Discontinue

CKD

SM-11219-A

INSTRUCTION MANUAL

SELEX VALVE
4L2-4

MANIFOLD
LMF0-T0

- 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.

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SELEX Valve 4L2-4
MANIFOLD LMF0-T0
SM-11219-A

Dec.12.1995
Revision : Sep.04.2001

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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

- Incorrect address settings of serial transmission slave stations could cause the solenoid valve and the cylinder to malfunction. Before using the product, check the set addresses of the slave stations.
- For operation of serial transmission slave stations, read the communication system operation manual carefully.
- 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.

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1. PRODUCT

1.1 Specifications

1) Selex valve 4L2-4 series

Item	Specification	
Manifold system	Manifold Block type	
Applicable Solenoid Valve	4L2-4 series	
Nos of station	2 to 10 Stations	
Manifold type	Concentrated Air supply and Exhaust	
Ambient temperature ℃	−5 to 60 (Not to be frozen)	
Range of Ambient Humidity	35 to 85%RH (Not to dew)	
Environmental Condition	No corrosive gas around	
Range of Media temperature ℃	5 to 60	
Dia. of Connecting Port	Pressure Supply port (P) Exhaust Port (R1 · R2)	Cylinder port (A · B)
	Rc 1/4	Rc 1/8、Rc 1/4

2) Solenoid Valve Specifications

Item \ Model Code / No. of Position and Port type	4L2-4				
	FG-S 2-Position Single	FG-D 2-Position Double	FHG-D 3-Position All port blocked	FJG-D 3-Position A · B · R Connection	FIG-D 3-Position P·A·B Connection
Service Media	Compressed Air				
Max. Service Pressure MPa	0.97				
Min. Service Pressure MPa	0.1		0.1 5		
Poof Pressure MPa	1.47				
Effective Sectional Area mm^2	15				
Responding Time msec	30 or shorter		60 or shorter		
Manual Control Type	Non locking type (Standard)				
Lubrication	Not required. (Use Turbine Oil, Class 1, ISO, VG32 if preferred to lubricate.)				
Actuator	Pilot (Soft Spool)				
Protective structure	IP-40				

3) Electric Specifications

Item	Specification		
Rated Voltage V	AC100V (50/60Hz)	AC200V (50/60Hz)	DC24V
Starting Current A	0.056/0.044	0.034 / 0.026	0.08
Holding Current A	0.028/0.022	0.017 / 0.013	0.08
Consumption of Electricity W	1.8/1.4	2.1 / 1.6	1.9
Others	Lamp · Surgeabsorber (Optional)		

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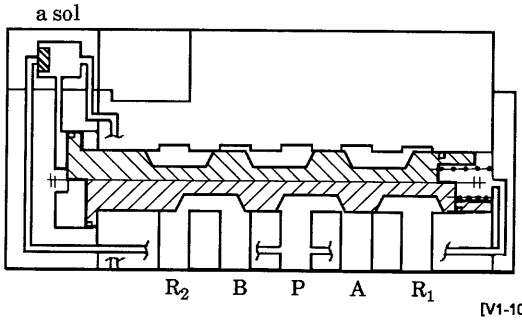
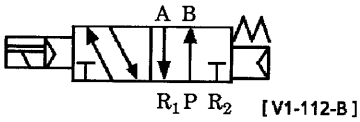
1.2 Briefing of internal structure

1) 4L2-4-FG-S



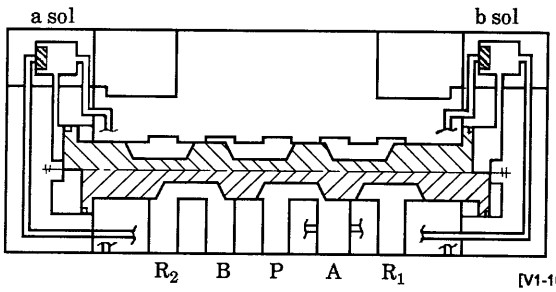
[V1-106-A]

JIS symbols

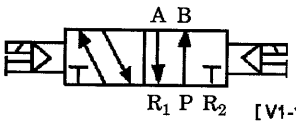


[V1-112-B]

2) 4L2-4-FG-D

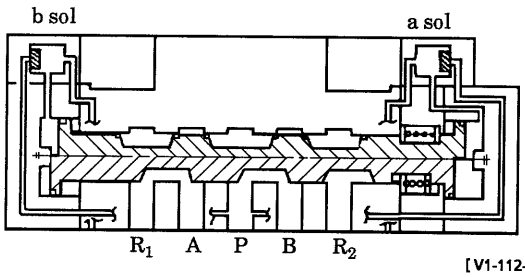


[V1-106-B]

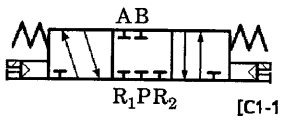


[V1-112-C]

3) 4L2-4-FHG-D

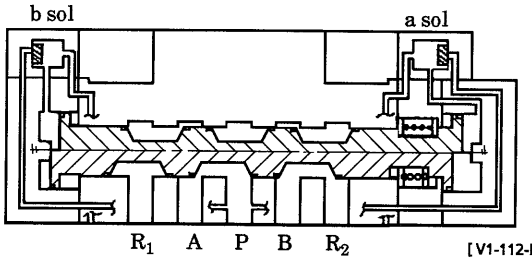


[V1-112-A]

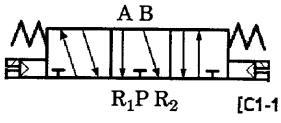


[C1-112-D]

4) 4L2-4-FJG-D

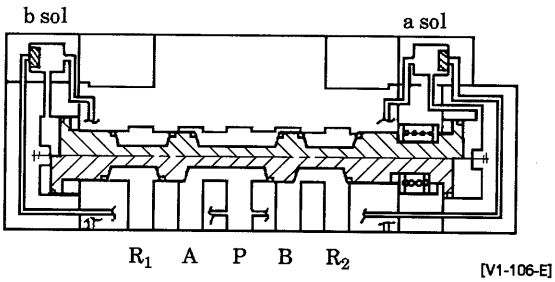


[V1-112-E]

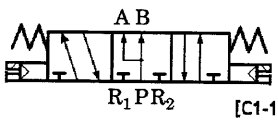


[C1-112-F]

5) 4L2-4-FIG-D



[V1-106-E]



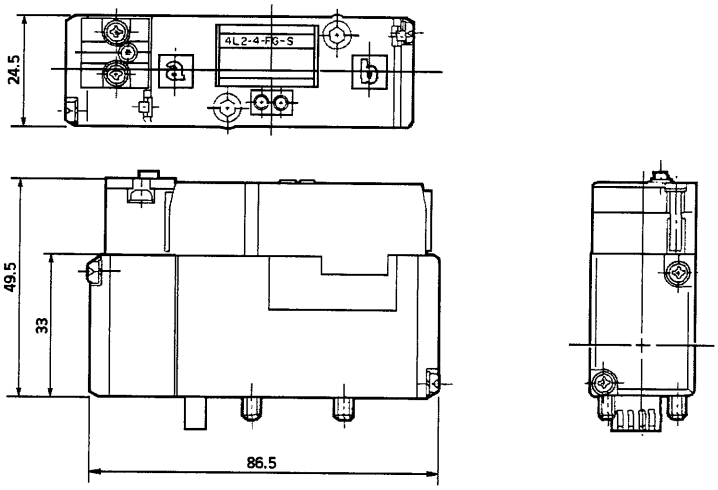
[C1-112-G]

Discontinue

1.3 Outside Dimensions

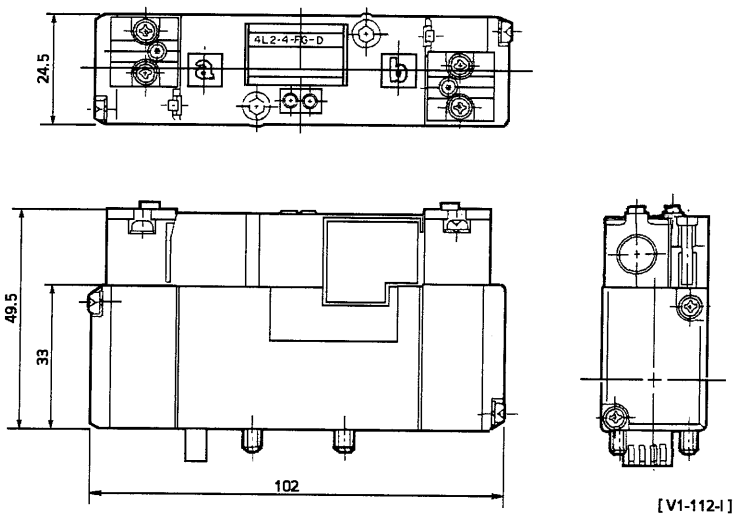
- Solenoid valve unit

4L2-4-FG-S



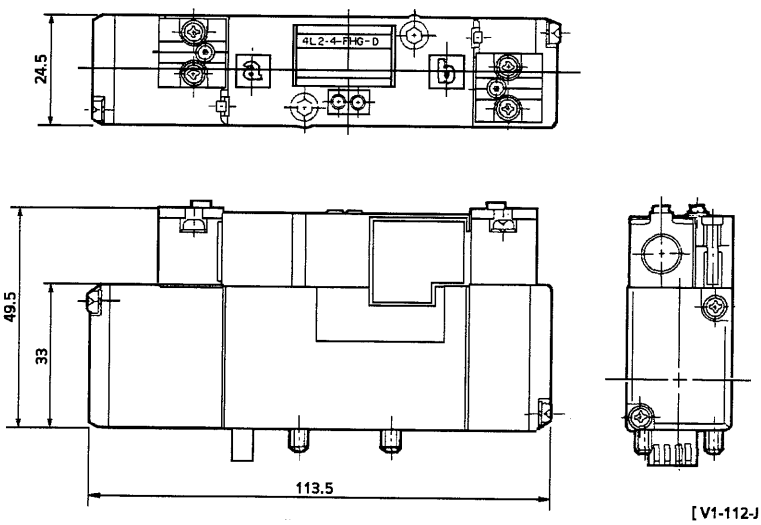
[V1-112-H]

4L2-4-FG-D



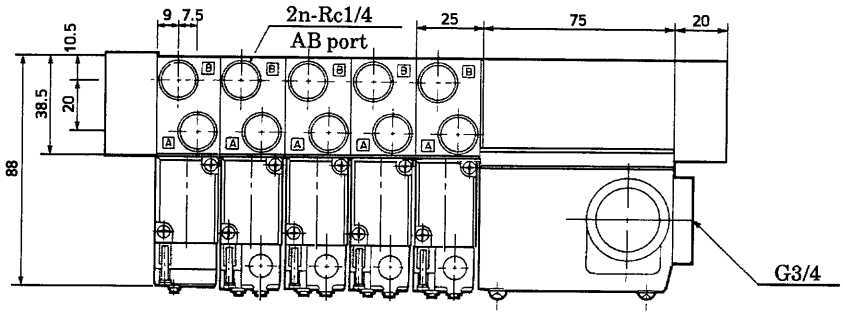
[V1-112-I]

4L2-4-FHG-D
4L2-4-FJG-D
4L2-4-FIG-D



[V1-112-J]

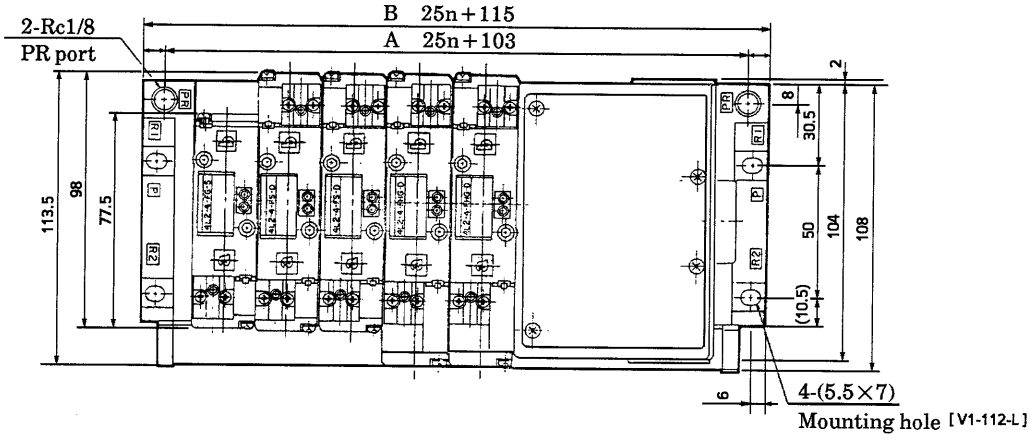
● Maniholo (Solenoid valves assembled)



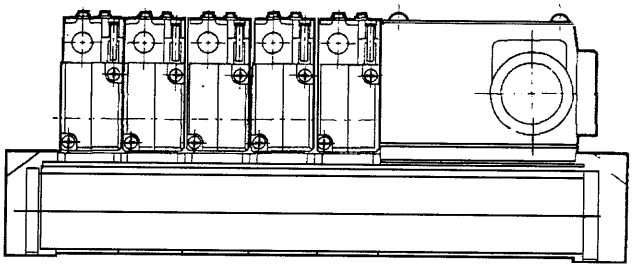
[V1-112-K]

U side (Upper surface)

ⓝ ——— ③ — ② — ① Nos. of station



[V1-112-L]

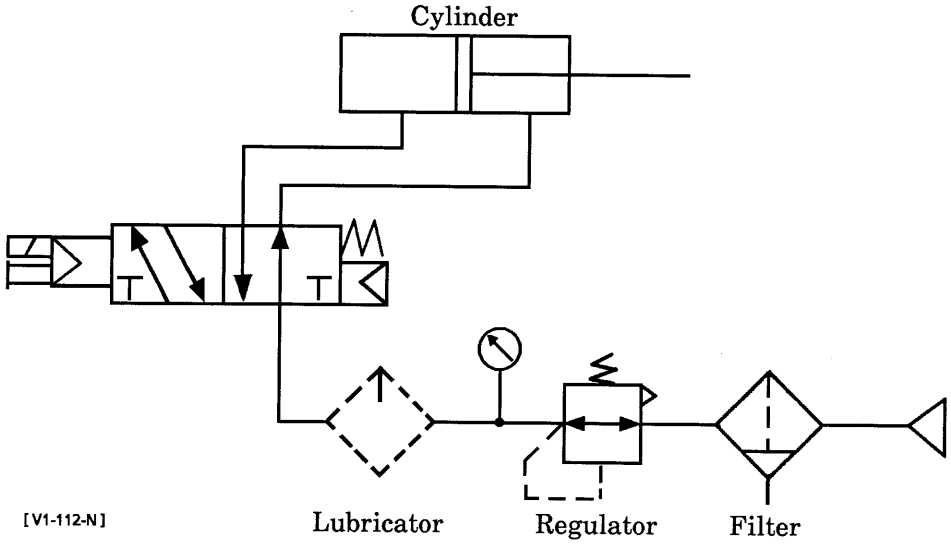


[V1-112-M]

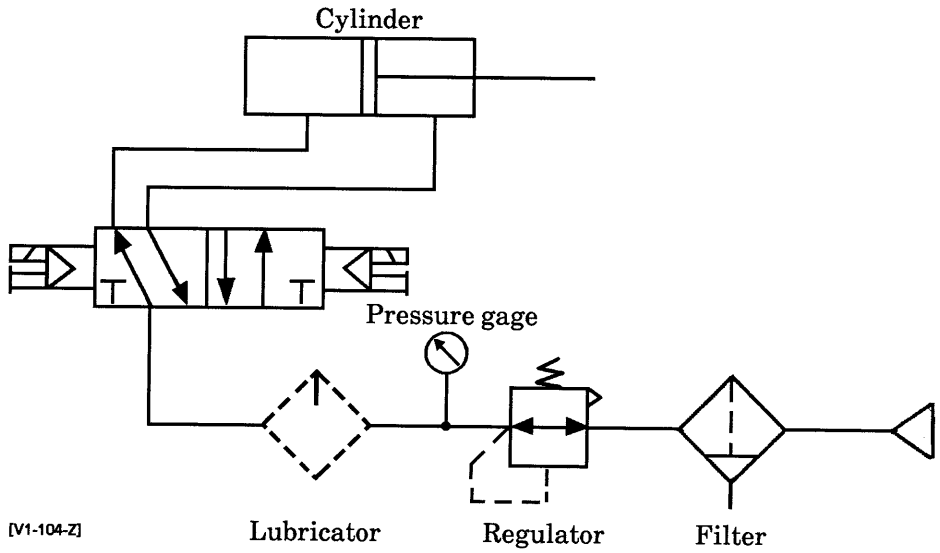
Nos. of station / Symbol	2	3	4	5	6	7	8	9	10
A	153	178	203	228	253	278	303	328	353
B	165	190	215	240	265	290	315	340	365

1.4 Fundamental circuit

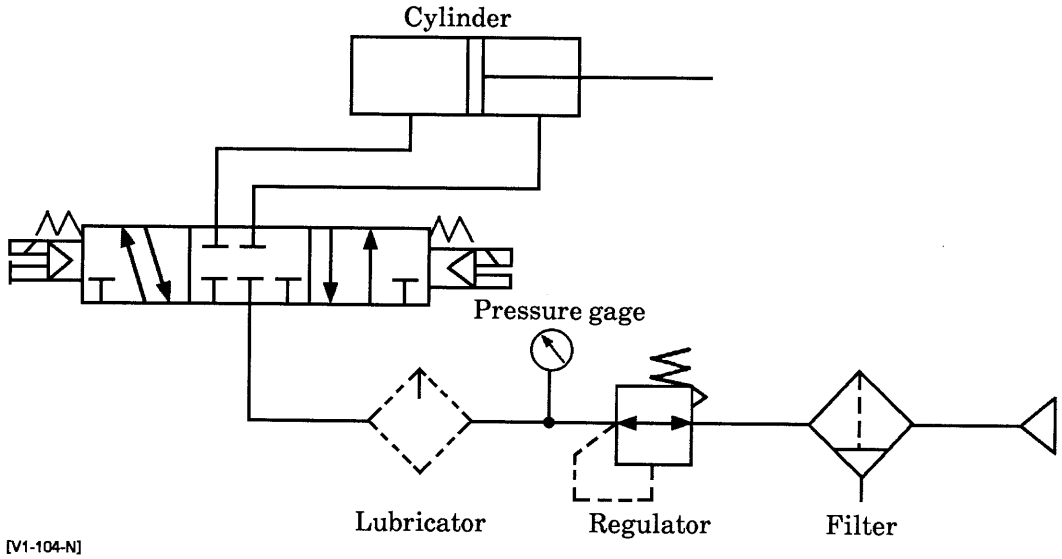
1) Single



2) Double

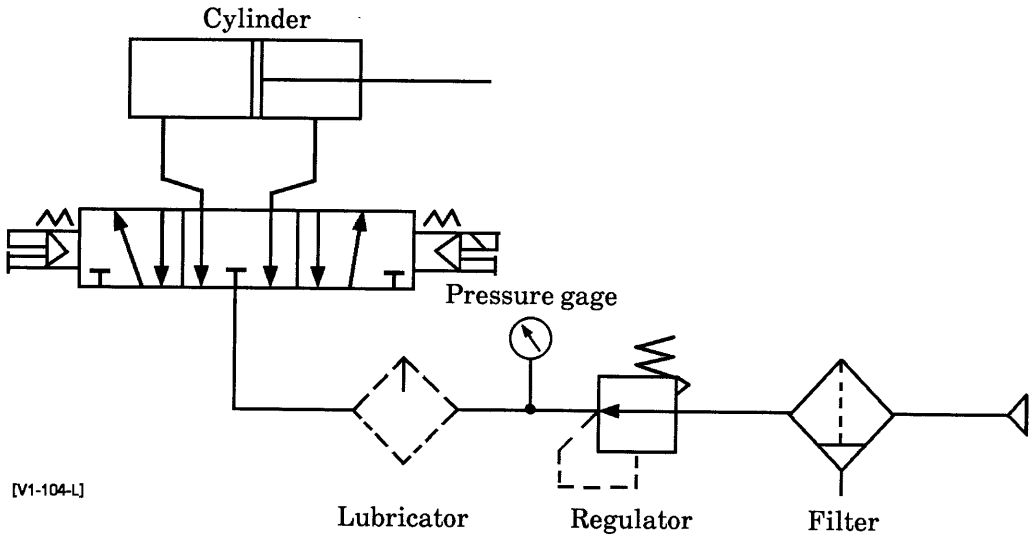


3) 3-position all port blocked



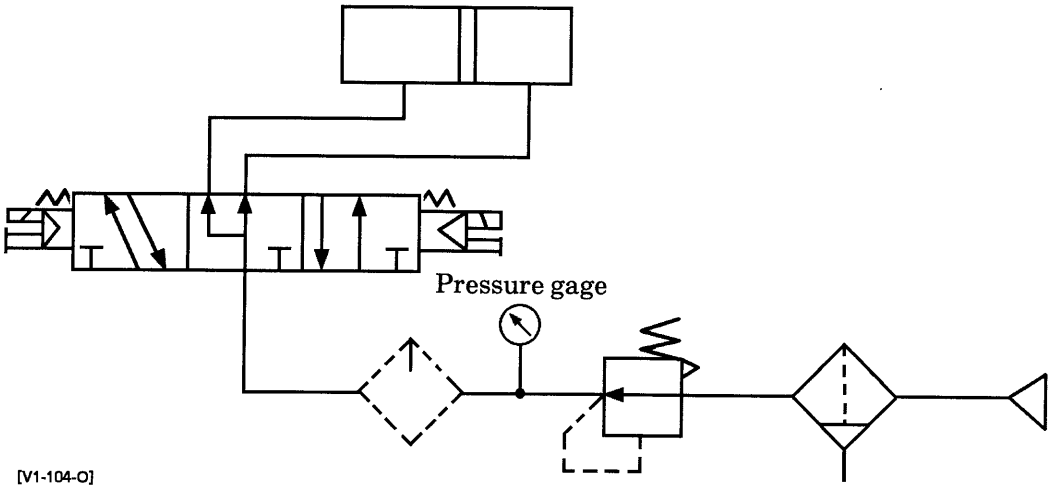
[V1-104-N]

4) 3-position ABR connection (Exhausto center)



[V1-104-L]

5) 3-position, PAB connection



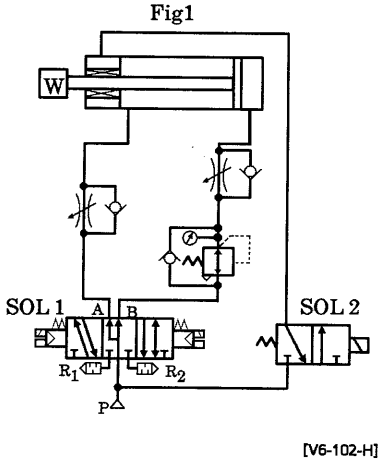
PAB connection is used for the purpose of letting eigher Rod-less cylinder or Seltop cylinder make intermediate stops.

Cirecuit diagrams for seltop cylinder application are as shown below.

(1) IN CASE OF HORIZONTAL LOAD

The lay-out per Fig.1 prevents the piston rod from popping out at the moment the brake system is released as equal pressure is delivered on both sides of piston when the cylinder motion sis stopped by shifting the solenoid valve to its neutral position.
Keep balancing by installing a regulator with a check valve to the circuit of cylinder head side.

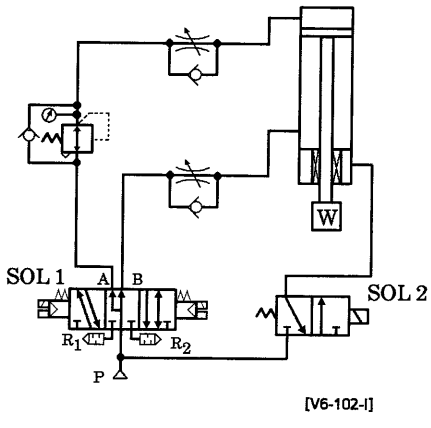
Fig1



(2) IN CASE OF DOWNWARD LOAD

When the lay-out of circuit is as shown in Fig.2, install a reducing valve with a check valve to the circuit of cylinder head side for the purpose of reducing the downward thrust of the rod and keeping a balance because the cylinder rod is apt to be suddenly pulled down due to the load at the moment the brake system is released.

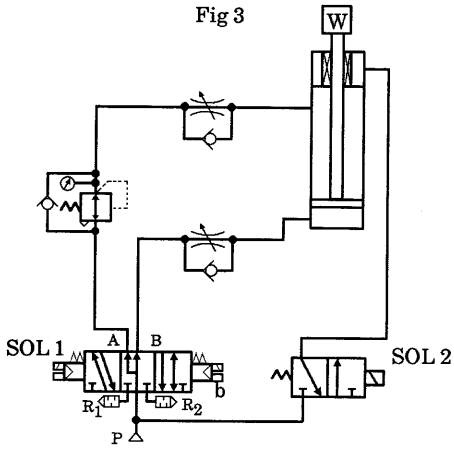
Fig 2



(3) IN CASE OF UPWARD LOAD

When the load is upward as shown in Fig.3, install a reducing valve with a check acheck valve to the circuit of piston rod side for the purpose of reducing reversed throust of the rod and keeping a balance because the cylinder rod is apt to be pushed backward due to the load at the moment the brake system is released.

Fig 3



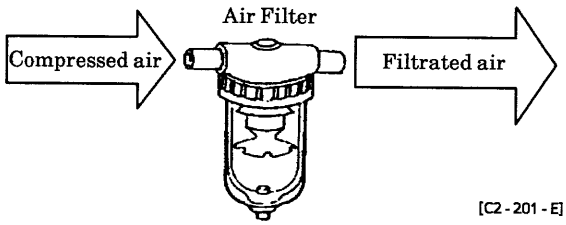
[V6-102-J]

2. CAUTION

2.1 Fluid

Use the compressed, filtrated, clean and dehumidified air. The air contaminated with humidity, hydroxide oil, tarry substance, foreign particles and drain apt to substantially reduces reliability of pneumatic equipment.

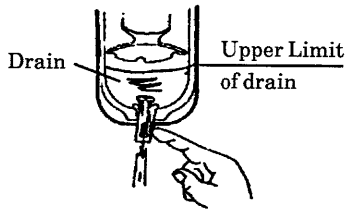
1) Carefully select a filter of an adequate filtration rate (5μm or lower preferred), flow rate and its mounting posture and location.
Drain out the accumulation of sludge in filter periodically before it exceeds specified level marking.



[C2-201-E]

2) 4L2-4 model is serviceable with non-oil operation. It is recommended, however, to use Turbine oil Grade 1, ISO VG32 if and when lubrication is required due to other equipment in system line.

3) As be sure to carry out thorough inspection and maintenance work of compressor, so as to reduce air contamination by tarry substance and / or carbon and to achieve the maximum extent of performance of pneumatic equipment.



[C2-201-F]

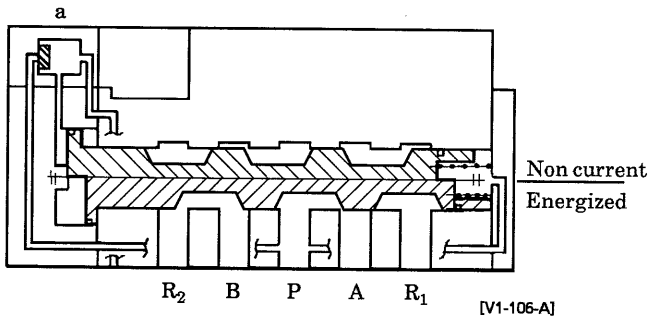
3. OPERATION

3.1 Function

1) 2-position, Single solenoid
Solenoid on = Cylinder advances (retracts)
Solenoid on = Cylinder retracts (advances)

Non-current
P →B
A →R1
R2 →Blocked

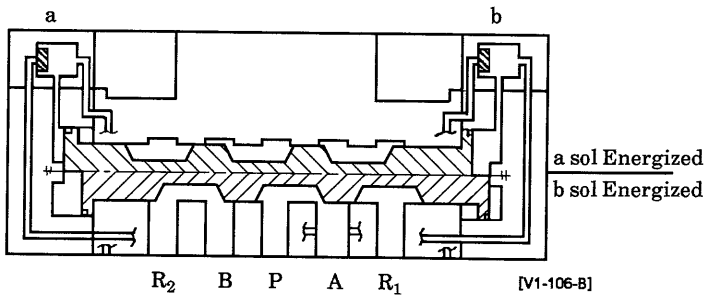
With current
P →A
B →R2
R1 →Blocked



2) 2-position, Double solenoid
One side solenoid on = Cylinder advances (retracts)
The same solenoid off = Holds present posiotion
The other solenoid on = Cylinder retracts (advances)
This concept is also used for self holding (Cylinder does not move even at the occasion of power failure.)

a solenoid on
P →A
B →R2
R1 →Blocked

b solenoid on
P →B
A →R1
R2 →Blocked



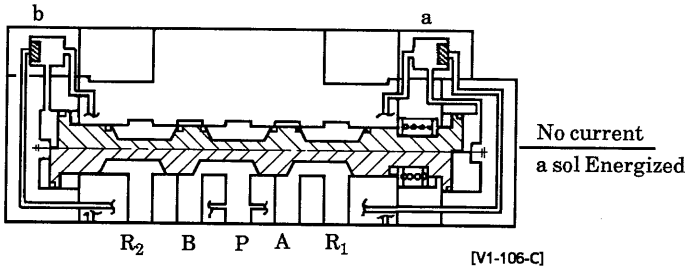
3) 3-position, All ports blocked (FHG)

Cylinder stops at intermediate positions (when off).

Once it stops, cylinder is locked and external force is unable to move the cylinder.

When both solenoids receive no signal current ;
every port such as P, A, B, R1 and R2 is blocked.

a solenoid on	b solenoid on (下図)
P → A	P → B
B → R2	A → R1
R1 → Blocked	R2 → Blocked

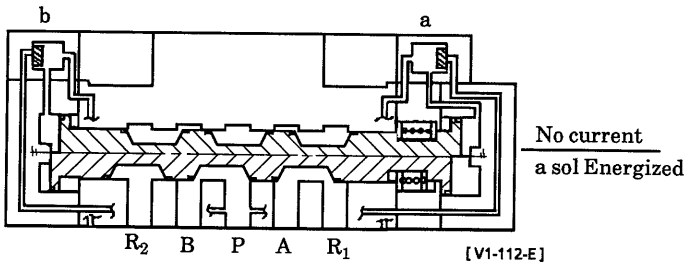


4) 3-position, ABR connection (FJG)

Cylinder stops at intermediate positions same as 3) above. But an external force is able to move the once stopped cylinder.

When both solenoids receive no signal current ;
P → Blocked
A → R1
B → R2

a solenoid on	b solenoid on (下図)
P → A	P → B
B → R2	A → R1
R1 → Blocked	R2 → Blocked



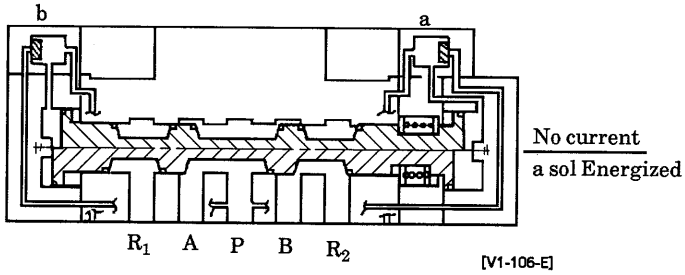
5) 3-position, PAB connection (FIG)

Cylinder stops at intermediate positions (when current is off) as same as 3) above. But the cylinder is not to stay still unless the unit pressure from both side of cylinder balances up due to individual pressurization to C1 port as well as to C2 port.

When both solenoids receive no signal current ;

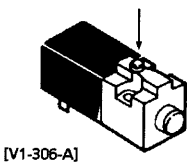
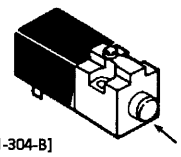
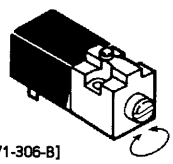
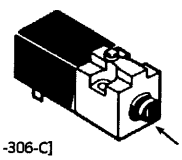
P → A · B
R1 → Blocked
R2 → Blocked

a solenoid on	b solenoid on
P → A	P → B
B → R2	A → R1
R1 → Blocked	R2 → Blocked



3.2 To operate the solenoid valve by other signal than electric

In the event that manual operation is tentatively required rather than the operation by an electric signal, push manual operation button with a rod as specified below.

Name	Upside Non locking button	Sideway Non locking button	Sideway Locking type	W/Dust Preventive Cover
Option Marking	M6	M0	M1	M4
Type	 [V1-306-A] Push Botton with a rod ϕ2 or less	 [V1-304-B] Push Botton with a rod ϕ3 or less	OFF ON  [V1-306-B] Turn it with ⊖ tip screw driver	 [V1-306-C] Push by finger

● There is no neutral position for 2-position type.

4. INSTALLATION

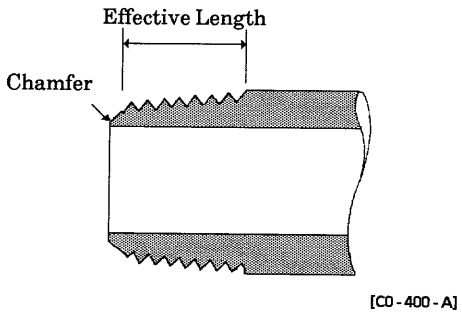
4.1 Piping

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

2) See to it that the pipe connecting cylinder and solenoid valve has effectictive sectional area needed for the cylinder to drive at specified speed. (Refer to Selection Guide Table for Related Equipment.)

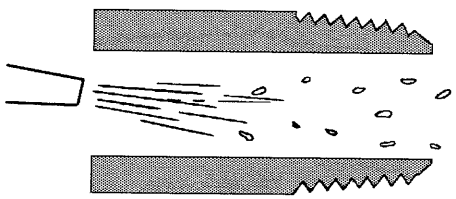
3) Install filter preferably adjacent upper-stream to solenoid valve for eliminating rust, foreign substance and drain in the pipe.

4) Strictly observe the effective thread length of gas pipe and give a chamfer of approx. 1/2 pitch from the threaded end.



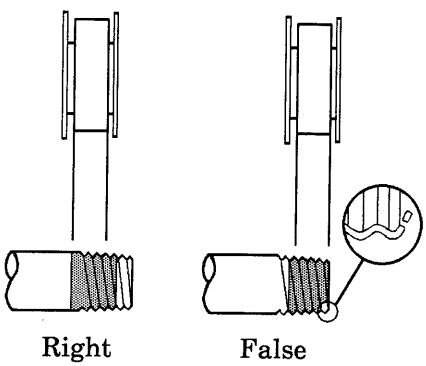
[C0-400-A]

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

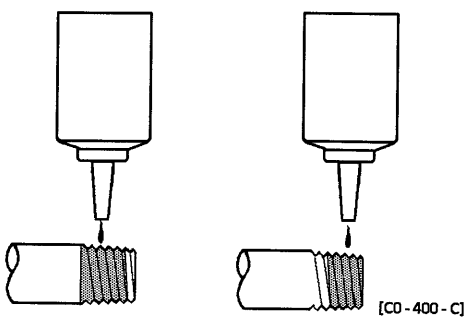

[C0-400-B]

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


Right False

● Sealant (Paste or liquid)


Right False

[C0-400-C]

7) Avoid plugging the PR port as it may cause malfunction of valve itself. Keep it open.

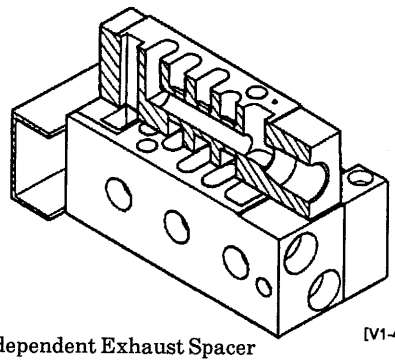
8) Installation of a filter is mandatory. Install a lubricator (Turbine oil class 1, ISO VG32) at an upper-stream location to the valve when it seems to be necessary.

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

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

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

12) It sometimes makes an adjacent cylinder pops out when driving single acting cylinders with this manifold mounted with 3-position ABR connector or alternated 3-port use, due to its back pressure. Either one of the following remedies is recommended as for preventive measure of the accidental popping out, such as independent use of this particular circuit or adopt independent exhaust type circuit of the system.



Independent Exhaust Spacer [V1-404-A]

13) Keep torque of 10N·m of less for tightening Rc 1/4 (08) port of M4LB2.

[SM-11219-A]

4.2 Wiring

LMF0 manifold is so designed as to provide simple and easy electrical connection with valve 4L2-4 to be mounted on. User is to simply mount valves on each manifold to build his own system as appropriate wirings to terminal block has been completed prior to ex-factory shipping.

1) Terminals

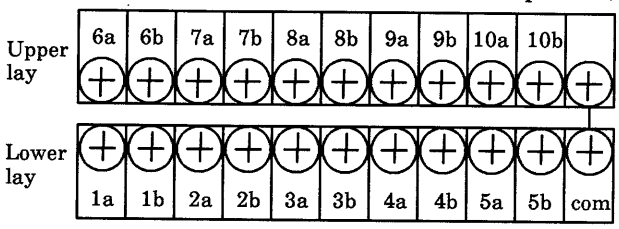
(1) Concentrated type terminal LMF0-T0

Letter either "a" or "b" is marked on respective terminals on a block to specify connection with either solenoid "a" or that of "b".

Direct current

It is unnecessary to distinguish either (+common) or (-common) to connect DC to this terminal block.

The lay-out of terminals on a block (Top View)



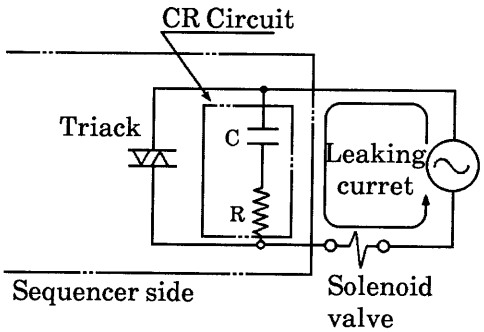
Connecting screws ; M3.5

[V1-404-B]

Use the vinyl insulated cable (600V) of sectional area 0.75 or 1.25, JISC3312. Use caulked terminal piece on each tip of wire to eliminate insufficient contact or loosening. (Example : Use within the scope of 1.25-3.7 ; 1.25-M3 ; 1.25-M4 ; ID M3.5 and OD ϕ7)

2) Control of leak current

Be extremely careful to regulate the residual leaking current within the limitation specified in the following illustration because it apt to give some undesirable effect to the function of solenoid valve due to the leaking current through the CR element, when designing to make use of the sequencer which has built-in CR circuit for absorbing surge voltage from the switching element.



[V1-302-C]

Leaking current

AC100V less than 3mA

AC200V less than 1.5mA

DC24V less than 1.8mA

4.3 Installation

1) Posture of manifold blocks at their installation

Although there is no restriction as to the mounting posture of solenoid, it is recommendable to mount it on a flat surface and horizontally.

So design that blocks at both end are mounted parallel to each other and tighten the mounting bolts with equal force.

2) Installation or dismounting the 4L2-4 model valve

Slide this type of valve, 4L2-4, right up or right down as there are electric terminals provided between solenoid body and its subplate. It may ending up with some mechanical troubles if the valve is slid diagonally.

3) Environmental conditions

Within the area of much dust or floating foreign particles, mount either silencers of elbow joints to PR and R ports keeping their open ends downward to provide protactive measurement of keeping those foreign particles from falling into either port.

Instead of leaving water dripping over the solenoid, either provide a cover or install the solenoid within a panel box.

Eliminate using it in the area of more than $50 m/s^2$ vibration or the area of more than $300 m/s^2$ shock.

4) Provide some anti-freezing measures of solenoid valves

When those are installed within an open air circuit provide some remedies to prevent some undesirable malfunction of the valves due to freezing during winter season. (Such as draining out at the end of day's work or use dehumidified air)

5. MAINTENANCE

5.1 Disassembling

1) 2-position, Single

Carefully line up the disassembled components particularly from Spool ass'y 26 and Pilot valve body 21 because such structural members have specific position and direction of overall assembly.

(1) Disassembling the valve

① Straighten up the hook nail in the longitudinal end of it to take the Body cover 12 away from the coil connector.

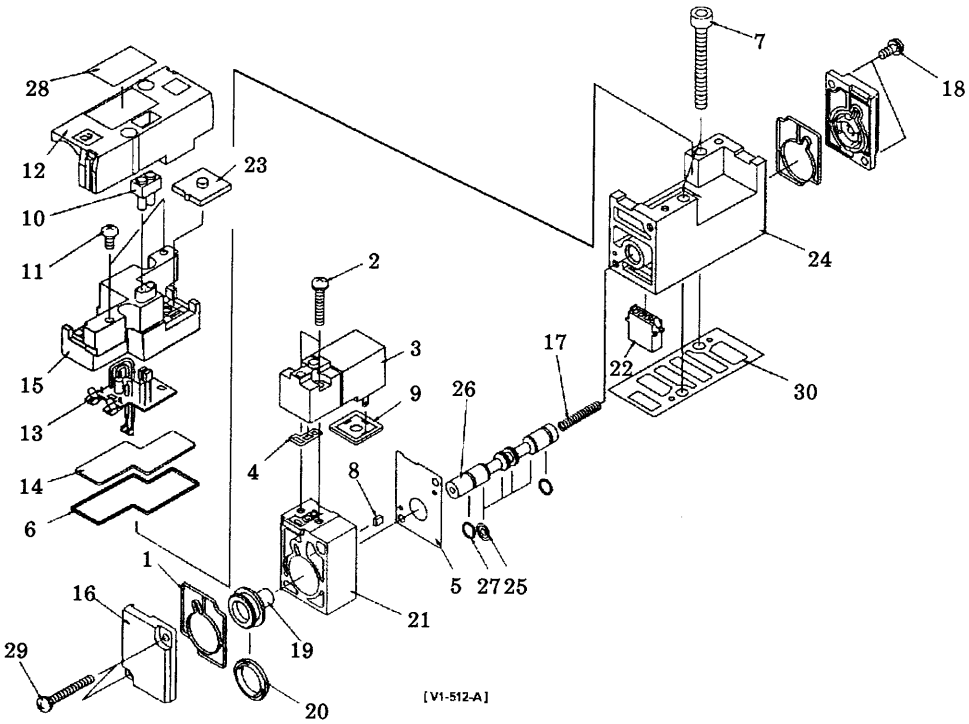
② Remove mounting screws 2 to take out the microsol 3.

③ Remove mounting screw 11 to take out the Coil connecter 15.

④ Remove mounting screws 18 & 29 to take out caps 16 from both ends. At this time, the internal structural members come out of the Body 24. The Pilot valve body 21 also comes out while keeping the Piston 19 inside of it.

⑤ Push Spool 26 out of the Valve body 24.

(2) When ready to start assembling, be sure, to wipe off the surface of spool, piston, interior surface of spool packing etc at where only least amount of dust is expected. Apply a thin film of lithium soda base grease over sliding parts for the best operational condition of unit.



1	Cap gasket	16	Cap
2	Cross Recessed screw	17	Spring
3	Microsol	18	Cross recessed screw
4	Microsol gasket	19	Piston
5	Gasket	20	MY packing
6	Connecter housing gasket	21	Pilot valve body
7	Socket headed bolt	22	Receptacle housing
8	Pilot filter	23	Plug
9	Terminal gasket	24	Body
10	Lamp guide	25	Spool packing
11	Cross Recessed screw	26	Spool (2-position)
12	Body cover (for single)	27	Spool O ring
13	Coil connecter ass'y	28	Product name plate
14	Body cover plate	29	Cross recessed screw
15	Coil connecter housing	30	Body gasket

2) 2-position, Double

Carefully line up the disassembled components particularly from Spool ass'y 19 and Valve body because such structural members have specific position and direction of overall assembly.

(1) Disassembling the valve

① Straighten up the hook nail in the longitudinal end of it to take the Body cover 1 away from the coil connector.

② Remove mounting screws 13 to take out the microsol 11.

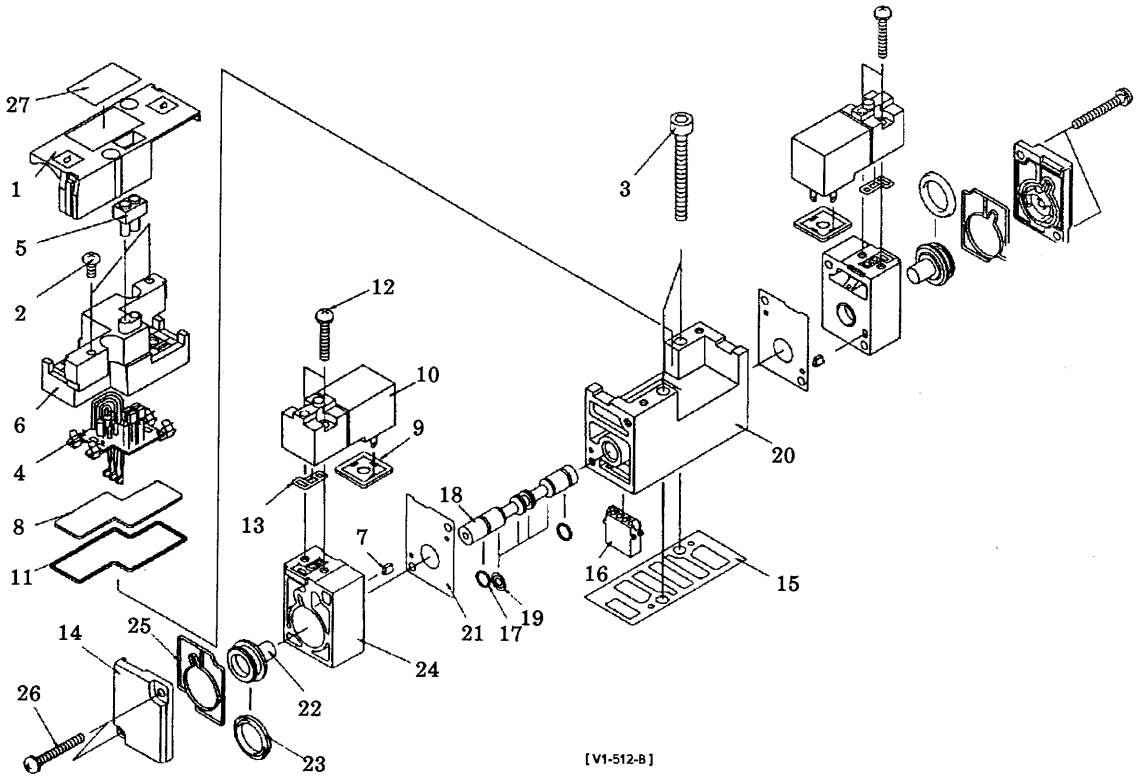
③ Remove mounting screw 2 to take out the Coil connecter 7.

④ Remove mounting screws 27 to take out caps 15 from both ends. At this time, the internal structural members come out of the body 21. The pilot valve body 25 also comes out while keeping the Piston 23 inside of it.

⑤ Push Spool 19 out of the Valve body 21.

(2) When ready to start assembling, be sure, to wipe off the surface of spool, piston, interior surface of spool packing etc at where only least amount of dust is expected. Apply a thin film of lithium soda base grease over sliding parts for the best operational condition of unit.

Discontinue



1	Body cover (for Double)	15	Body gasket
2	Cross recessed screw	16	Receptacle housing
3	Socket headed bolt	17	Spool O ring
4	Coil connecter ass'y	18	Spool
5	Lamp guide	19	Spool packing
6	Coil connecter housing	20	Body
7	Pilot filter	21	Gasket
8	Body cover plate	22	Piston
9	Terminal gasket	23	MY packing
10	Microsol	24	Pilot valve body
11	Coil connecter housing gasket	25	Cape gasket
12	Cross recessed screw	26	Cross recessed screw
13	Microsol gasket	27	Product name plate
14	Cap		

3) 3-position

Carefully line up the disassembled components particularly from Spool ass'y 21 and from Pilot valve body (for 3-position) 27 because such structural members have specific position and direction of overall assembly.

(1) Disassembling the valve

① Straighten up the hook nail in the longitudinal end of it to take the Body cover 2 away from the coil connector.

② Remove mounting screws 14 to take out the microsol 12.

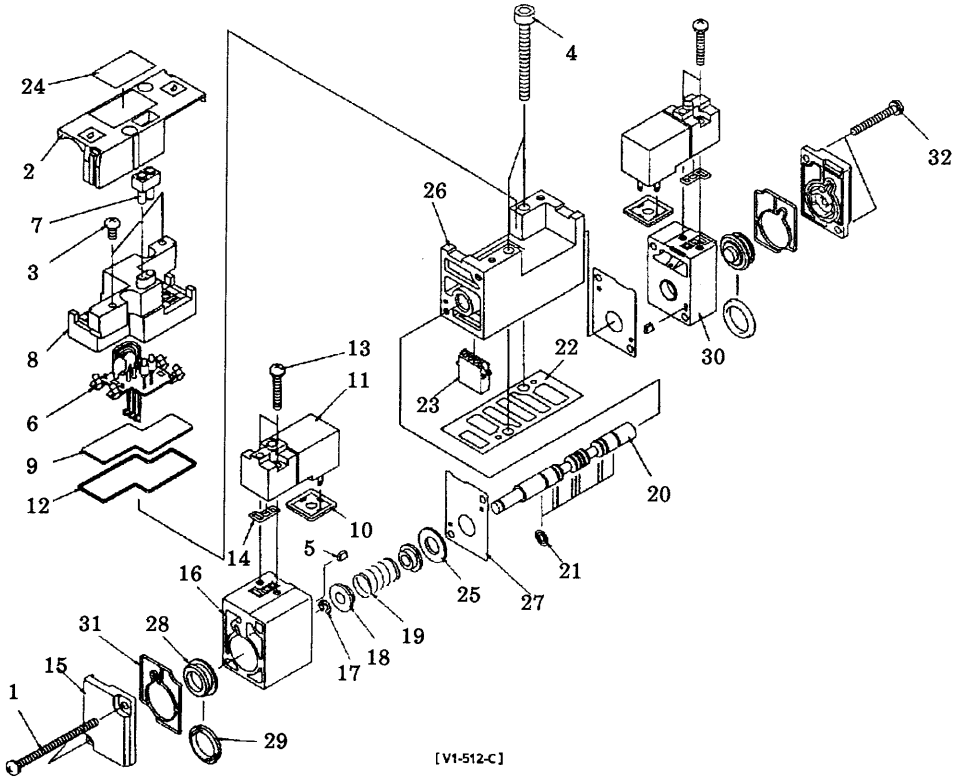
③ Remove mounting screw 3 to take out the Connecter Housing 8.

④ Remove mounting screws 1 & 33 to take out caps 16 from both ends. At this time, the internal structural members come out of the Body 27. The pilot valve body 17 & 31 also come out while keeping the Pistons 29 inside of them.

⑤ Push Spool 21 out of the Valve body from whichever the end where spring is not exists.

(2) When ready to start assembling, be sure, to wipe off the surface of spool, piston, interior surface of spool packing etc at where only least amount of dust is expected. Apply a thin film of lithium soda base grease over sliding parts for the best operational condition of unit.

Discontinue



1	Cross recessed screw	17	E shaped snap ring
2	Body cover (for Double)	18	Spring seat
3	Cross recessed screw	19	Spring
4	Socket headed bolt	20	Spool
5	Pilot filter	21	Spool packing
6	Coil connecter ass'y	22	Body gasket
7	Lamp guide	23	Receptacle housing
8	Connecter housing	24	Product name plate
9	Body cover plate	25	Spacer
10	Terminal gasket	26	Body
11	Microsol	27	Gasket
12	Connecter housing gasket	28	Piston
13	Cross recessed screw	29	MY packing
14	Microsol gasket	30	Pilot valve body
15	Cap	31	Cape gasket
16	Pilot body (3-position)	32	Cross recessed screw

4) LMF0-T0 (Concentrated terminal)

(1) Disassembling

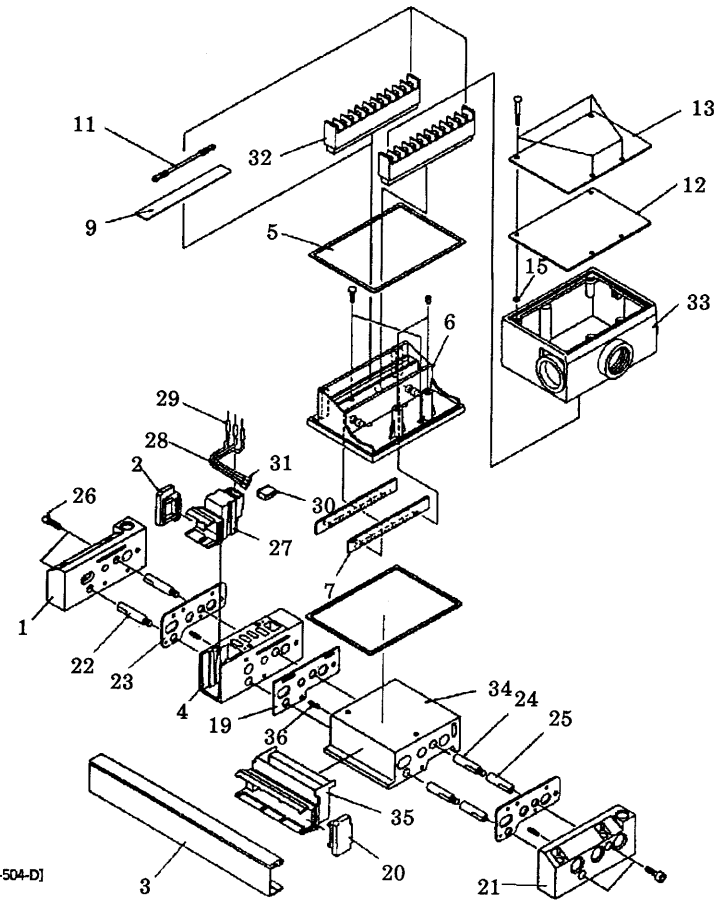
Wiring in relation with the number of blocks to be used and sequential order is completed in advance correspondingly with the sequential order on terminal box base board 7. Carefully insert wire terminal to the reight position to eliminate malfunction of valve.

① To dismount the wiring cover 3, insert the minus tip of a screw driver in a gap between wiring cover and subplate 4 and give a little twist.

② In case dismantling each block apart, remove the Bolt 26 off the tie rod and pull each block out of tie rod.

(2) Assembling

Gather lead cords 28, 29, 30 and 31 from each block should be inserted to respective terminal plate on a terminal box base board 7 correspondingly to each valve block number.



1	Subend L	22	Tie rod L
2	Pin contact housing end L	23	Manifold gasket
3	Wiring cover	24	Tie rod M
4	Subplate	25	Tie rod R
5	Terminal box gasket	26	Socket headed bolt
6	Terminal box plate	27	Pin contact housing
7	Terminal box base plate	28	Flate cable
9	Dust cover (for 1 block 5 blocks)	29	Pin contact
11	Lead cord	30	Housing
12	Insulation gasket	31	Contact
13	Terminal box lid	32	Terminal block
15	O ring	33	Terminal box cover
19	Manifold gasket	34	Terminal box bottom base
20	Pin contact housing end R	35	Terminal box bottom frame
21	Sub end R	36	Spring pin

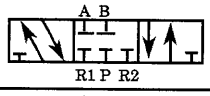
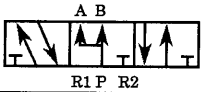
Discontinue

6 HOW TO ORDER

6. MODEL CODING

- Solenoid valve unit

4L2 — 4 — a — b — c — d — e — f

ⓐ Circuit symbol		ⓑ Nos. of solenoid		ⓒ Rated voltage		ⓓ With or without indicator lamp	
FG		S	Single solenoid	1	AC100V	No code	No
FHG		D	Double solenoid	2	AC200V	N	With lamp and surge killer
FJG				3	DC24V		
FIG				4	DC12V		
				9	Others (Specify the voltage)		

Note :
When selected Marking 9 (Specify the voltage), be sure always specify the voltage preferred at the tail of model coding.
Either AC100V coil or AC200V coil is servicable with AC110V (60Hz) and AC220V (60Hz), respectively.

ⓔ Manual operation device		ⓕ With or without subplate	
M6	Perpendicular, Non locking type	No cord	Without subplate
M0	Lateral, Non locking type		

Model coding of Manual operation device

ⓔ Manual operation device	
M6	4L2-4-P5032M6BR-ⓒ
M0	4L2-4-P5032M0BR-ⓒ

- Manifold (Solenoid valve non-included)

LMF — 0 — a — b — c — d

ⓐ Number of blocks		ⓑ Diameter of A and B ports		ⓒ Diameter of P, R1 & R2 ports	
1	1block	01	Rc1/8 (Right hand side only)	O2B	Rc1/4 (Either upper or lower side)
2	2block	02	Rc1/4 (Right hand side only)	O2D	Rc1/4 (Lower side only)
3	3block	C4	Snap joint ϕ4 (Right hand side only)	O2U	Rc1/4 (Upper side only)
4	4block	C6	Snap joint ϕ6 (Right hand side only)	C8B	Snap joint ϕ8 (Either upper or lower side)
5	5block	01Z	Rc1/8 (Reverse side of block)	C8D	Snap joint ϕ8 (Lower side only)
6	6block	※	Combination (Specify on the purchase order)	C8U	Snap joint ϕ8 (Upper side only)
7	7block				
8	8block				
9	9block				
10	10block				

Note : Consult us regarding ※ marked item.
Snap jointer GWS4-8 or GSS6-8 is threaded in the block for building C4 or C6.

Note : Snap jointer GWS8-8 is threaded in the block for building C8.

ⓓ Wire connecting type	
T0U	Concentrated terminal type
T0D	Concentrated terminal type

Note : T0H has the terminals on U side.
T0D has the terminals on D side.