



登録No. VFS6000-OMH0002

OPERATION MANUAL

PILOT OPERATED 4-WAY SOLENOID VALVES
SERIES VFS6000

SUB-PLATE TYPE

SMC CORPORATION

CORD No.		TMA-VS-91-001		
SYM	PL	CHANGE	DATE	BY

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1. SPECIFICATIONS

1) Standard Specifications

MEDIA	Air, inert gases			
Max. operating pressure MPa{kgf/cm ² }	1.0{10.2}			
Min. operating pressure MPa{kgf/cm ² }	0.1{1.0}			
Proof pressure MPa{kgf/cm ² }	1.5{15.3}			
Ambient and operating fluid temperature, °C	(Note 1) -10~+60			
Lubrication	(Note 2) Unnecessary			
Protection	Dust-proof			
Pilot valve manual operation	Non-lock push type(Flush type)			
Rated voltage of coil	100VAC, 200VAC, 50/60Hz 24VDC			
Allowable voltage fluctuation, %	-15~+10 (at rated voltage)			
Classification of coil insulation	class B or equivalent (130 °C)			
Apparent power, VA (Power consumption, W)	AC	Inrush	50Hz	5.6
			60Hz	5.0
		Holding	50Hz	3.4(2.1)
			60Hz	2.3(1.5)
	DC	1.8		

Note 1) In low temperature applications, use dry air.

2) When supplying oil, use turbine oil Class 1
(ISO VG32 or equivalent).

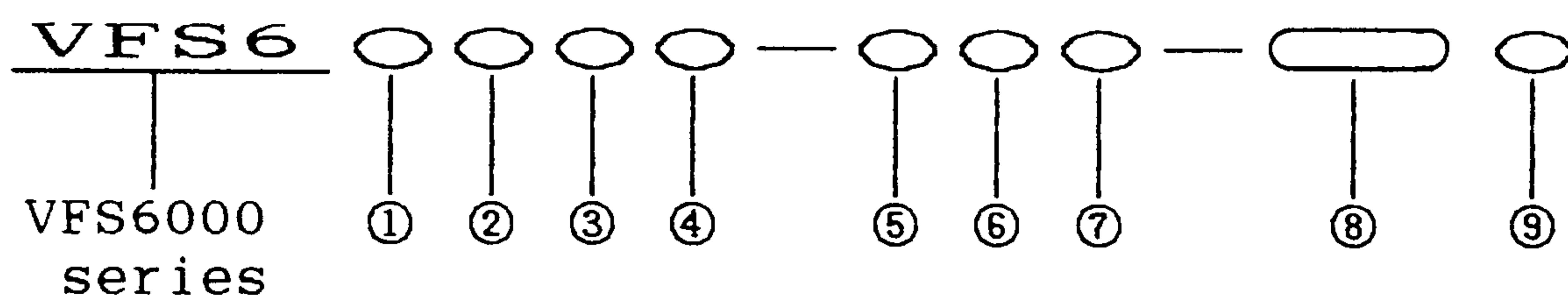
2) Model Specifications

Valve Functions	Model	Port size	Eff. Area, mm (Cv Factor)	1) Max. Operating Frequency, CPM	2) Response Time ms.	3) Weight, kg
2-position single solenoid	VFS61**	Rc(PT)3/4 Rc(PT)1	162(9.0) 180(10.0)	180	160max	2.50
2-position double solenoid	VFS62**	Rc(PT)3/4 Rc(PT)1	162 (9.0) 180(10.0)	180	60max	2.75

- Note 1) Conforming to JIS B8375-1981 (once a month)
 2) Conforming to JIS B8375-1981.
 SUP.press.: 0.5MPa{5.1kgf/cm²} , Solenoid:w/o Surge
 suppressor.
 3) Figures in the list are those without a sub-plate.
 for models with a plug-in
 sub-plate 1.65kg(Rc3/4), 1.5kg(Rc1) respectively.

2 . MODEL IDENTIFICATION

1) VALVE MODEL IDENTIFICATION.



① Valve functions

1	2-position single
2	2-position double

② Body type

0	Plug-in sub-plate
1	Non plug-in sub-plate

③ Body option

0	Standard
1	With direct manual

④ Method of pilot signal

None	Internal pilot
*R	External pilot

*Semi-standard

⑤ Power source

1	100	VAC, 50/60 Hz
2	200	VAC, 50/60 Hz
*3	110~120	VAC, 50/60 Hz
*4	220	VAC, 50/60 Hz
5	24	VDC
*6	12	VDC
*7	240	VAC, 50/60 Hz
*9	others	

*Semi-standard

⑥ Electrical entry

F	Conduit terminal
E	Grommet terminal
D	Din type terminal

⑦ Option

None	Not provided
Z	W/Indicator light surge suppressor

⑧ Port size

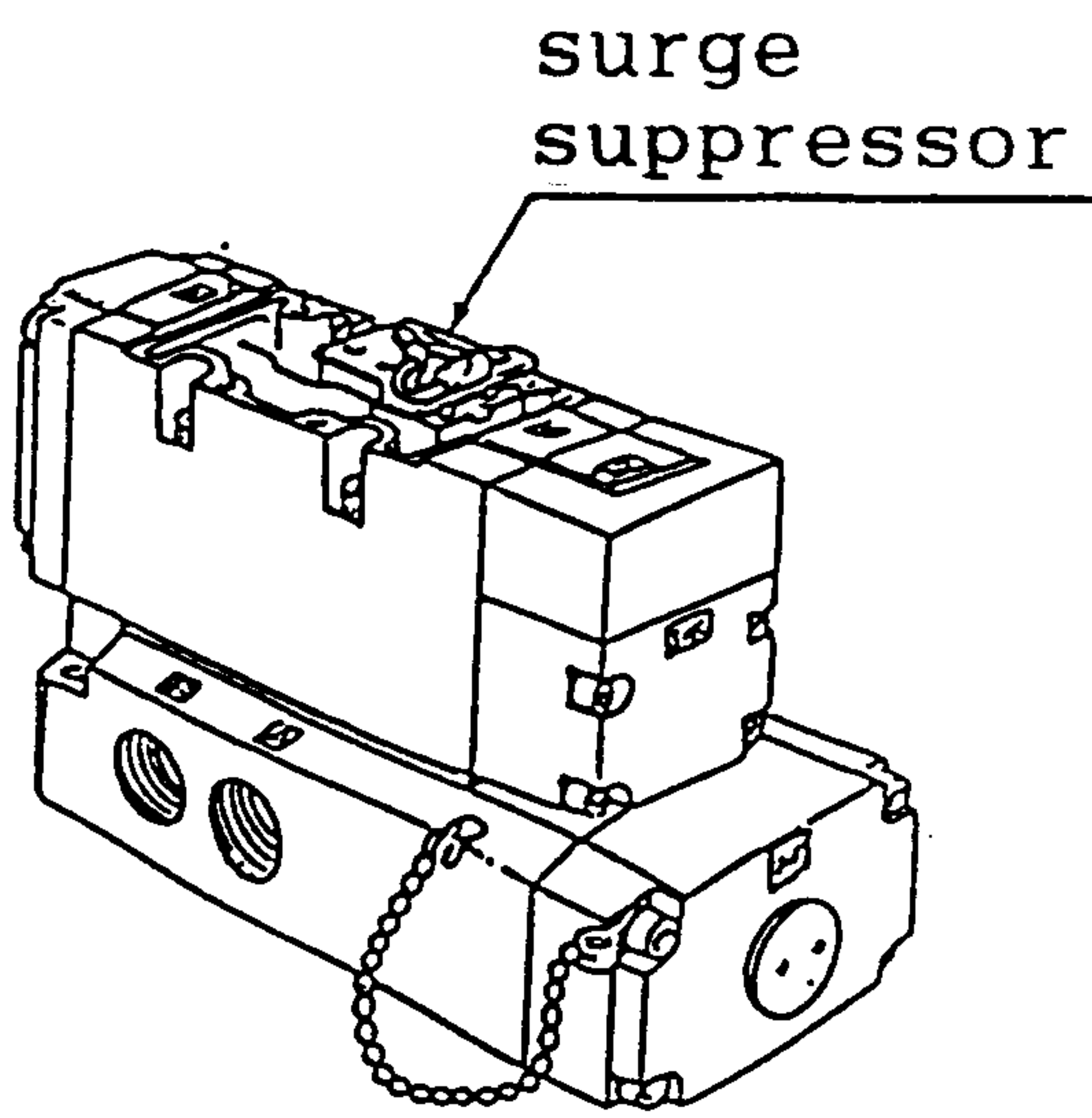
None	W/O Sub-plate
06	Rc(PT)3/4
10	Rc(PT)1

⑨ Pipe threads

None	Rc(PT)
*N	NPT
*T	NPTF
*F	G(PF)

*Semi-standard

3 . INDICATOR LIGHT SURGE SUPPRESSOR

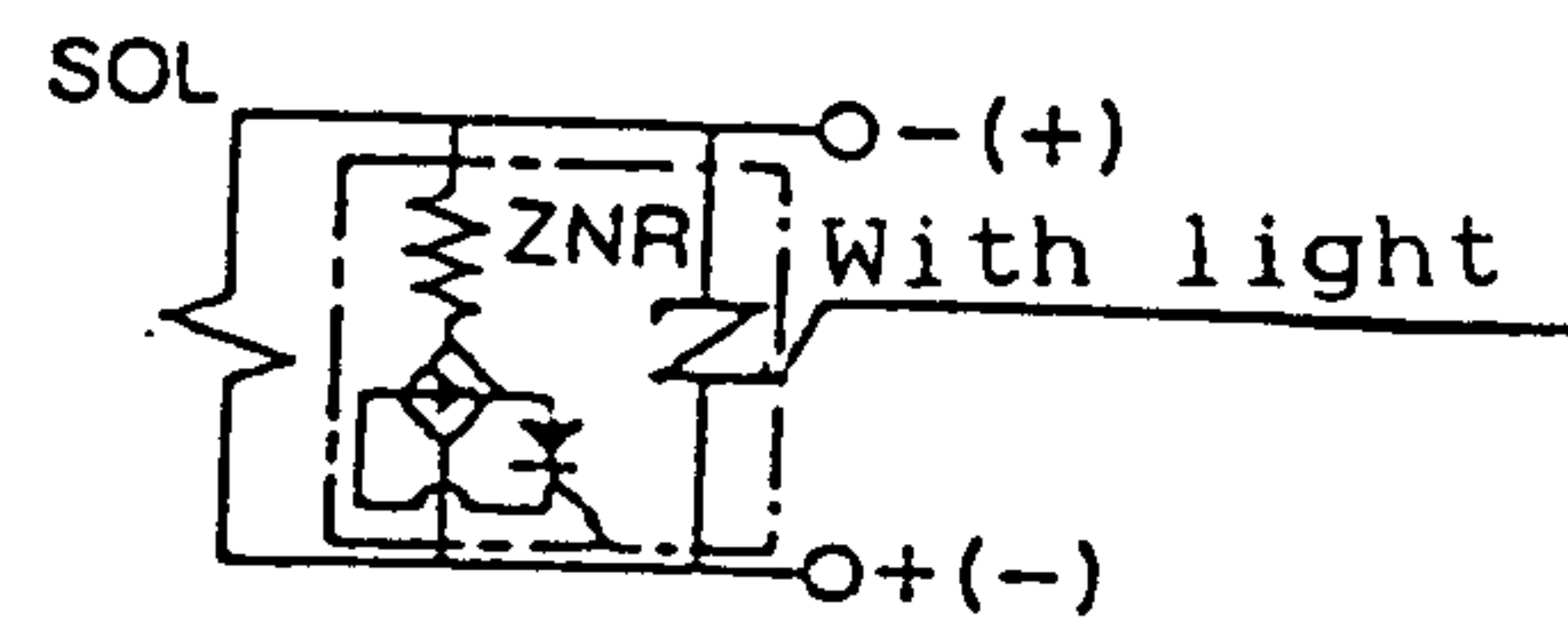
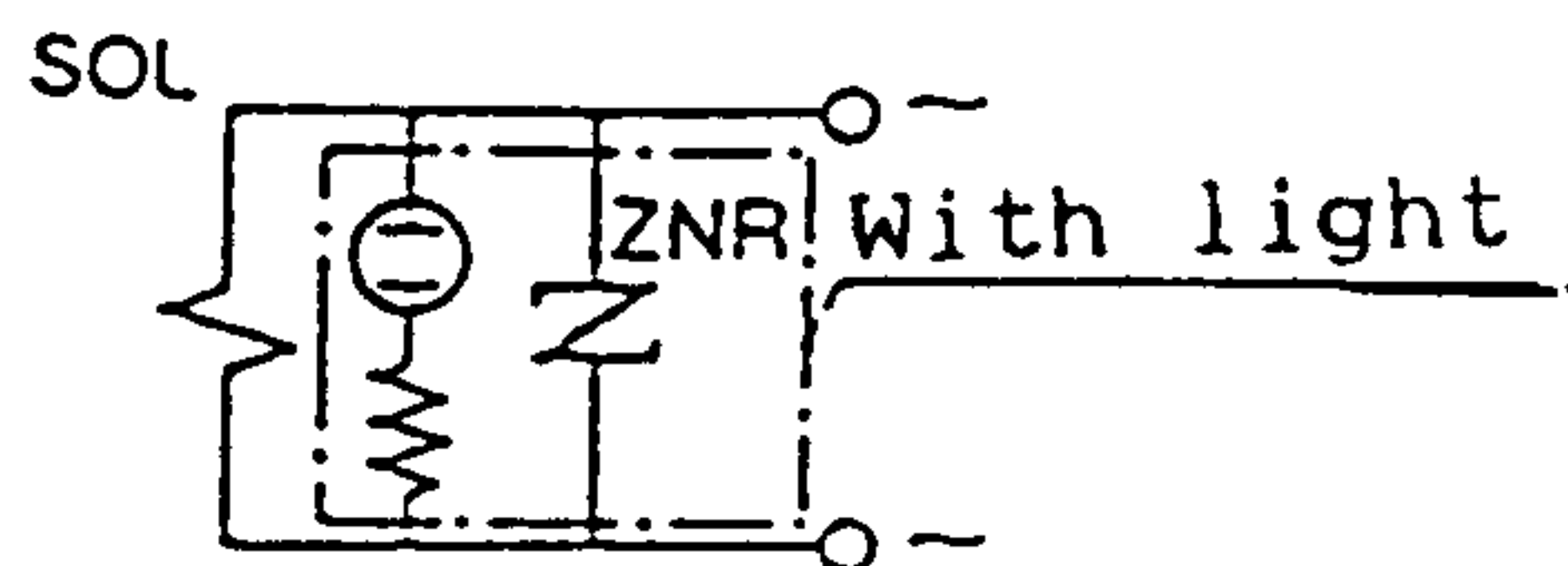


The indicator light surge suppressor can easily be mounted by the circuit board assembly (Part No. VF4000-9A-*) to the pin terminal of the terminal board inside body.

The circuit is as follows:

100 VAC.VDC or more

24 VDC or less



4 . REPLACEMENT AND REMOVAL

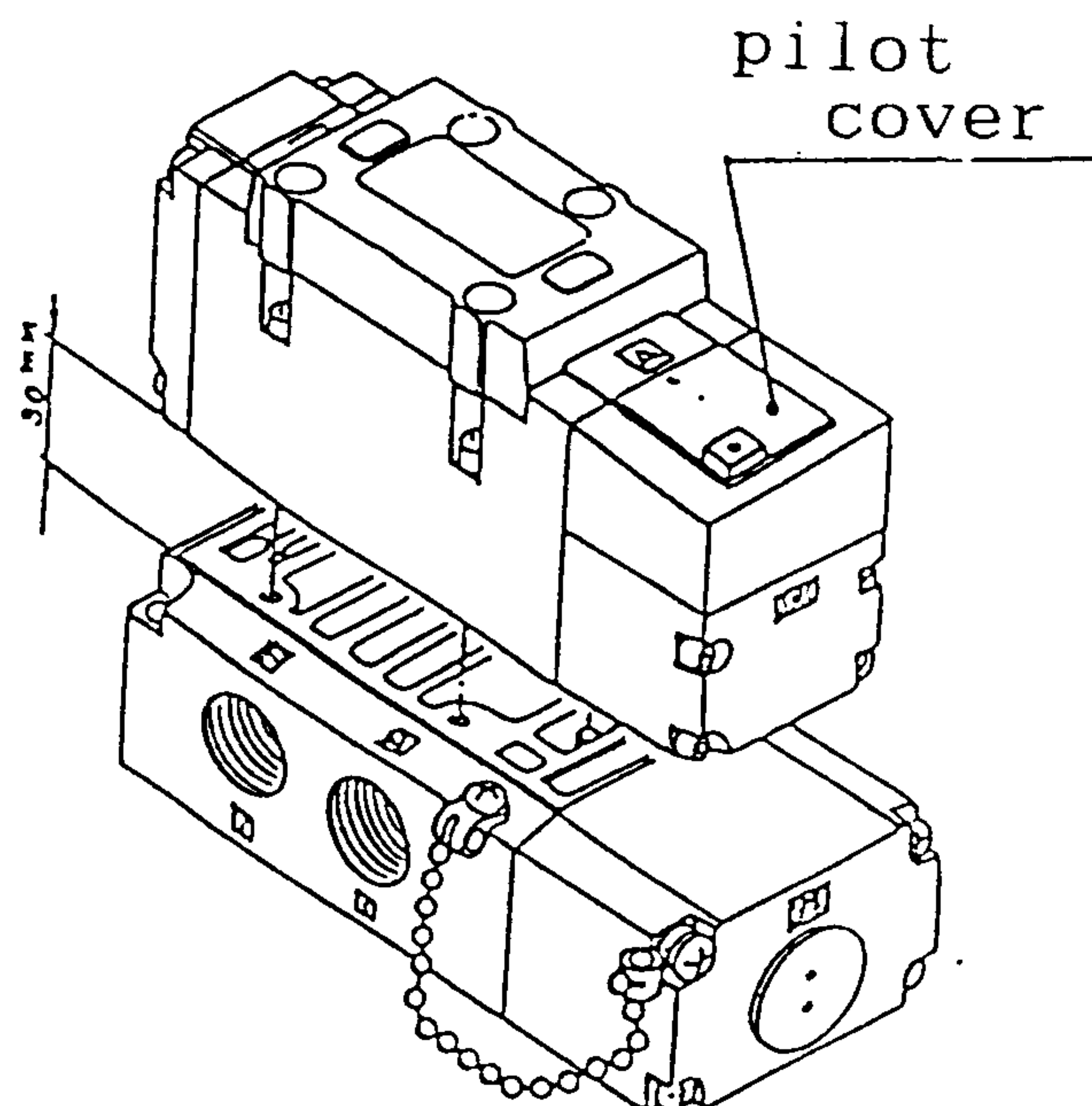
Remove the bolts (M8x80 4psc.), and extract straight the solenoid valve body from the sub-plate.

Extract straight to avoid problems.

When mounting the solenoid valve body to the base, be sure to insert the pin assembly (male pin side) straight to the receptacle assembly (female pin side).

Replacement of pilot valve

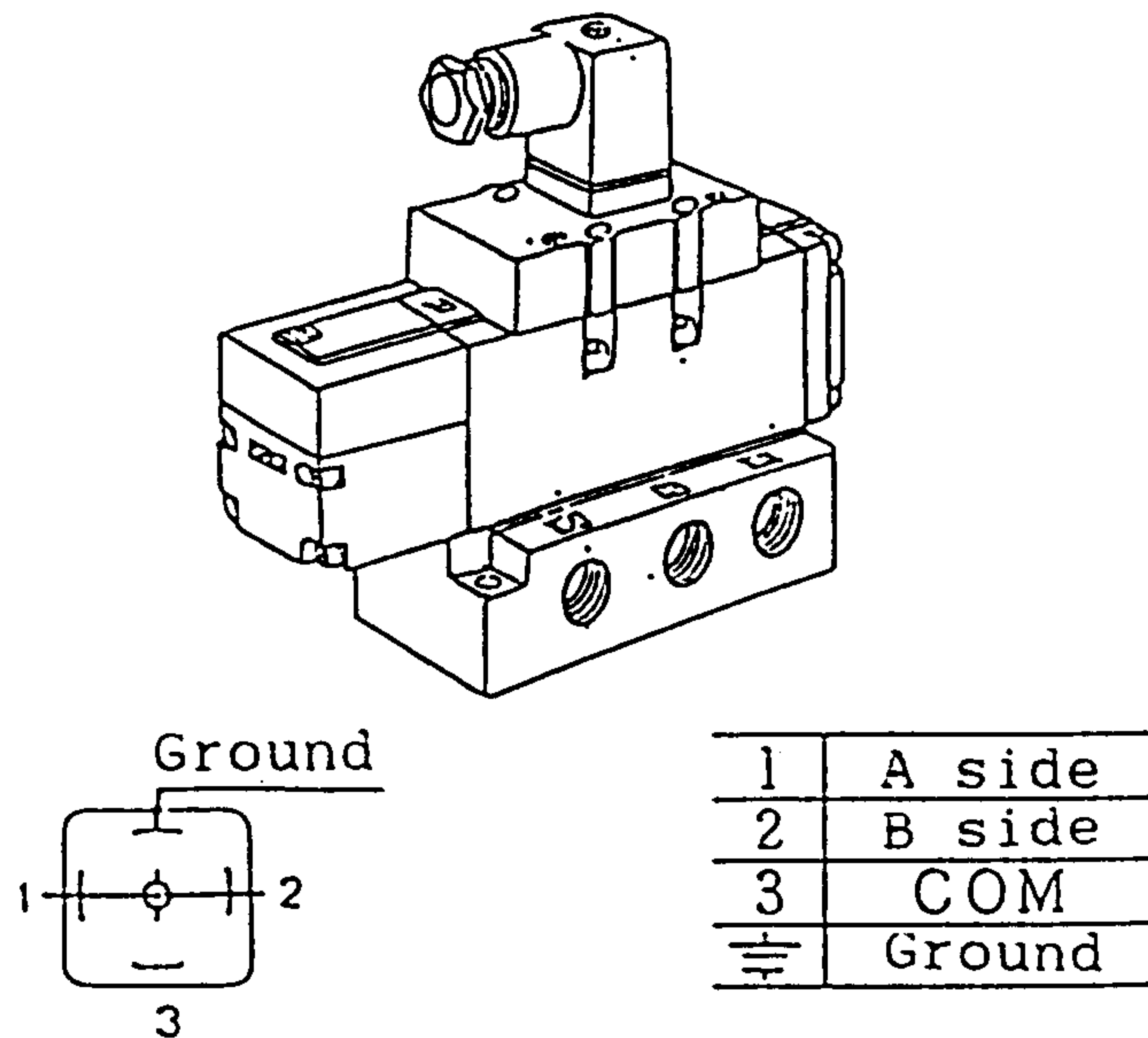
For either plug-in type or non plug-in type pilot valve, replacement can be performed in the same procedure as that of the solenoid valve body.



5. CONNECTION OF LEAD WIRES

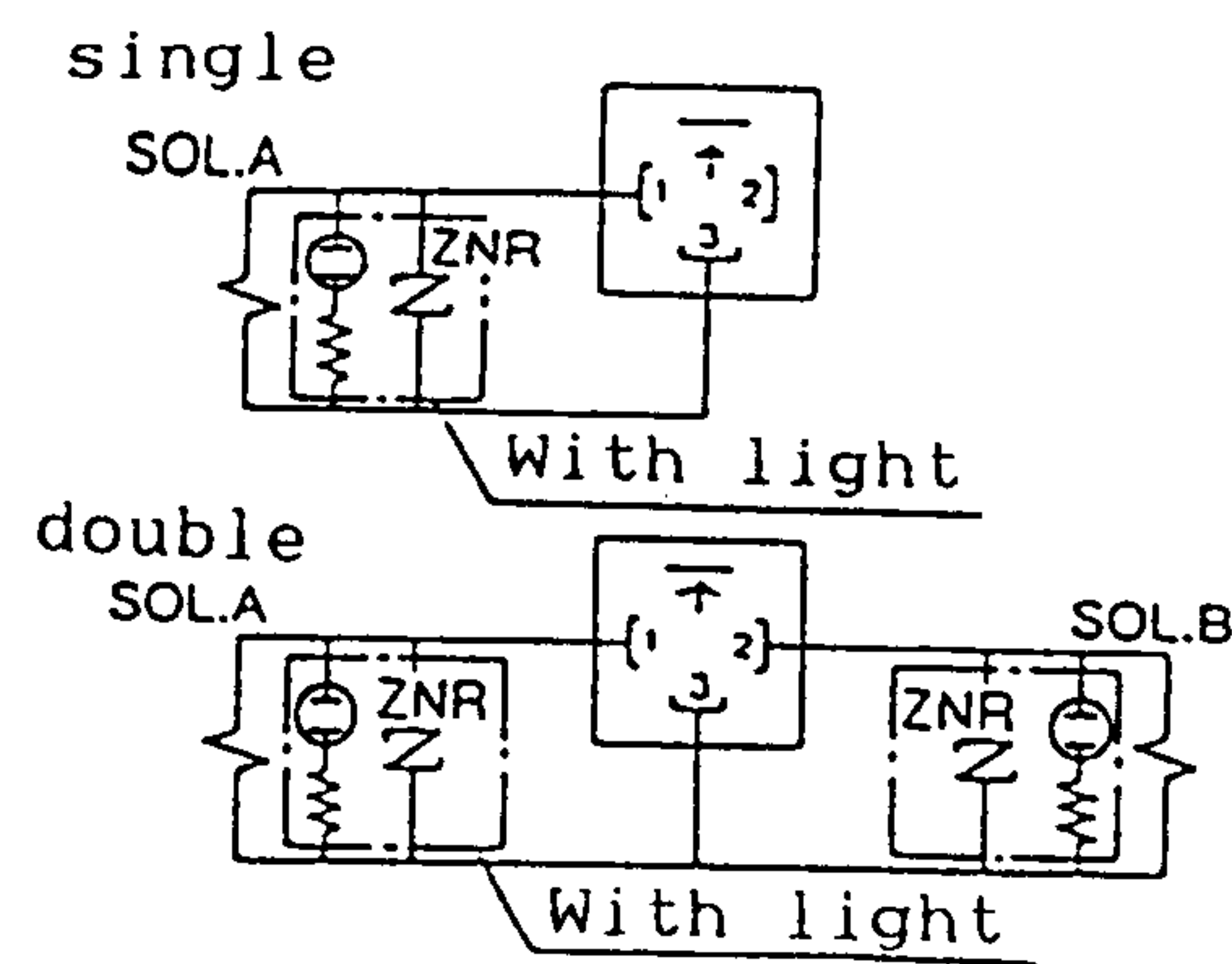
1) DIN Terminal Board Type

The male pin terminals of the DIN terminal board are internally connected to the solenoid as shown below; connect the lead wires to the respective terminals of the connector.

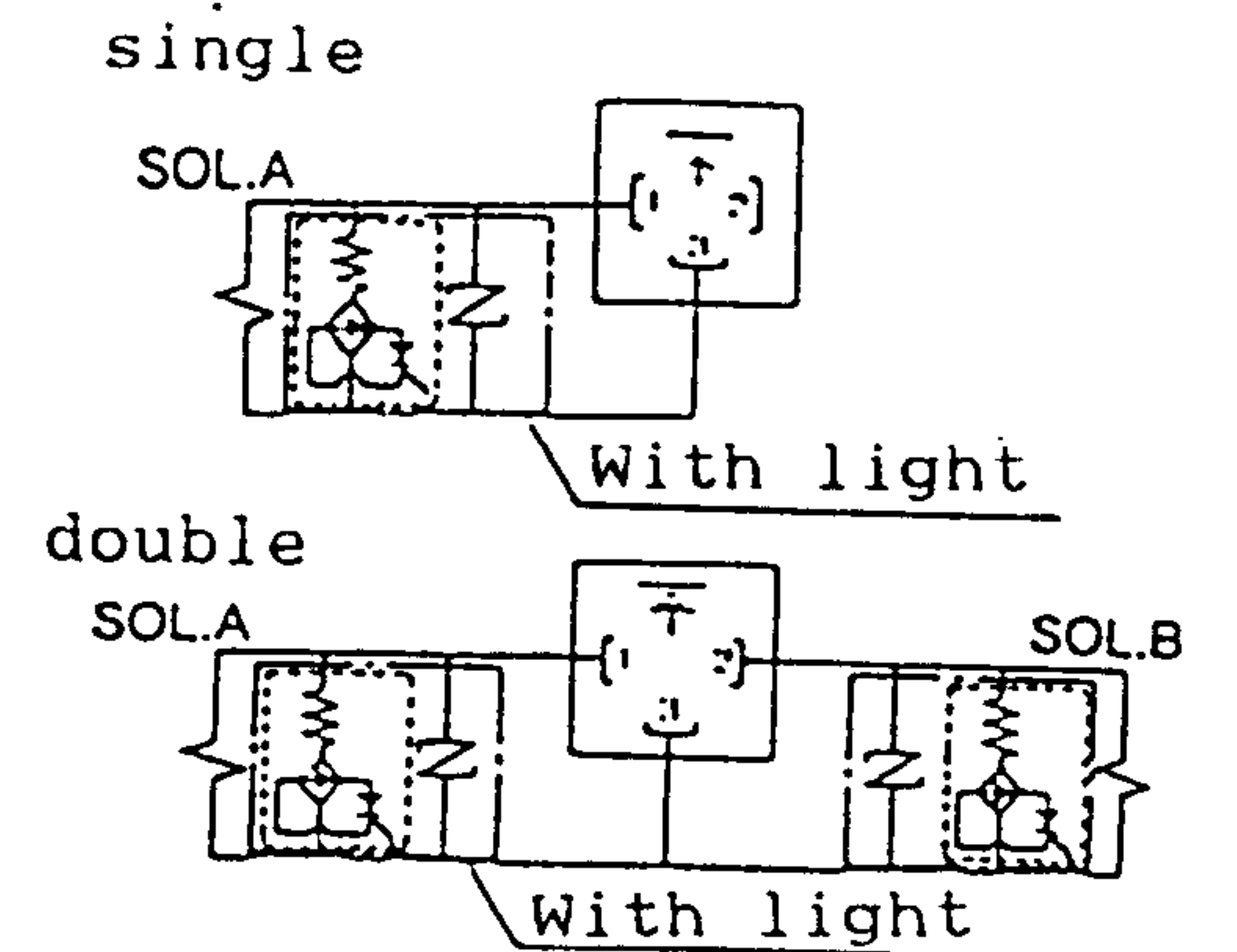


Note) No polarity

AC and 100VDC or more



24VDC or less



Applicable insulated cable. Cables of 6.8 to 11.5mm in diameter
Applicable solderless terminals. Three types shown below

1.25Y-3L, 1.25-3.5S, 1.25-4M

Fastening torque of connector. Clamping screws: 6kgf-cm

Terminal screws: 9kgf-cm

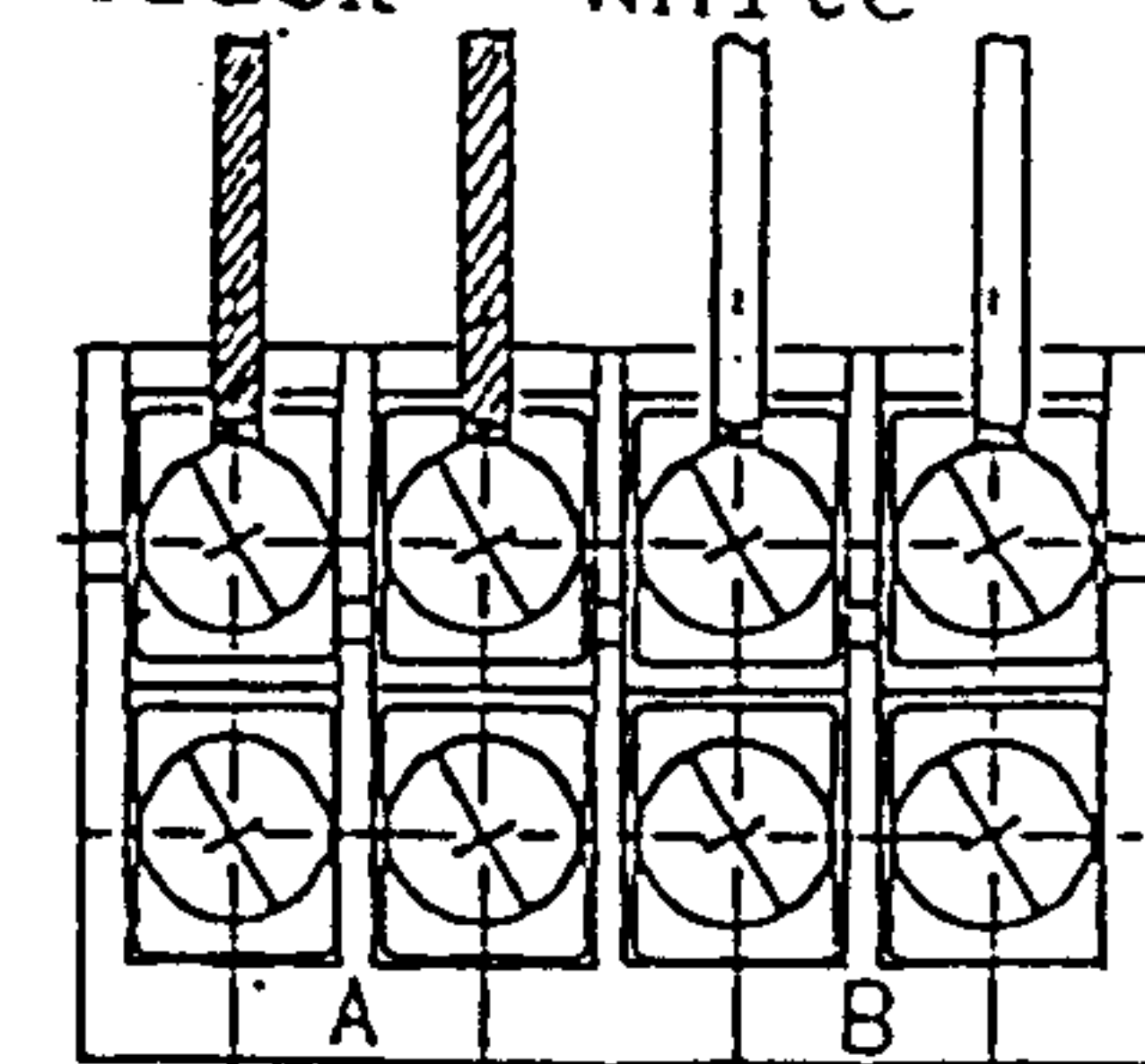
2) Plug-in Type (with terminals)

First remove junction cover of the terminal block

(Part No. AXT622-5)

Lead wire

color Black White



Terminal block

On the terminal block are put the following markings; connect them to the power supply side

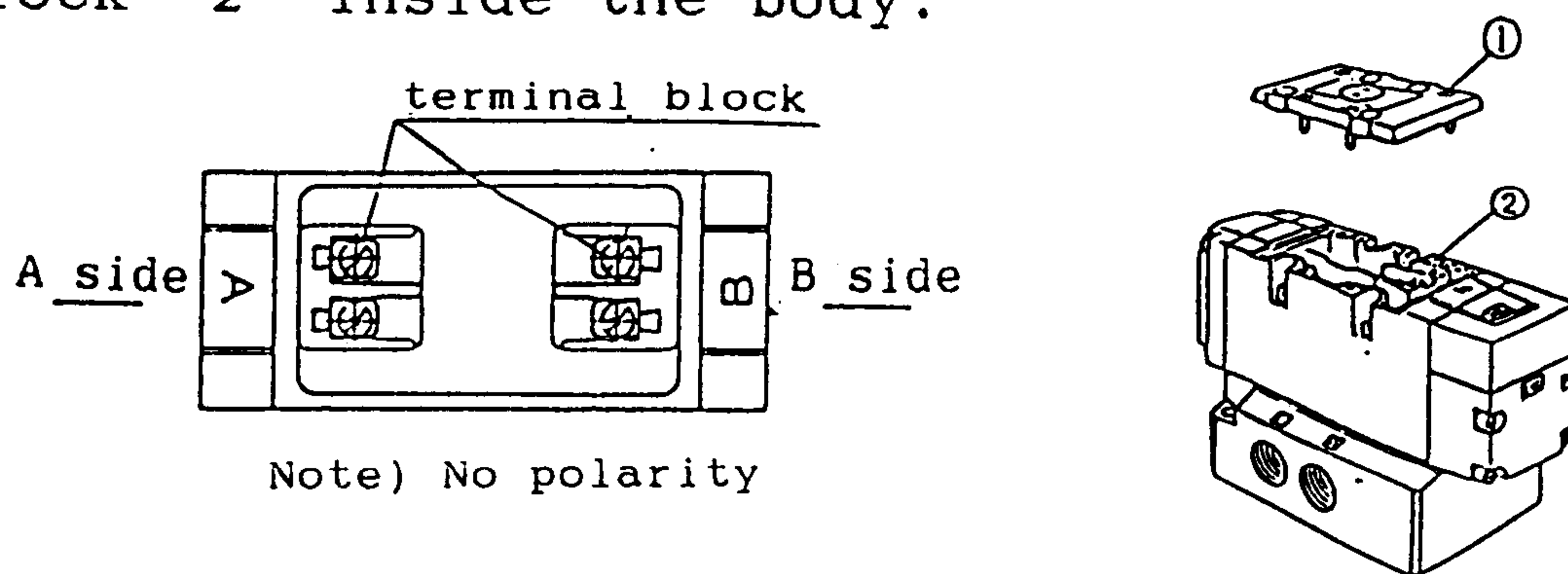
	Solenoid A Side	Solenoid B Side
Marking on terminal block	A	B
	com	

When the "com" terminal is used, it becomes "+com".

This can easily be attained by inserting special probe C (Part No. VVF4000-6-2) com between (+) terminals from rear.

3) Non plug-in Type (with terminals)

Remove cover 1, and then connect the lead wires to terminal block 2 inside the body.



6. INSTALLATION

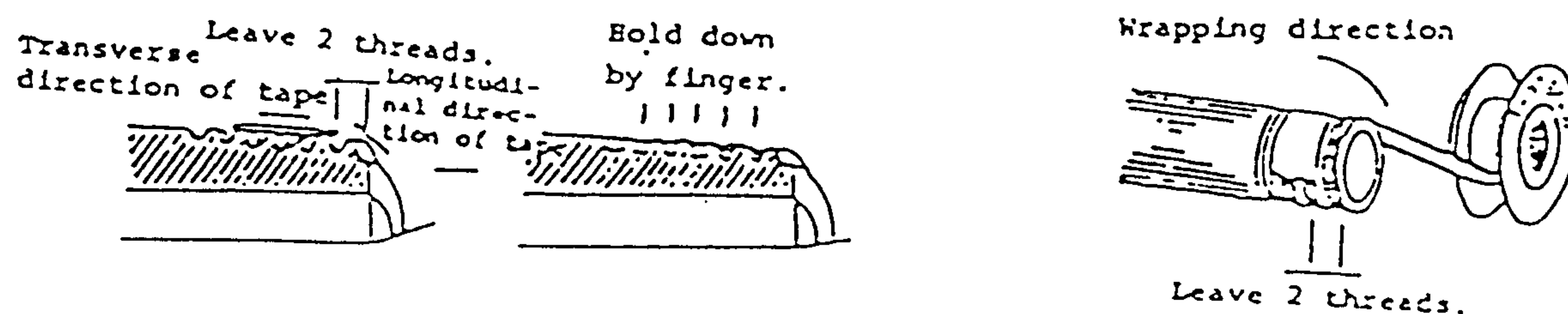
- 1) The unit can be installed in almost any position. For double-solenoid models, however, be careful so that the spool valve is parallel to the ground.

In applications where vibration is unavoidable, install the unit so that the spool valve is perpendicular to the direction of vibration.

(Do not use this unit in a place where vibration of more than 5G is expected.)

7. PIPING

- 1) Use a pipe of inside diameter equal to or larger than the nominal diameter.
- 2) Before piping, thoroughly flush both primary (supply pressure side) and secondary (final controlling element side) pipes to completely clear away dust, scale, and other foreign matters generated during piping job.
- 3) When wrapping the threads with a teflon sealing tape, leave one to two threads exposed at the tip of the thread and press the tape onto the thread by a finger nail to tightly adhere. When using a liquid sealing agent, also leave one to two threads and be careful not apply too much agent on the threads. In no case should the female threads be applied with the agent.



Fastening torque

Thread	Proper fastening torque,kgf-cm(N-m)	
Rc(PT)1/8	70- 90	(7- 9)
Rc(PT)3/4	280-300	(28-30)
Rc(PT)1	360-380	(36-38)

Pay utmost attention to design and performance of piping to facilitate removal and installation of the unit in the event trouble.

8 . ENVIRONMENTAL CONDITIONS

- 1) When the unit is used in dusty location,protect the rod of the cylinder to prevent dust from entering the secondary side through the rod.

On the EXH.port,provision should be made to prevent dust from entering the unit either by installing a silencer to the EXH.port or installing an elbow with its open end pointing downward.

- 2) In applications where installation of the unit in a place exposed to corrosive gas,chemical solution or its vapor, seawater,etc.or where high temperatures more than 60 C is expected is unavoidable,consult with the manufacturer.

9 . LUBRICANTS

- 1) The unit does not require lubrication. If however,lubrication is required for any reason such as the use of a lubrication-requiring cylinder,install a lubricator (oiler) in the primary side piping to supply atomized oil. Use turbine oil Class 1 (ISO VG32) as a lubricant. Never use spindle oil or machine oil. In low temperature applications,use low temperature lubricant.

Example : Idemitsu Kosan,lubricant for low temperatures,
Daphne Super Hydro 32WR -20 to +60 C

Turbine oil is higher in viscosity at low temperatures below 0 C, causing valve trouble.

10 . MAINTENANCE

- 1) This solenoid valve does not require any particular maintenance. If,however,any trouble should occur during operation,refer to the troubleshooting list.
- 2) The carbon powder generated from an air pressure source (mainly a compressor) and oil contaminants will adhere to the spool,increasing the sliding resistance of the spool and

5. REPLACEMENT AND SPACE FOR REMOVAL.

For replacement of the valve assembly, refer to

SHOOTING.

corrective action based on the chart in 13. TROUBLE-

Step3 Once the real source of trouble is located, take a phenomenon.

Step2 Check the possible sources of trouble in the order of their higher probability judging the actual

(3) Poor seal?

(2) Buzzing?

(1) Faulty operation?

Step1 What is the phenomenon of trouble?

1) Location the source of trouble

11. TROUBLES AND REMEDY

the gaskets do not slip.

all the parts in place. Tighten all the bolts evenly so that

4) When assembling the disassembled parts, be sure to replace

in cleaning solution.

In so doing, do not immerse the "O" ring attached to the sleeve

chloride.

clean them in a solution such as trichloroethylene or tetra-

extract the spool and sleeve from the valve body, and then

er plate and end cap (in which the return spring is housed),

matter generated at an air pressure source, remove the adapt-

3) When the spool and the sleeve seize because of the foreign

Idemitsu Kosan : Daphne CSS55, CS49

Nippon Oil : Farecaol A-80

Commercially available compressor lubricants are :

particles from entering the inside of the valve.

series) after a normal filter (AF series) will prevent fine

Installation of a mist-separator with finer filtration (AM-

better quality which forms less oxidized substances.

type of compressor lubricant, and use compressor oil with

sleeve, causing the spool to seize. In such a case, check the

air or oil contaminant will build up between the spool and

for a long period of time, the carbon powder contained in the

the unit is left with the SUP. pressure applied to the unit

In applications where the air with poor quality is used, if

far attention to the quality of air.

In the worst case, the spool may completely seize, particu-

eventually resulting in faulty operation of the valve.

To users :
 If the above remedies do not work , please send the unit back to the supplier
 for repair or replacement.

N o .	R e m e d y
①	Re-wire correctly.
②	Replace parts and correct wiring.
③	Regulate power voltage.
④	Regulate pressure so as to fall in operating pressure range.
⑤	Replace pilot valve ass'y.
⑥	Disassemble main valve spool and sleeve valve and eliminate dust.
⑦	Take countermeasure against freezing.
⑧	Take countermeasure against contamination of air source.
⑨	Take countermeasure against removing drain.
⑩	Fasten mounting bolts.

3) REMEDY

