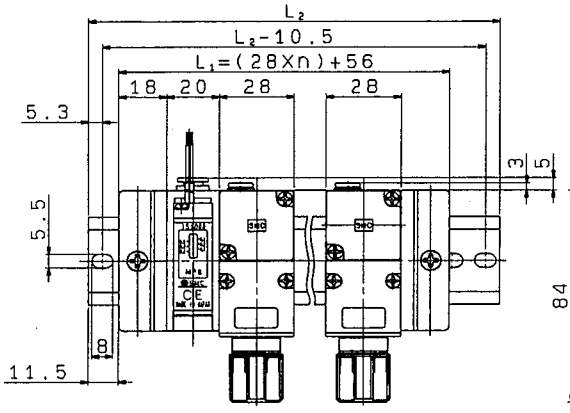


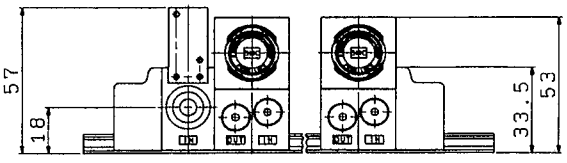


Stn.	Din rail no.	L₁Dimention
1	AXT100-DR-9	123
2	AXT100-DR-11	148
3	AXT100-DR-13	173
4	AXT100-DR-16	210.5
5	AXT100-DR-18	235.5
6	AXT100-DR-20	260.5
7	AXT100-DR-22	285.5
8	AXT100-DR-25	323
9	AXT100-DR-27	348
M	AXT100-DR-29	373

ARM11AC2－＊12－A

Handle position bottom spec.／common supply with pressure switch

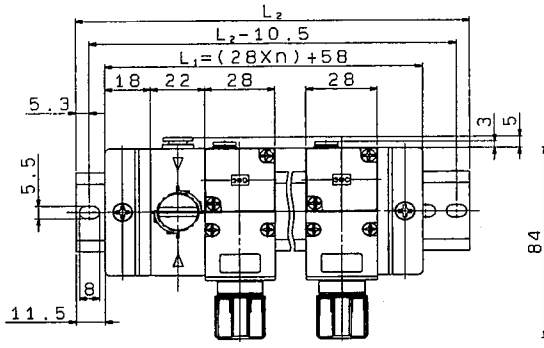


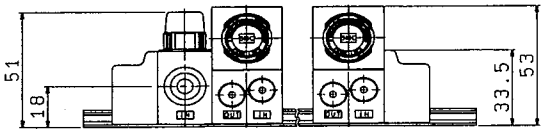


Stn.	Din rail no.	L₁Dimention
1	AXT100-DR-9	123
2	AXT100-DR-11	148
3	AXT100-DR-13	173
4	AXT100-DR-16	210.5
5	AXT100-DR-18	235.5
6	AXT100-DR-20	260.5
7	AXT100-DR-22	285.5
8	AXT100-DR-25	323
9	AXT100-DR-27	348
M	AXT100-DR-29	373

ARM11AC2－＊12－B

Handle position bottom spec.／3 way valve type common supply block

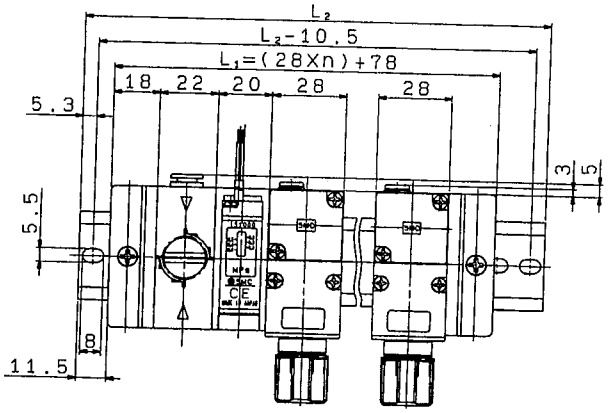


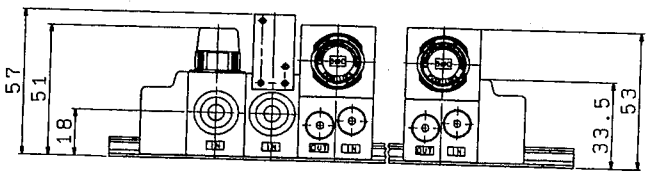


Stn.	Din rail no.	L₂Dimention
1	AXT100-DR-9	123
2	AXT100-DR-11	148
3	AXT100-DR-13	173
4	AXT100-DR-16	210.5
5	AXT100-DR-18	235.5
6	AXT100-DR-20	260.5
7	AXT100-DR-22	285.5
8	AXT100-DR-25	323
9	AXT100-DR-27	348
M	AXT100-DR-29	373

ARM11AC2－＊12－C

Handle position bottom spec.／3 way valve type common supply block+pressure switch block

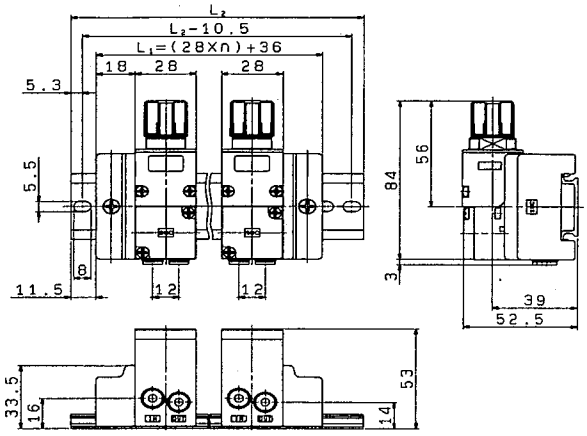




Stn.	Din rail no.	L₂Dimention
1	AXT100-DR-11	148
2	AXT100-DR-13	173
3	AXT100-DR-15	198
4	AXT100-DR-17	223
5	AXT100-DR-19	248
6	AXT100-DR-22	285.5
7	AXT100-DR-24	310.5
8	AXT100-DR-26	335.5
9	AXT100-DR-28	360.5
M	AXT100-DR-31	398

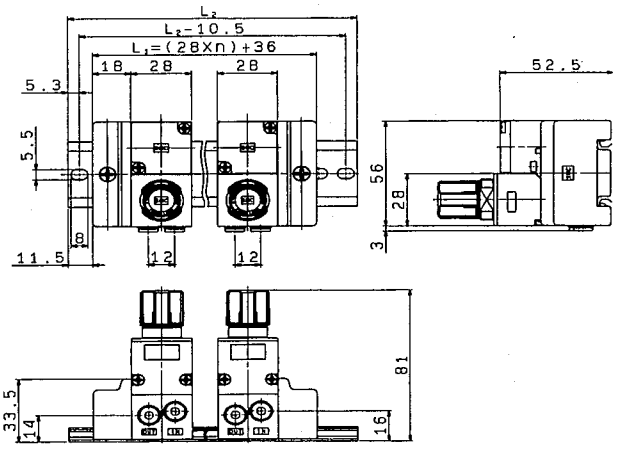
③Manifold regulator／Individual air supply

ARM11BA1－＊08
Handle position top spec.



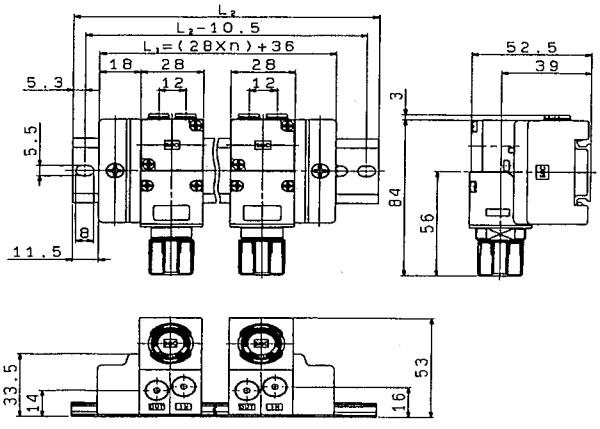
Stn.	DIN rail no.(for side L,R)	L2Dimention
1	AXT100-DR-8	110.5
2	AXT100-DR-10	135.5
3	AXT100-DR-12	160.5
4	AXT100-DR-14	185.5
5	AXT100-DR-16	210.5
6	AXT100-DR-19	248
7	AXT100-DR-21	273
8	AXT100-DR-23	298
9	AXT100-DR-25	323
M	AXT100-DR-28	360.5

ARM11BB1－＊08
Handle position front spec.



Stn.	DIN rail no.(for side L,R)	L2Dimention
1	AXT100-DR-8	110.5
2	AXT100-DR-10	135.5
3	AXT100-DR-12	160.5
4	AXT100-DR-14	185.5
5	AXT100-DR-16	210.5
6	AXT100-DR-19	248
7	AXT100-DR-21	273
8	AXT100-DR-23	298
9	AXT100-DR-25	323
M	AXT100-DR-28	360.5

ARM11BC2－＊08
Handle position bottom spec.



Stn.	DIN rail no.(for side L,R)	L2Dimention
1	AXT100-DR-8	110.5
2	AXT100-DR-10	135.5
3	AXT100-DR-12	160.5
4	AXT100-DR-14	185.5
5	AXT100-DR-16	210.5
6	AXT100-DR-19	248
7	AXT100-DR-21	273
8	AXT100-DR-23	298
9	AXT100-DR-25	323
M	AXT100-DR-28	360.5