CKD

SM-3550-A

INSTRUCTION MANUAL

MICROSOL

P 5122 · 5126 · 5132 · 5136
M5122 · 5126 · 5132 · 5136
B 5122 · 5126 · 5132 · 5136

- 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 instruction 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

Microsol

P51□□ · M51□□ · B51□□

Manual No. SM-3550-A

NOTE : Letters & figures enclosed within Gothic style bracket (examples such as [C2-4PP07] · [V2-503-B] etc.) are editorial symbols being unrelated with contents of the book.

Feb.25.1997

Revision : Aug.7.2000

1. PRODUCTS

1.1 Specifications of Unit

Item	Specifications			
Type	P M 5122 B	P M 5126 B	P M 5132 B	P M 5136 B
Media	Compressed air			
Minimum working pressure MPa	0.1			
Maximum working pressure MPa	1.0	0.6	1.0	0.6
Proof pressure MPa	1.5			
Ambient temperature ℃	−10 to 50 (No freezing)			
Media temperature ℃	5 to 50			
Lubrication	Not required (Use Turbine oil, class 1, ISO VG 32 if Lub. is preferred)			
Connecting port diam.	—			
Orifice mm	φ1.2	φ1.6	φ1.2	φ1.6
Effective Sectional Area mm²	0.62	0.76	P→B : 0.62 B→R : 0.84	P→B : 0.76 B→R : 0.84
Actuation type	Poppet			
Manual Operation Device	Non-lock type (Push type)			

- Above-mentioned response time is the figure on the non-lubricated at 0.5 MPa, and depends on the pressure and quality of lubricant.
- Pressure is converted as 1MPa = 10.1972kgf/cm² ≒ 10.2kgf/cm²

(Note 1) Ambient temperature is the room temperature while component is stored or assembled system is standing still and it differs from that of running media in operation.

1.2 Coil Specifications

Rated Voltage / Item	AC100V (50/60Hz)	AC200V (50/60Hz)	DC12V	DC24V	AC110V (50/60Hz)	AC220V (50/60Hz)
Starting current A	0.056/0.044	0.034/0.026	0.150	0.075	0.051/0.040	0.034/0.024
Holding current A	0.028/0.022	0.017/0.013			0.026/0.020	0.016/0.012
Power consumption W	1.8/1.4	2.1/1.6	1.8		1.8/1.4	2.1/1.6
Voltage Fluctuation	±10%Class B (Moulded Coil)					
Insulation Class	45°C					
Temperature Rise						

Note) AC100V, 200V (50/60Hz) are serviceable with AC110V, 220V (60Hz).

2. CAUTION

2.1 Operational cautions

1) Environmental conditions

(1) When the solenoid valve is used in the area of much dust, please attach either a silencer or elbow joint downwardly to the R (Exhaust) port to keep the R (Exhaust) port from dust.

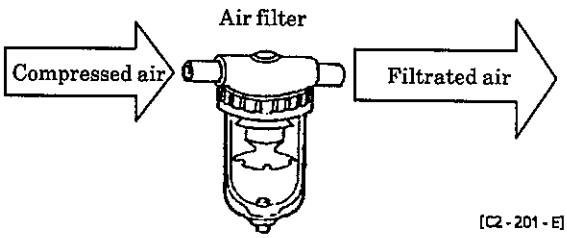
(2) Instead of leaving water or cutting coolant dripping over the solenoid, either provide a cover or install the solenoid enclosed by a box.

2) Installation auxiliary equipment

(1) Air filter

Select a filter element of 5μm or smaller.

Periodically discharge the drain out of air filter.

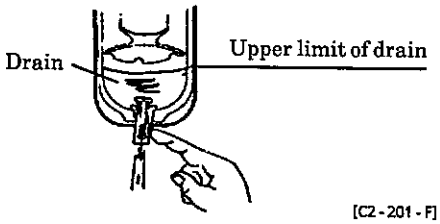


[C2-201-E]

(2) Lubricator

Microsol do not particularly require lubrication. (Use Turbine oil, Type 1, ISO VG32 (Non-additive) if and when lubrication is preferred.)

Prevent to use spindle oil or machine oil, otherwise it may cause malfunction of system due to swollen packings.



[C2-201-F]

3) Drain

Much drain (water which includes oxidized oil, tar and foreign particles) is contained within the compressed air. It destructs the reliability of pneumatic equipment remarkably. Consider the following remedies of removing such drain.

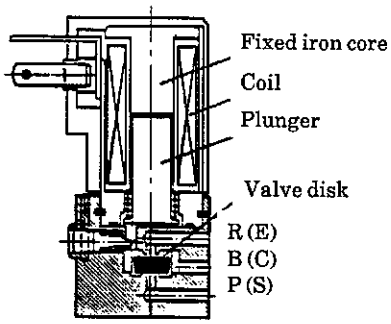
4) Improving the quality of compressed air

Dehumidifying by use of after-cooler and dryer, removing foreign particles by use of air filter and removing tarry accumulation by use of tar removal filter are effective to improve the quality of compressed air.

3. OPERATION

3.1 Function

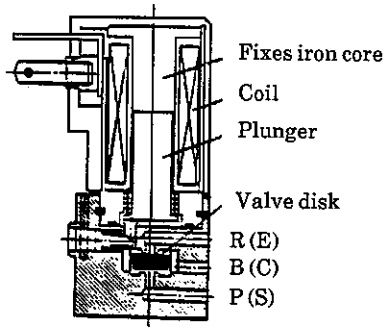
- No current



[V1-301-A]

With no current: When current is shut off, plunger separates from fixed iron fixed iron core.
Valve disk then closes due to its own weight and the force of spring.

- With current

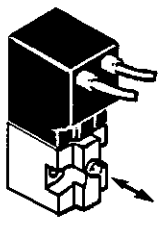


[V1-301-B]

With current: When current is charged to coil, , plunger is attracted to fixed iron core, valve disk then opens due to pressure supplied the P(S) port.

3.2 Manual operation

Manual operation is available. Make use of it in the case of test operation of power failure. Valve returns to former position as soon as pressing force is removed due to being non-lock type. Procedure is as posted below.



[V1-301-C]

Press the button with a rod of $\phi 2$ or smaller

4. INSTALLATION

4.1 Mounting procedures of Microsol

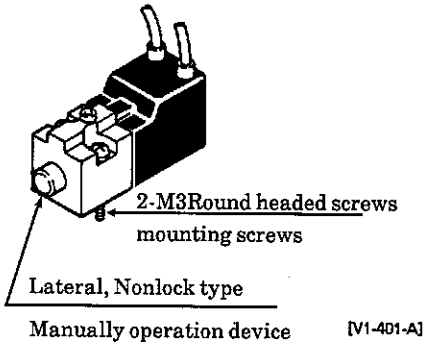
1) Mounting P type

① Make sure there is a body gasket.

② Carefully remove foreign particles out of mounting opponent surface and gasket surface.

③ Apply seal oil (Turbine oil) over body gasket surface.
Class 1, ISO VG32 (No additions)

④ Mount Microsol to opponent body making use of attached round headed cross recessed screw (2 ea. M3).

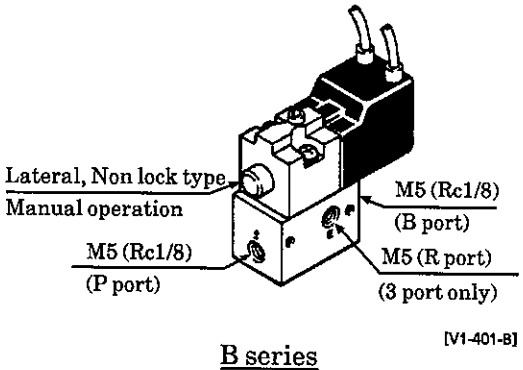


P series

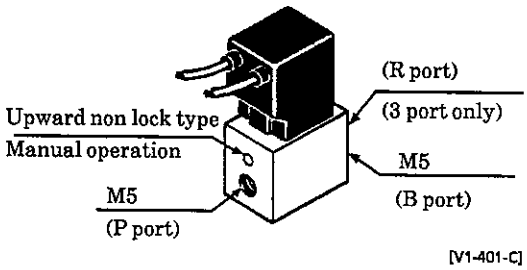
2) Mounting B, M types

① Give flushing to blow off foreign particles.

② Connect pipings using joints onto subplate or body, M5 port.



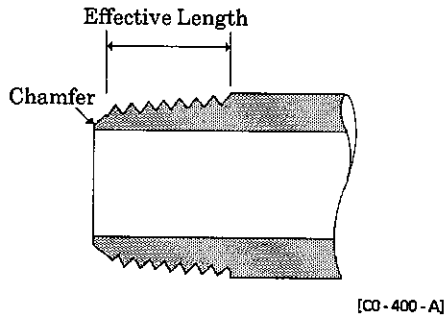
B series



M series

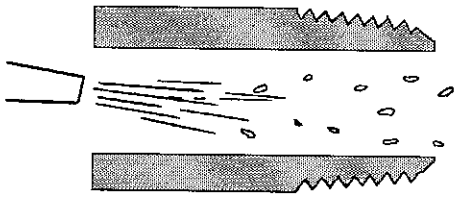
4.2 Piping

1) For piping beyond the filter, use pipes that hardly get corroded such as galvanized pipes, nylon tubes, rubber tubes, etc. (Refer to Selection Guide Table for Related Equipment.)
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. (Refer to Selection Guide Table for Related Equipment.)
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.



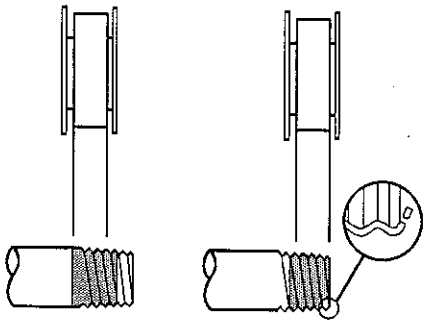
[C0-400-A]

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

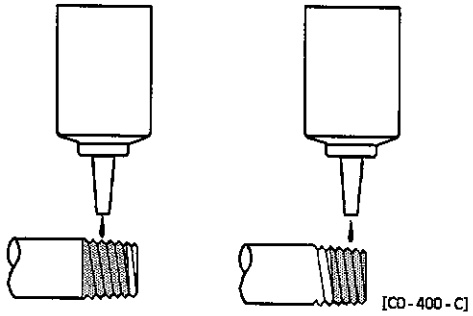

[C0-400-B]

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)



[C0-400-C]

7) Although there is no restriction as to the mounting posture of solenoid valve, it is recommendable to mount it on a flat surface and horizontally.
Avoid the using on the condition of over 5G vibration or over 30G shock because it may cause wrong operation.

4.3 Usage of manifold

1) Connect Supply port (S port) to both ends of manifold blocks and release exhaust ports to atmosphere, in the case of actuating six or more of solenoids simultaneously.
2) Ports for either Sup. (S) or Exh. (R) are provided on both sides of manifolds, and the pipings can be connected to both sides.
3) Use the pipe size corresponding to P port size of manifold. Insufficient flow or pressure may cause either wrong operation of valve or short thrust of cylinders.

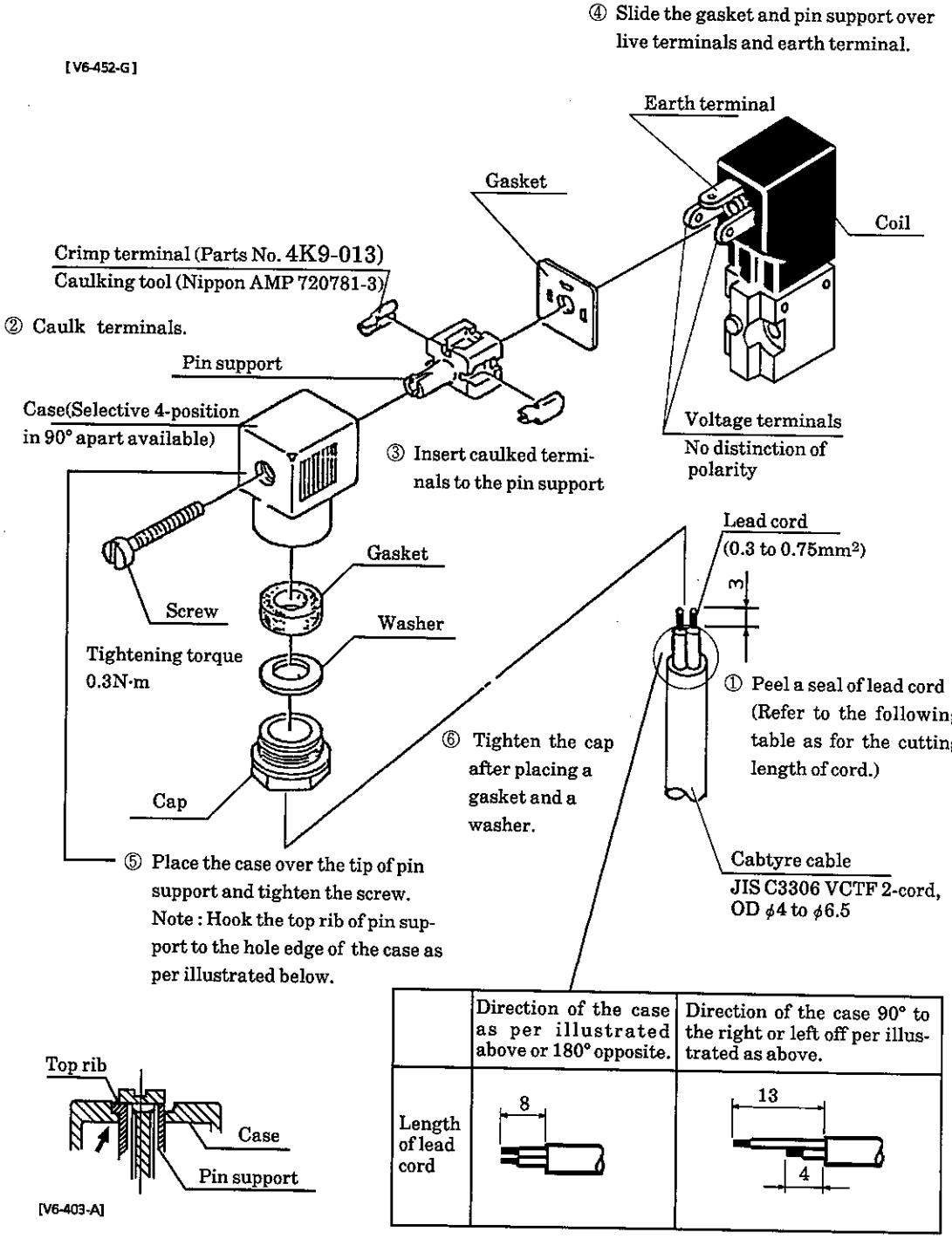
4.4 Environmental conditions

1) When the solenoid valve is used in the area of much dust, please attach either a silencer or elbow joint downwardly to the E (Exhaust) port to keep the E (Exhaust) port from dust.
2) Instead of leaving water or cutting coolant dripping over the solenoid, either provide a cover or install the solenoid enclosed by a box as it may cause short circuit or coil burning . Prevent cutting coolant drip over cylinder rod because it may cause wrong operation of solenoid valve due to penetrated coolant through cylinder.
3) Prevent to install the valve within the corrosive gas such as sulfurous acid gas.

4.5 Electric wiring

1) Connection to small terminal box

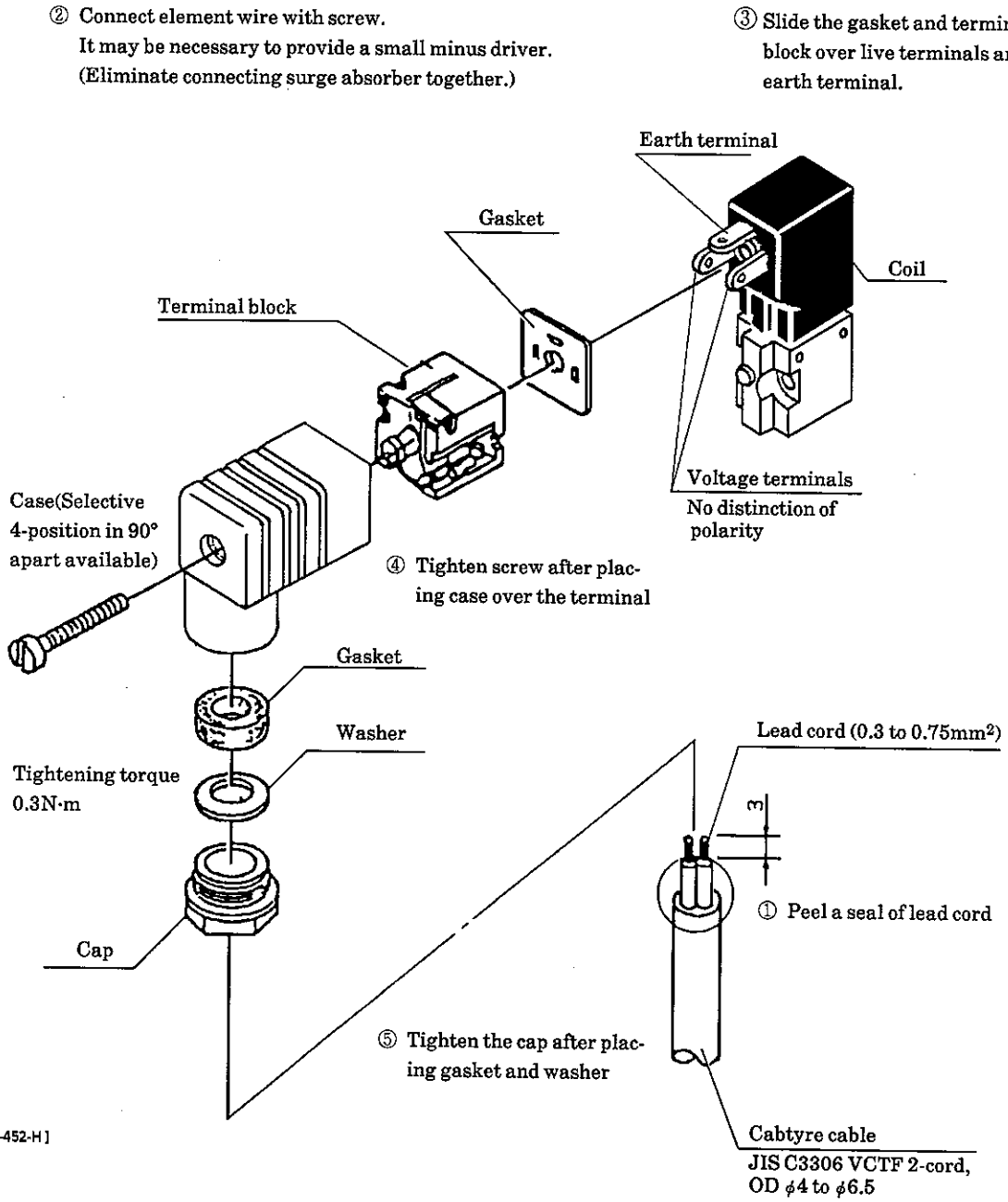
Wire the small terminal box Ⓑ in the sequence of ① to ⑥ referring to the following illustration.



	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	8	13 4

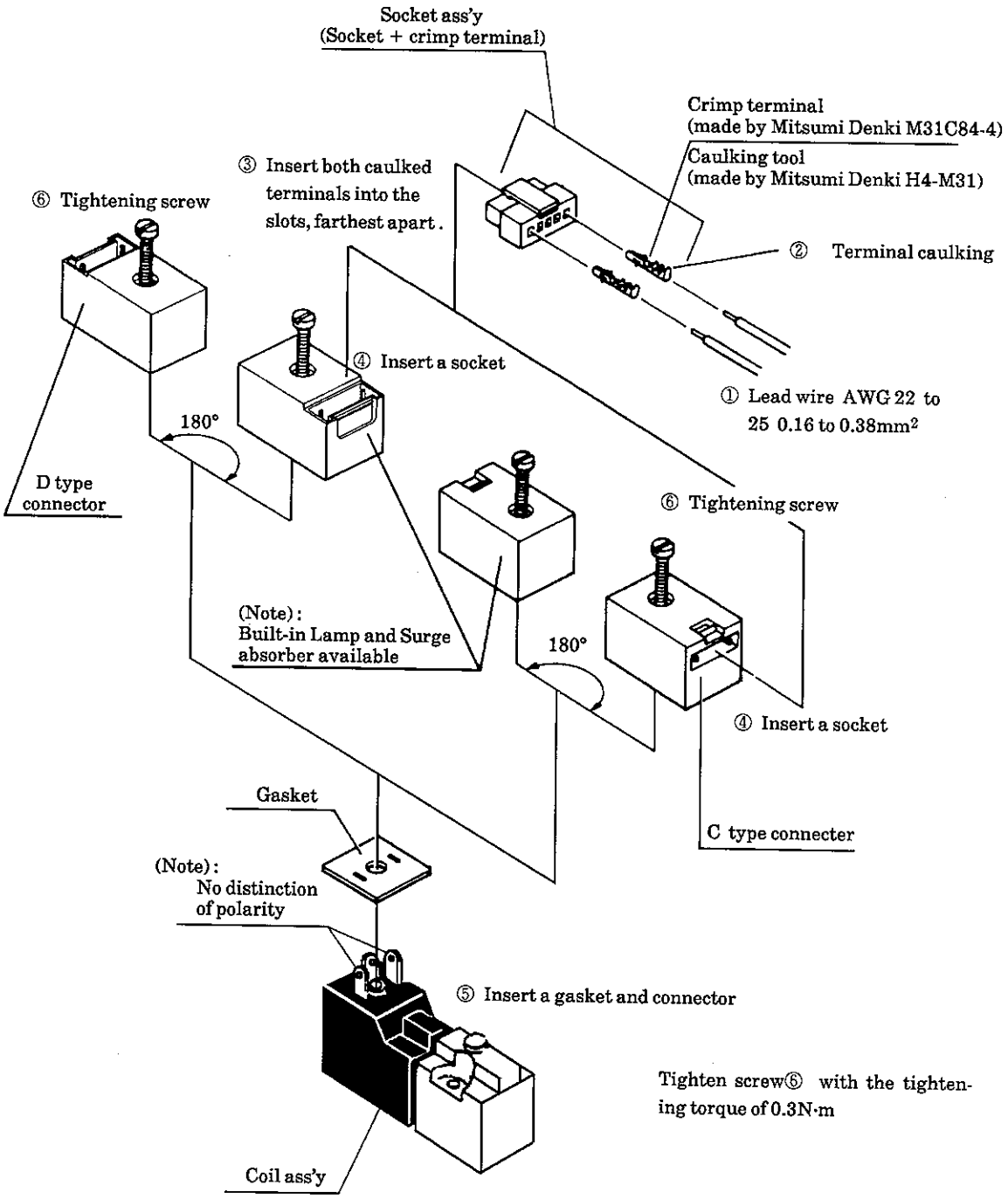
2) Wiring to the small terminal box with Lamp (L · LS)

Wire the small terminal box L · LS in the sequence of ① to ⑤ referring to the following illustration.



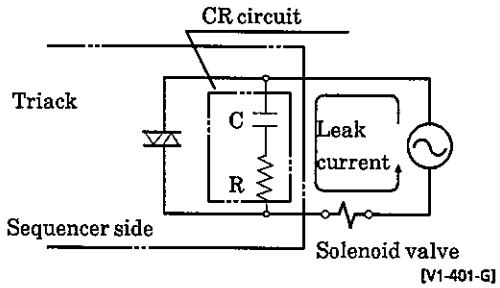
3) Wiring the connector Model C and Model D

Wire either connecter in the sequence of ① to ⑥ referring the following illustration.



4) Restriction of current leak

Pay enough cautional consideration over bad effect to unit due to leak current through CR element in case of using sequencer to protect switching element by absorbing surge voltage with CR circuit.



Keep the residual leak current within the following limitations.

AC200V	Below 1.5mA
AC100V	Below 3mA
DC	Below 1.8mA

5. MAINTENANCE

5.1 Periodic Inspection

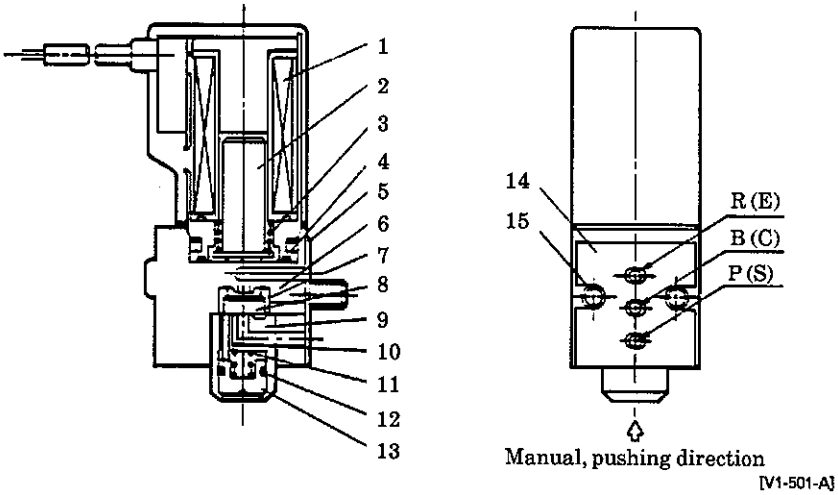
1) Conduct periodic inspection(s) once or twice per annum for the best service condition of solenoid valves.
2) Items to inspect
   (a) Inspect for dust or foreign particle and high viscosity substitute within valve. Clean valve if their existence is realized.
   (b) Principally eliminate trying to disassemble neither coil nor pilot valve.

5.2 Trouble Shooting

Motion troubles	Suspected cause	Remedies
Does not actuate	No electric signals	Turn on the power
	Damage to signal wiring system	Repair the control circuit
	Excessive fluctuating range of current or voltage	Reaffirm the power capacity. (within ±10% of voltage fluctuation)
Malfunctions	Excessive leaking current	Correct control circuit and / or set a bleed circuit
	Chattering	Inspect switching system and / or tighten each loosen terminal screw
	Voltage deviates than specified on the name plate	Rectify the voltage to meet the specification
	Damaged or short circuited coil	Replace the coil
	Erroneous shut off pressure source	Turn on the pressure source
	Insufficient pressure	Reset the pressure reducer valve or install a pressure raising valve
	Insufficient flow of fluid	Rectify the size of pipe or install a surge tank
	Pressure supplied through exhaust port	Change the piping to supply port (P port)
	Erroneous piping, erroneous omitting some piping	Rectify the piping system
	Speed control valve completely closed by error	Reset the needle valve
	Valve is frozen	Add remedies of avoiding freezing (Heating system or dehumidifying system etc.)
	Delayed return of a plunger (Excessive oil, existence of tar)	Check the quality of the lubricant (Turbine oil type 1, ISO VG 32)
	〃	Rectify the quantity of lubricant drip
	〃	Install a tar removing filter
	Clogged-up exhausting port with dust	Install a cover or silencer and clean it regularly
High actuating pressure is required	Bulged or decomposed packings	Check the quality of the lubricant. (Turbine oil type 1, ISO VG32)
	〃	Relocate the valves away from splashing area of cutting coolant
	〃	Keep organic chemicals away from valves.
	Foreign particles cut into packing lips	Remove the foreign particle away from the packing
Malfunctions when manifold is used	Delayed response when multiple blocks are used	Install Sup.(P) piping to P ports on both sides of manifold block
	〃	Connect Exh.(R) piping to R ports on both sides of manifold block so as to exhaust to air through
	Adjacent cylinder pops out (3-way, single acting cylinder)	Rewire to have the solenoid valve in question is actuated prior to others sequentially. Install a locking system to the cylinder

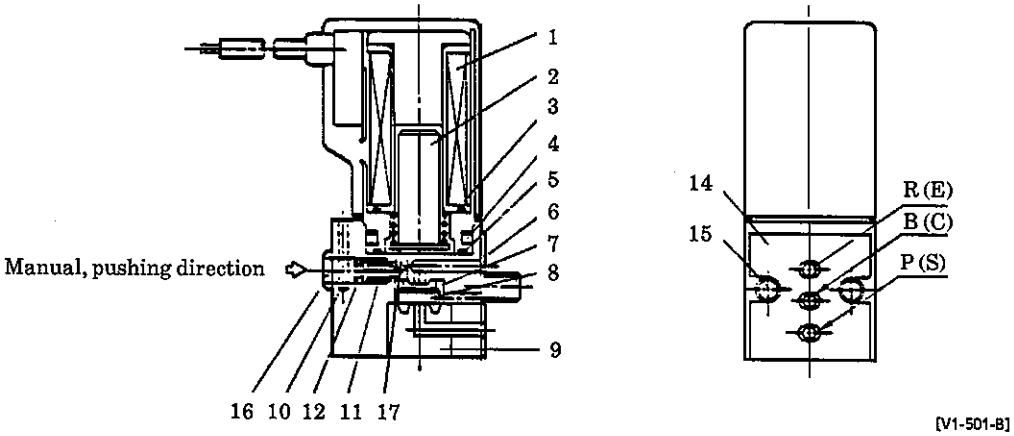
5.3 Internal, structure and Component parts list

1) Manual operation device , lateral (MO)



[V1-501-A]

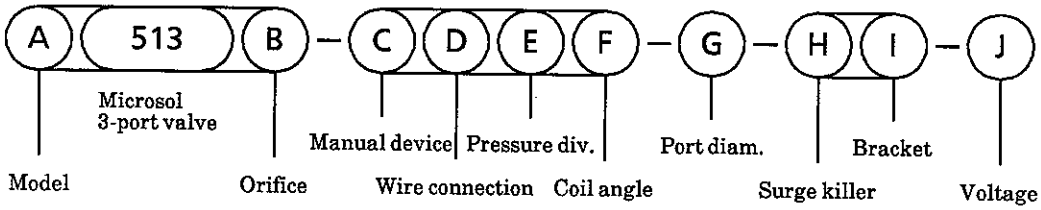
2) Manual operation device Upward (M6)



[V1-501-B]

No.	Parts	Material	Remarks
1	Actuator ass'y	———	
2	Plunger	SUS405	
3	Plunger spring	SUS304	
4	Wave pin	SWP	Black oxide finish
5	O ring	FKM	
6	body	ZDC	Chromate
7	Metal disk	SUS304	
8	Valve disk	NBR	
9	Bottom seat	C3604	
10	Parallel pin	SUS303	
11	Manually operate spring	SUS304	
12	O ring	FKM	
13	Push button	C3604	
14	Body gasket	High strength cork	NC 860
15	Cross recessed screw w/spring washer	SWRH, SWRM	Zinc chromate
16	Manual push shaft	PA	
17	Manual pin	PA	

6. MODEL NO. CLASSIFICATION



Ⓐ Model		Ⓑ Orifice		Ⓒ Manually operation device	
P	Pilot type	2	ϕ1.2	M0	Lateral, non lock (standard)
M	Direct type	6	ϕ1.6	M1	Lateral, lock type (option)
B	Subbase type			M4	Non locking type with dust proof coating
				M6	Upward, non lock (standard)
				N	No manual (option)

For Direct type (M) and low pressure, low vacuum (V) M0 and M1 are not available.

Ⓓ Connecting wire			Ⓔ Pressure division	
E	Grommet lead cord	Standard	No mark	Standard
B	Compact terminal box		V	zl.zpres., Vcm
C	w/C type connecter lead cord			
C1	without C type connecter lead cord	Option		
C2	w/C type connecter lead cord, Lamp & surge killer			
C3	wo/ C type conn. lead cord but Lamp & surge killer			
D	w/D type connecter lead cord			
D1	without D type connecter lead cord			
D2	w/D type connecter lead cord, Lamp & surge killer			
D3	wo/ D type conn. lead cord but Lamp & surge killer			
L	Compact terminal box w/Lamp			
L2	Compact terminal box w/Lamp and lead cord			
LS	Compact terminal box w/Lamp and surge killer			
P	Compact terminal box w/surge killer			
Q	Grommet lead cord w/surge killer			

Orifice becomes "6" when "V" is specified and serviceable to the range of L.Pres. (0 to 0.3MPa) L.vacuume (−97 to 0KPa) .Take vacuum out of port P (S) or port R (E).

Ⓕ Coil angle		Ⓖ Connecting port diam.		Ⓗ Surge killer	
No mark	std. angle	No mark	w/o piping	No mark	withpout
R	180° reversed	M5	M5 (standard)	S	Sge killer attached
		06	Rc1/8 (option)		

"R" is available for P (Pilot type) or M (direct type) only.

Spacify no marking for P (pilot type) because with no pipes. M5 only is available for M (direct type) while both M5 and M6 only are available for B (subbase).

Ⓘ Bracket		Ⓙ Voltage
No mark	without	AC100V
U	U shape bracket	AC200V
L	L shape bracket	DC12V
		DC24V
		AC110V
		AC220V

"U" is for B (subbase type), swhile"L" is for M (direct type)