CKD

SM-6988-A

INSTRUCTION MANUAL

SELEXVALVE

A4F010-M5, 06

4F020-M5, 06

- Please read this instruction manual carefully before using this product, particularly the section describing safety.
- Retain this instruction manual with the product for further consultation whenever necessary.

CKD Corporation

For Safety Use

To use this product safely, basic knowledge of pneumatic equipment, including materials, piping, electrical system and mechanism, is required (to the level pursuant to JIS B 8370 Pneumatic System Rules).

We do not bear any responsibility for accidents caused by any person without such knowledge or arising from improper operation.

Our customers use this product for a very wide range of applications, and we cannot keep track of all of them. Depending on operating conditions, the product may fail to operate to maximum performance, or cause an accident. Thus, before placing an order, examine whether the product meets your application, requirements, and how to use it.

This product incorporates many functions and mechanisms to ensure safety. However, improper operation could result in an accident. To prevent such accidents, read this operation manual carefully for proper operation.

Observe the cautions on handling described in this manual, as well as the following instructions :

⚠ Precautions

- Do not touch electric wiring connections (exposed live parts) : this will cause an electric shock. During wiring, keep the power off. Also, do not touch these live parts with wet hands.

INDEX

A4F010

4F020

SELEX Valve

4Way Solenoid Valve

SM6988-A

1. PRODUCTS

1-1. Specification

1) General Specification

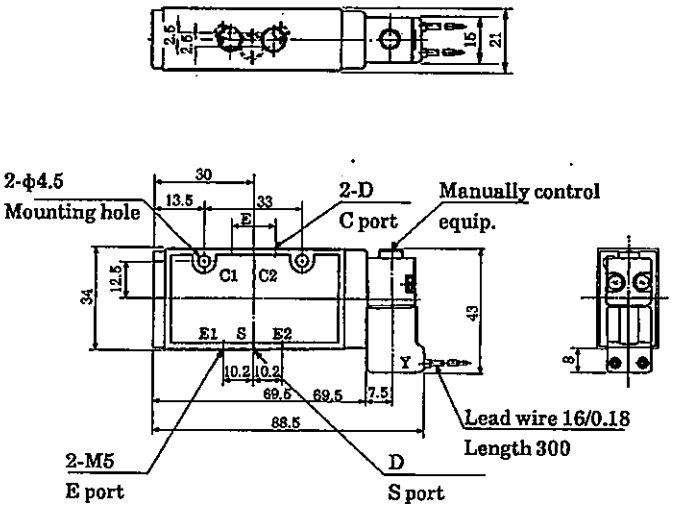
Working fluid	Compressed air
Working pressure MPa	0.15 ~ 0.99
Proof pressure MPa	1.5
Ambient temperature °C	−10 ~ 60 (Not to be frozen)
Fluid temperature °C	5 ~ 60
Lubrication	Not required
Valve type and operation	Pilot (Soft spool)

2) Electric specification

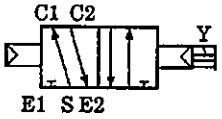
Rated voltage	AC100V(50/60Hz)	AC200V(50/60Hz)	DC12/24V
Starting current (A)	0.056/0.44	0.028/0.022	0.15/0.075
Holding current (A)	0.028/0.022	0.014/0.011	1.8
Power consumption (W)	1.8/1.4		
Thermal class	B (Moulded coil)		

3) External dimensions

(1) 4F010 (2-Position, single solenoid, lead wire type)

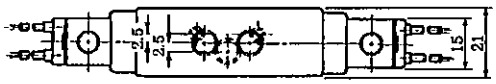


Symbol

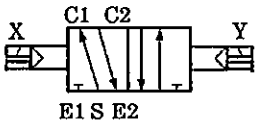


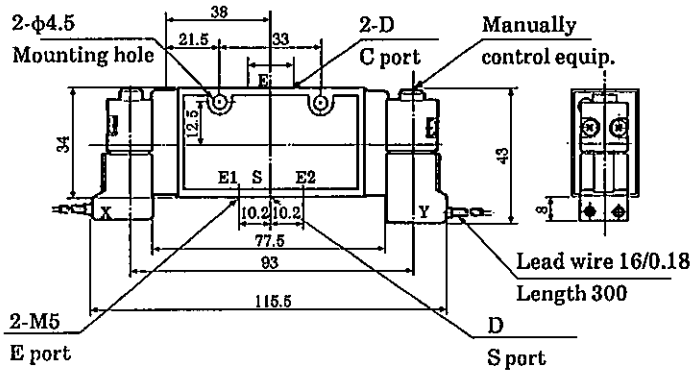
Marking / Model code	D	E
※-M5	M5×0.8	10.4
※-06	PS1/8	15

(2) 4F020 (2-position, double solenoid, lead wire type)



Symbol



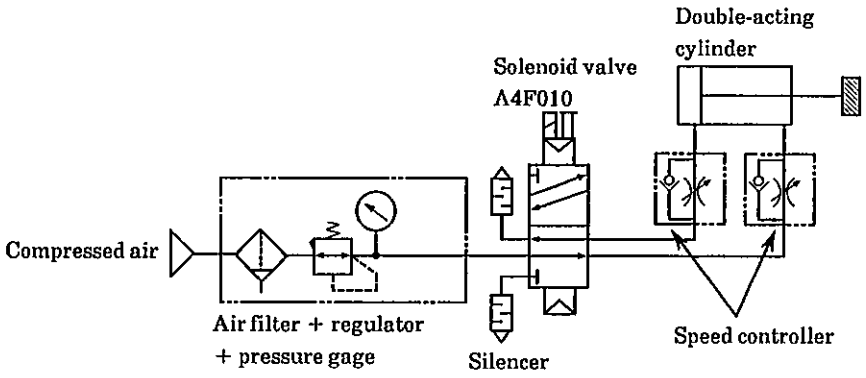


Marking / Model code	D	E
※-M5	M5×0.8	10.4
※-06	PS1/8	15

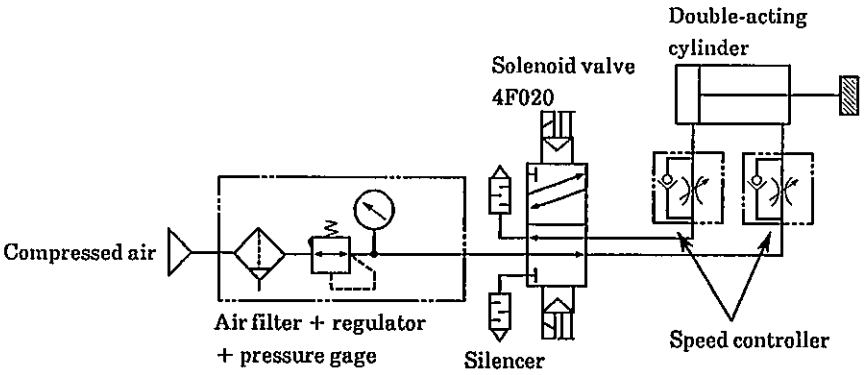
1-2. Fundamental circuit diagram

Fundamental circuit diagram to drive cylinder with 2-position solenoid valve generally appears as shown below.

1) A4F010



2) 4F020

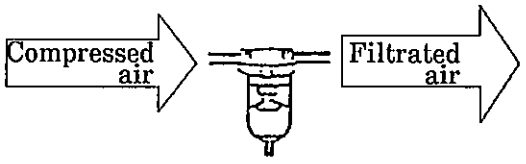


2
WARNING

2. CAUTION

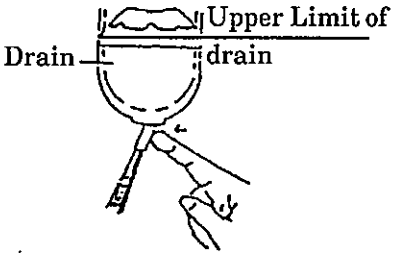
2-1. Fluid.

1) Use the compressed air, filtrated and dehumidified. Carefully select a filter of an adequate filtration rate (5μm or lower preferred), flow rate and its mounting location (as closest to solenoid valve as possible).



2) Be sure to drain out the accumulation in filter periodically.

3) Note that the intrusion of carbide of compressor oil (such as carbon or tarry substance) into the circuit causes malfunction of solenoid valve and cylinder. Be sure to carry out thorough inspection and maintenance of compressor.



4) The solenoid valve of this type does not require lubrication. It is recommended, however, to use Turbine oil Grade 1, ISO VG32 as lubricant, if lubrication is preferred. Regulate the flow of lubricant to refrain from overfeeding it than necessary.

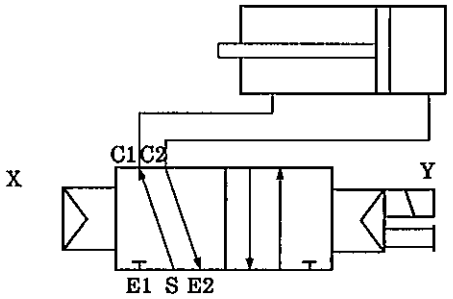
5) Carefully watch that the primary pressure (S port) will not exceed the range of working pressure.

3. OPERATION

3-1. Electric Sigvnal Operatin

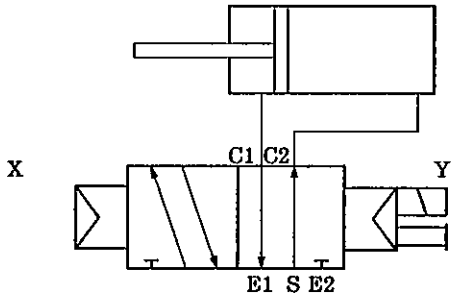
(a) 4F010

No signal current



From S (Sup) port to C1 (Cyl 1) and from C2 (Cyl 2) port to E2 (Exh 2)

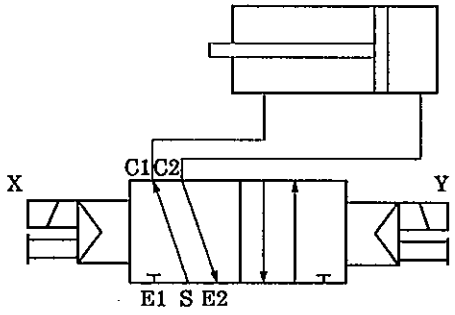
With signal current



From S (Sup) port to C2 (Cyl 2) and from C1 (Cyl 1) port to E1 (Exh 1)

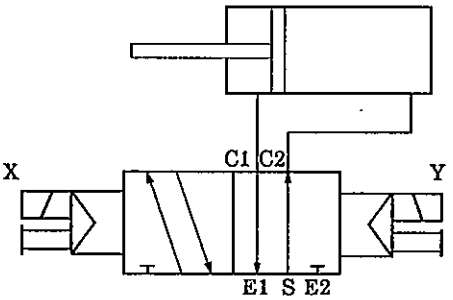
(b) 4F020

Current to X solenoid (This status of valve is held as is even after current is shut off.)



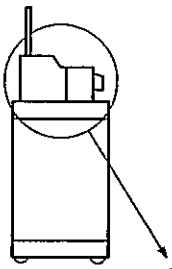
From S (Sup) port to C1 (Cyl 1) and from C2 (Cyl 2) port to E2 (Exh 2)

Current to Y solenoid (This status of valve is held as is even after current is shut off.)



From S (Sup) port to C2 (Cyl 2) and from C1 (Cyl 1) port to E1 (Exh 1)

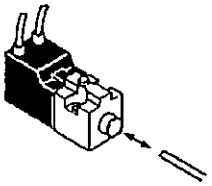
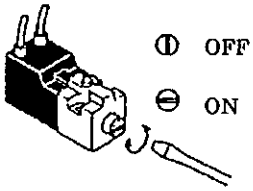
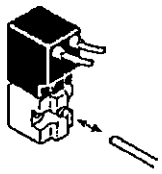
3-2. Manual Operation



Manual Contral Fixture

When manually actuate a solenoid whichever side of valve, it is energized and manipulates the spool of valve accordingly.

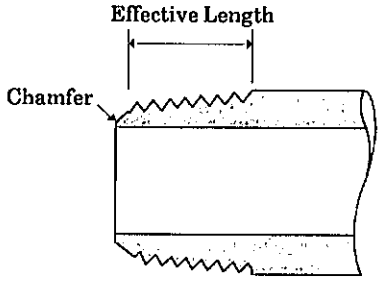
Manual control fixture

Model	Side fixture, Non-locking type	Side fixture, Locking type	Upright fixture, Non-locking type
Option coding	M0	M1	M6
Appearance	 Push this button with a rod of less than ϕ3mm.	 Turn this fixture 90° with a screw driver of minus tip.	 Push this button with a rod of less than ϕ2mm.

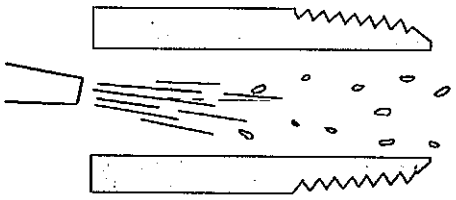
4. INSTALLATION

4-1. Piping

1) For piping beyond the filter, use pipes that hardly get corroded such as galvanized pipes, nylon tubes, rubber tubes, etc.
2) See to it that the pipe connecting cylinder and solenoid valve has effective sectional area needed for the cylinder to drive at specified speed.
3) Install filter preferably adjacent upper-stream to solenoid valve for eliminating rust, foreign substance and drain in the pipe.
4) Strictly observe the effective thread length of gas pipe and give a chamfer of approx. 1/2 pitch from the threaded end.

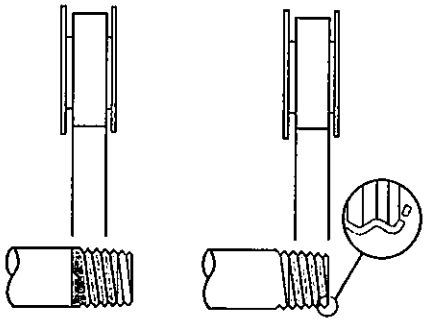


5) Flush air into the pipe to blow out foreign substances and chips before piping.

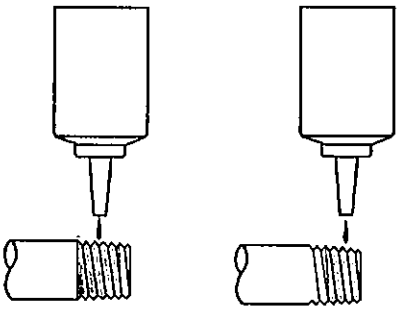


6) Refrain applying sealant or sealing tape approx. two pitches of thread off the tip of pipe to avoid residual substances from falling into piping system.

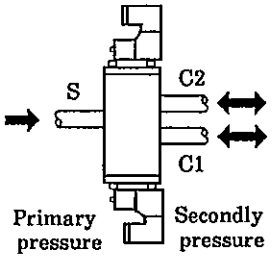
● Seal Tape



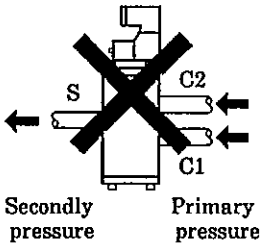
● Sealant (Paste or liquid)



7) Beware that the direction of air flow for the solenoid valve of this type is strictly specified. Carefully build the system.

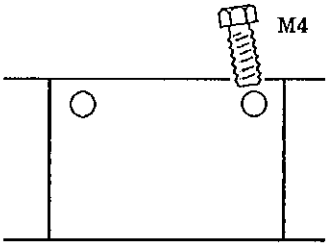


(Correct)

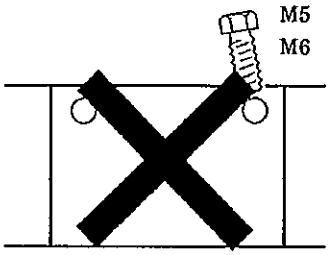


(Incorrect)

8) Use M4 bolt to mount the solenoid valve of this type. Adequate length of the bolts is 21mm.



(Correct)



(Incorrect)

9) Select an appropriate mounting location for valve, while designing a lay-out of circuit, where only the least vibration or shock is generated or nil.

10) Design plumbing circuit so as to provide an ample space for handling tools during later maintenance works.

11) Inspect against any external leakage at each threaded joint upon completion of plumbing, by applying soapy water over it.

4-2. Wiring

1) Cautions of wiring

(1) Install a 0.5 ~1A fuse in the circuit. to provide a protection.

(2) It is recommended the use of snap action switch(es) such as relay or magnetic switch to build a circuit.

(3) Use connector type (C, C1, C2 & C3) in the area with least mount of dust and where no splashing water or oil takes place.

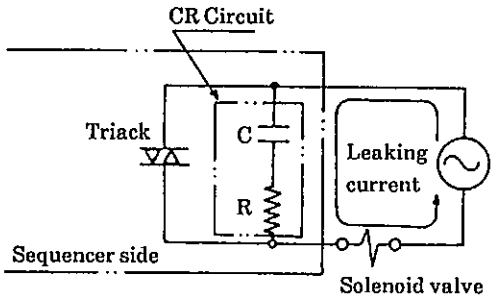
(4) Maintain voltage within the variation of± 10% of the rated voltage.

(5) Be extremely careful that it apt to give some undesirable effect to the function of product due to the leaking current through the CR element, when attempting to make use of the sequencer which has built-in CR circuit for absorbing surge voltage from the switching element.

Unit : mA

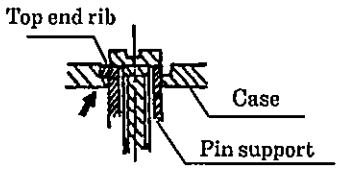
		W/Surge killer
AC 200V	1.5	3
AC 100V	3	6
DC 24V	1.8	3

Regulate the residual leaking current within the limitations as above.



2) Wiring of small terminal box (B)

(1) Use the following tools to caulk the terminal piece on cord.
Tool No. 720781-3, made by Nippon AMP.



(2) Think of direction of cord when placing caulked terminal pieces into the slits of the pin support.

(3) Hook the top rib of pin support to the hole edge of the case when assembling the case as per illustrated right.

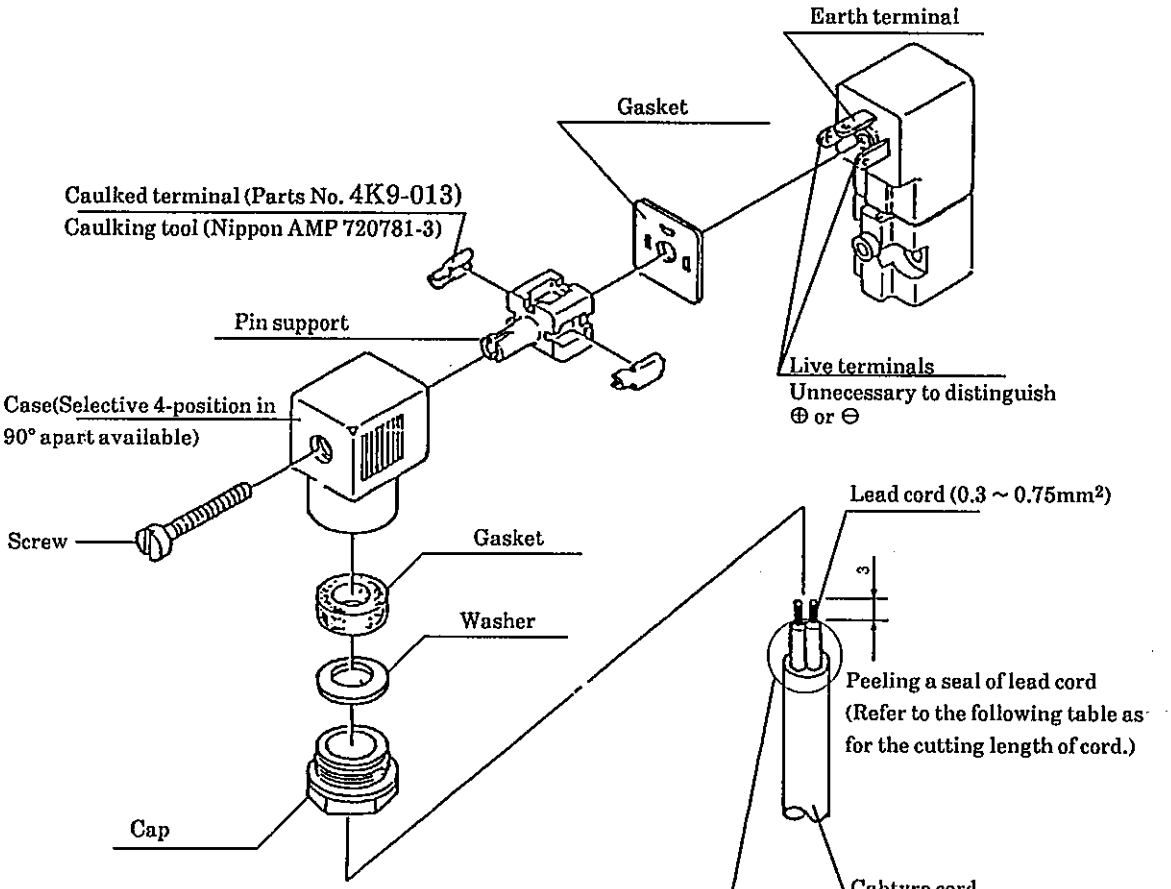
(4) Use lead cord of sectional area 0.3 ~0.75 mm^2.

(5) The cord outlet of case can be mounted in four different positions in 90° apart.

(6) Use JIS C3306 VCTF0.75mm^2, 2-core, less than ϕ6.6 OD when intend to use cabtyre cord of round section.

(7) Tighten cap against the case upon insertion a gasket and a washer.

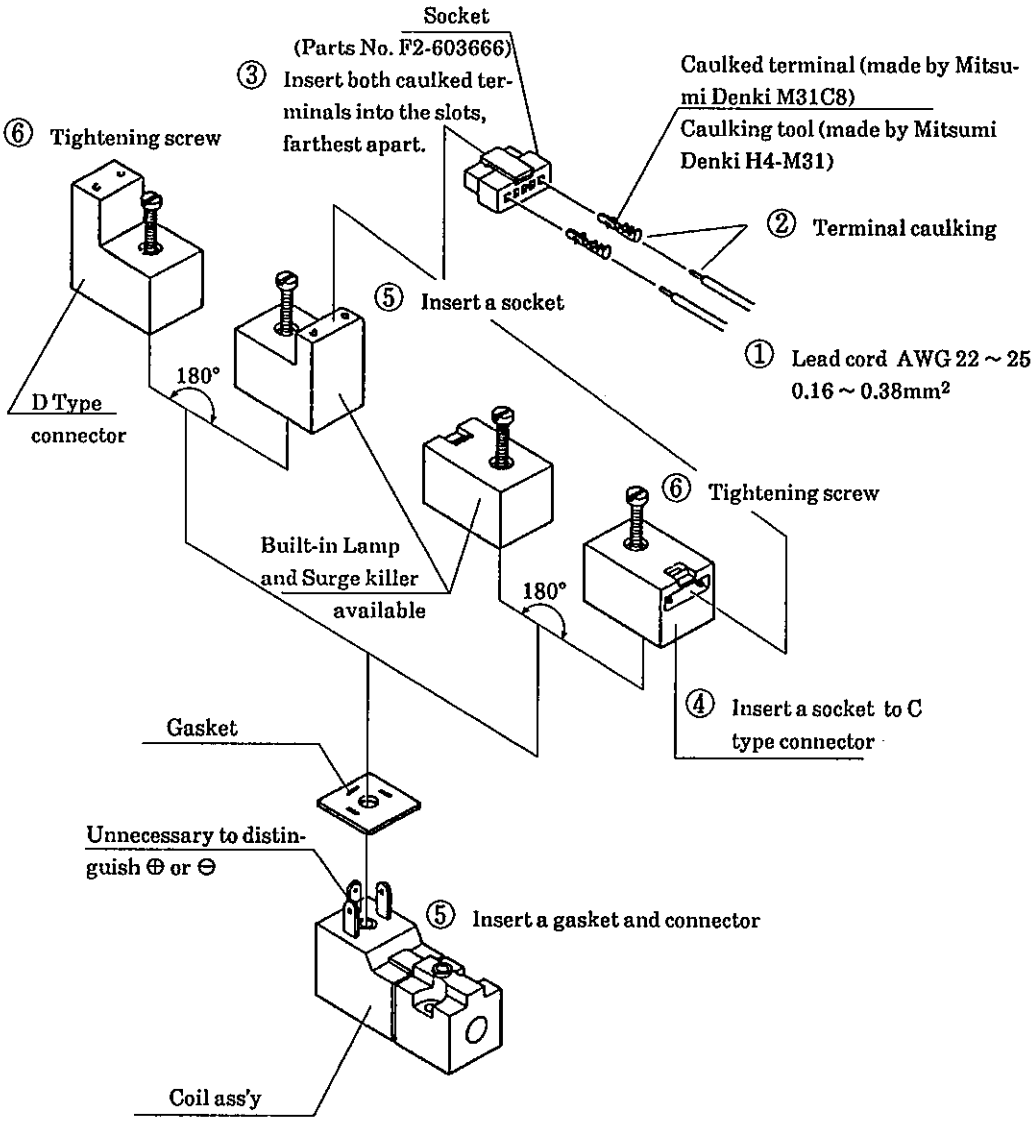
Wiring in small terminal Box (B)



	Direction of the case as per illustrated above or 180° opposite.	Direction of the case 90° to the right or left off per illustrated as above.
Length of lead cord		

3) Wiring the connector Model C and Model D

Wire either connecter in the sequence of ① ~ ⑤ referring the following illustration



5. MAINTENANCE

5-1. Trouble Shooting

Trouble	Cause	Countermeasure
Does not operate	No pressure or inadequate pressure	Provide an adequate pressure source.
	Signal is not transmitted to direction control valve	Correct the control circuit.
	Manual control button is left "On" status (Only the model M1)	Return the manual control button "Off" status.
	Damage to pilot valve	Replace the pilot valve.(12)
Does not function smoothly	Many foreign particles caught by spool	Disassemble the spool(7) and remove the caught foreign particles.
	Damage or tear and wear of piston packing	Replace piston ass'y (8).
Air leaks	Tear and wear of piston packing (External leakage.)	Replace piston ass'y (11) & (15).
	Tear and wear of spool packing (E port leaking)	Replace seal ass'y (8).
Unusual noise out of coil section	Wear and tea of pilot valve	Replace pilot valve (12).

Refer to the Disassembling Drawing as for parts numbers used above.

5-2. Disassembling and Assembling

1) Disassembling of Model A4F010

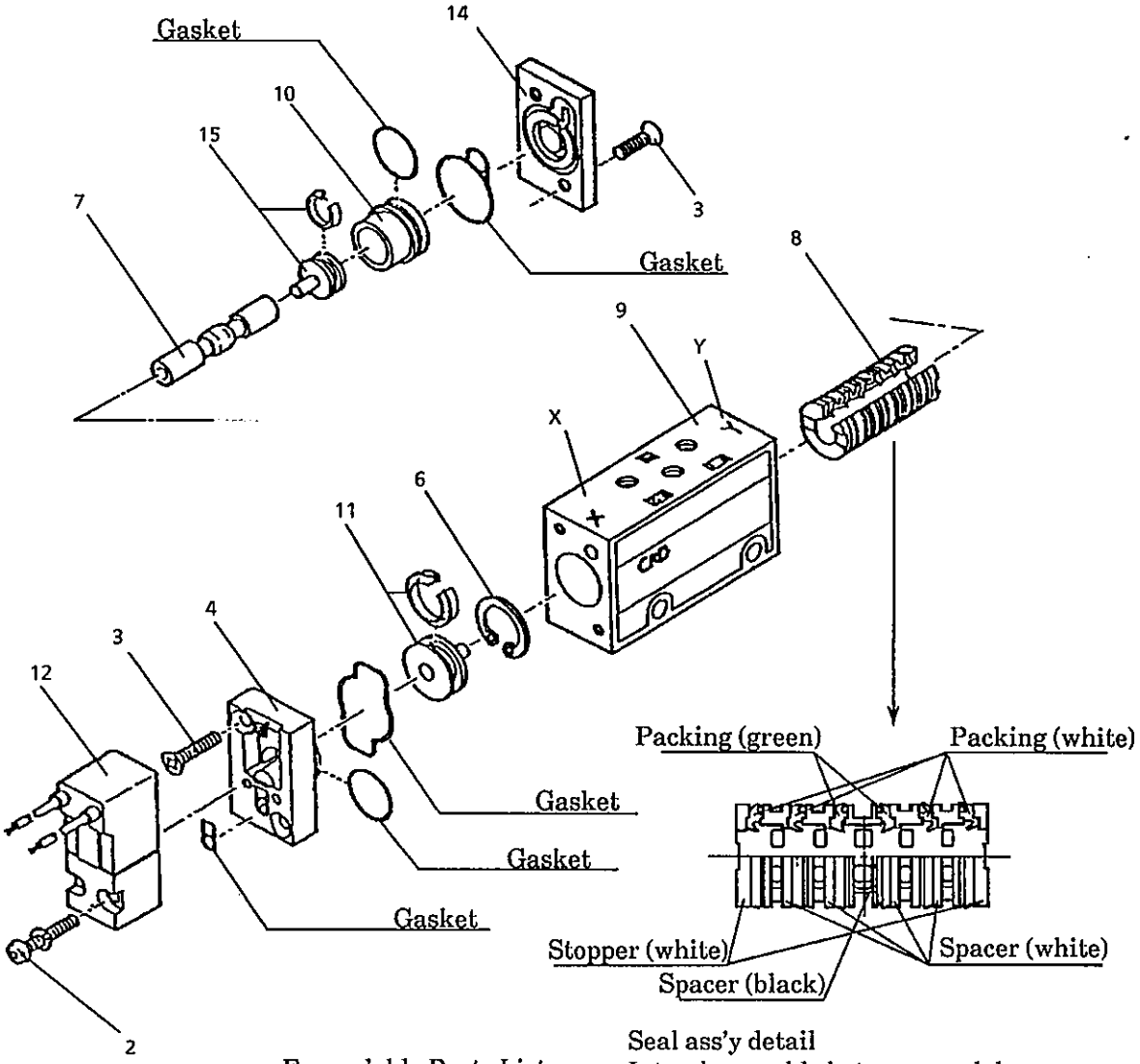
(1) Remove the mounting screws 2 to take out the solenoid 12.

(2) Remove the mounting screws 3 to take out the caps 4.

(3) Pull out piston ass'y 15 first and cylinder 10 out of Y side of body.

(4) Pull out piston ass'y 11 then remove C type snap ring 6 away from X side of valve body.

(5) Insert cylinder ass'y 11 back to the bore of X end of the valve body then push it through the bore all the way out to Y end. Components of internal structure such as spool 7 and seal ass'y 8, then, come out of the valve body.



Expendable Parts List
(Refer to page 14)

Seal ass'y detail
Interchangeable between models
A4F010 and 4F020

2) Assembling of Model A4F010

(1) When ready to start assembling, be sure to wipe off the dust from the surface of piston ass'y 11 & 15, spool 7 and seal ass'y at where only least amount of dust is expected and apply grease of litium list, alkali base.

(2) Insert seal component one at a time into the bore of valve body to assemble the seal ass'y. Assuming the S port as an assembly center of the seal ass'y, carefully watch the direction of lip and inserting order of each seal.

(3) Assemble back other structural components in the reversed sequence of disassembling.

3) Disassembling of Model 4F010

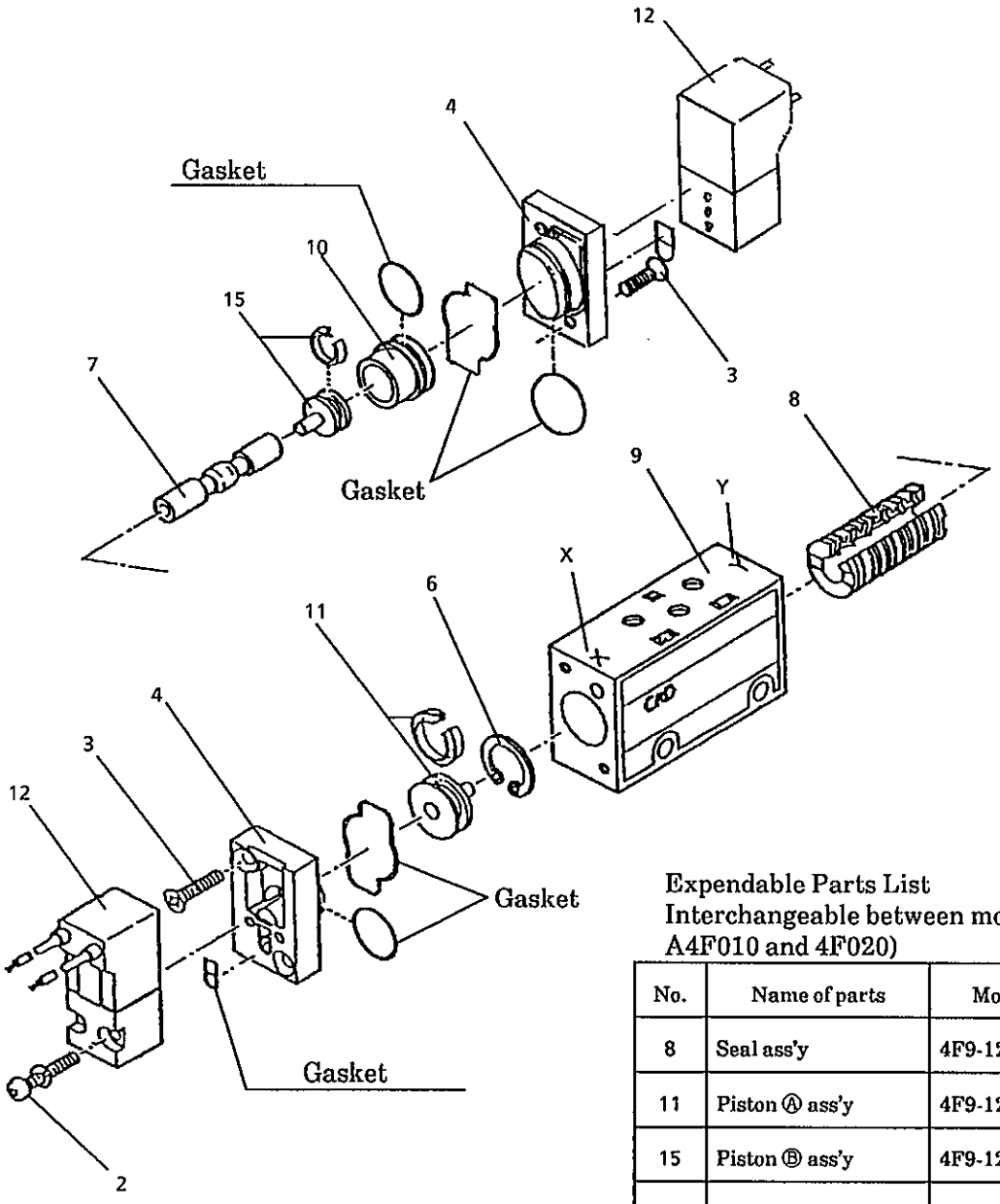
(1) Remove the mounting screws 2 to take out the solenoid 12.

(2) Remove the mounting screws 3 to take out the caps 4.

(3) Pull out piston ass'y 15 first and cylinder 10 out of Y side of body.

(4) Pull out piston ass'y 11 then remove C type snap ring 6 away from X side of valve body.

(5) Insert cylinder ass'y 11 back to the bore of X end of the valve body then push it through the bore all the way out to Y end. Components of internal structure such as spool 7 and seal ass'y 8, then, come out of the valve body.



Expendable Parts List
Interchangeable between models
A4F010 and 4F020)

No.	Name of parts	Model code
8	Seal ass'y	4F9-126
11	Piston Ⓐ ass'y	4F9-124
15	Piston Ⓑ ass'y	4F9-125
12	Pilot solenoid valve	4F9-P5132M□□

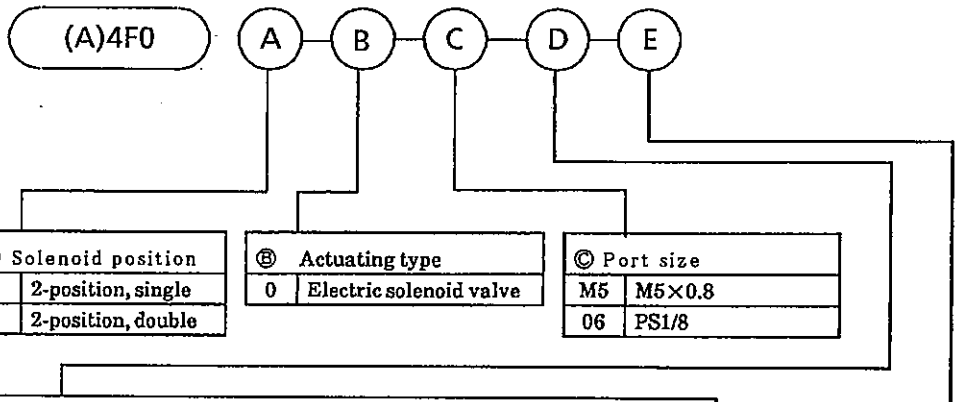
4) Assembling of Model 4F020

(1) When ready to start assembling, be sure to wipe off the dust from the surface of piston ass'y 11 & 15, spool 7 and seal ass'y at where only least amount of dust is expected and apply grease of litium list, alkali base.

(2) Insert seal component one at a time into the bore of valve body to assemble the seal ass'y. Assuming the S port as an assembly center of the seal ass'y, carefully watch the direction of lip and inserting order of each seal.

(3) Assemble back other structural components in the reversed sequence of disassembling.

6. MODEL CODING



Ⓐ Solenoid position	
1	2-position, single
2	2-position, double

Ⓑ Actuating type	
0	Electric solenoid valve

© Port size	
M5	M5×0.8
06	PS1/8

Ⓓ Option		
Manual control	Non-marking	Non-locking type
	M1	Locking type
	M4	Non-locking type w/dust cover
	M6	Non-locking type, upright
	R	Manual, position change
Electric signal	Non-marking	Grommet lead wire
	B	Small DIN type terminal box, Without indicator light
	L	Small DIN type terminal box, With indicator light
	C type connector	
	C	Lead wire length (300 mm)
	C1	No lead wire
	C2	Lead wire length (300 mm) surge absorber and lamp provided
	C3	No lead wire surge absorber and lamp provided
	D type connector	
	D	Lead wire length (300 mm)
	D1	No lead wire
	D2	Lead wire length (300 mm) surge absorber and lamp provided
	D3	No lead wire surge absorber and lamp provided
Others	P'	Mounting bracket, single item
	P1	Mounting bracket, single item
	S	Surge absorber attached
	N	Accompanying plug bolt (When intending to use valve as 3-way directional valve)

Ⓔ Rated voltage		
AC100V	100 VAC 50/60Hz	Standard
AC200V	200 VAC 50/60Hz	
DC12V	12 VDC (Standard for 4F0.1)	Optional
DC24V	24 VDC (Standard for 4F0.1)	
DC48V	48 VDC	

Note: Solenoid coil for AC100V and AC200V are serviceable with AC110V and AC220V 60Hz respectively.