Discontinue

CKD

SM－0521－A

INSTRUCTION MANUAL

FDO$^{3}_{4}$－4WAY

- 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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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.

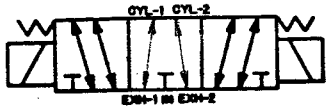
Observe the cautions on handling described in this manual, as well as the following instructions :

⚠ 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.

FDO Series Valves are direct solenoid operated, spring centered, 3-position, 4-way air valves.

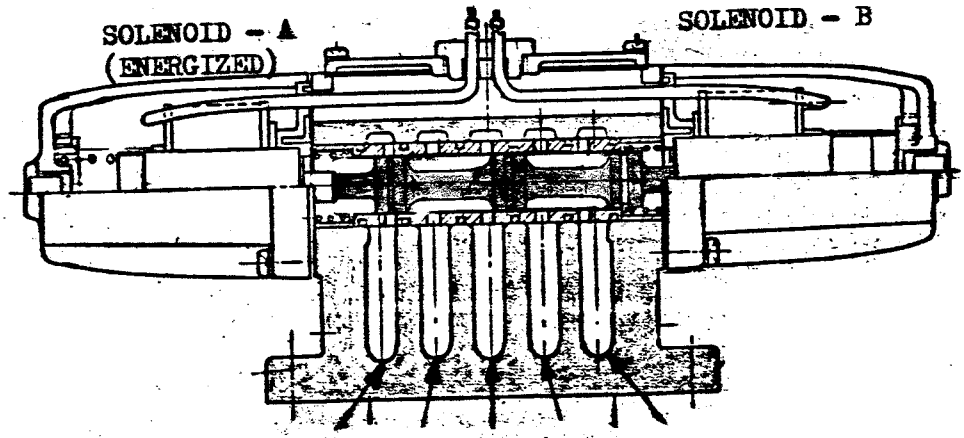
JIS SYMBOL



OPERATION

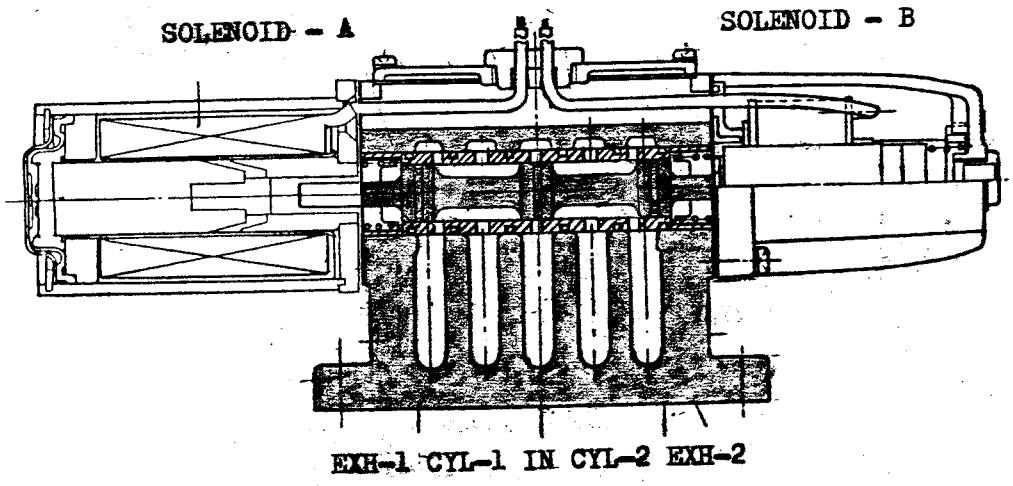
SOLENOID " A " ENERGIZED :

Solenoid " A " is maintained during the energized cycle to hold the valve spool in the position where "IN" port open to "CYL-1" while "CYL-2" port exhaustes via "EXH-2".



BOTH SOLENOIDS DE-ENERGIZED :

Springs at both ends of the valve return and keep the spool in the center position where all ports are open.



Discontinue

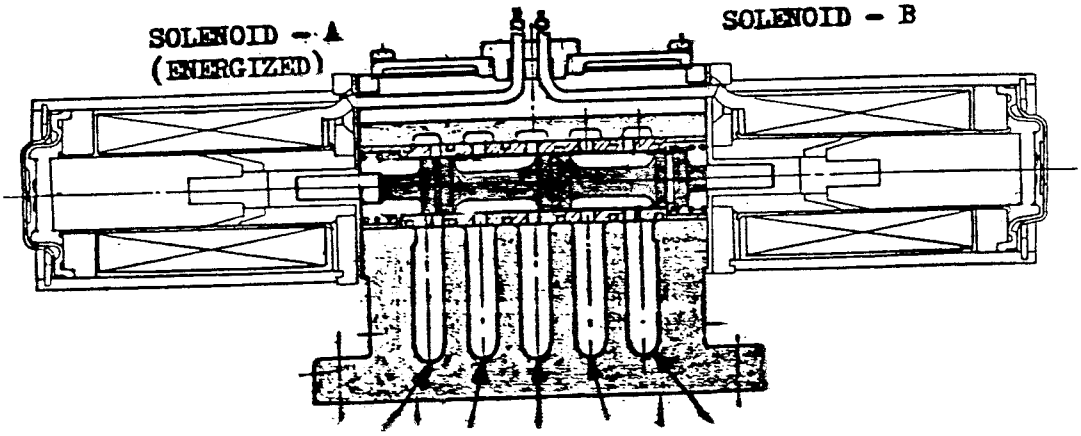
FD0 Series Valves are direct solenoid operated, spring centered, 3-position, 4-way air valves.

JIS SYMBOL

OPERATION

SOLENOID " A " ENERGIZED :

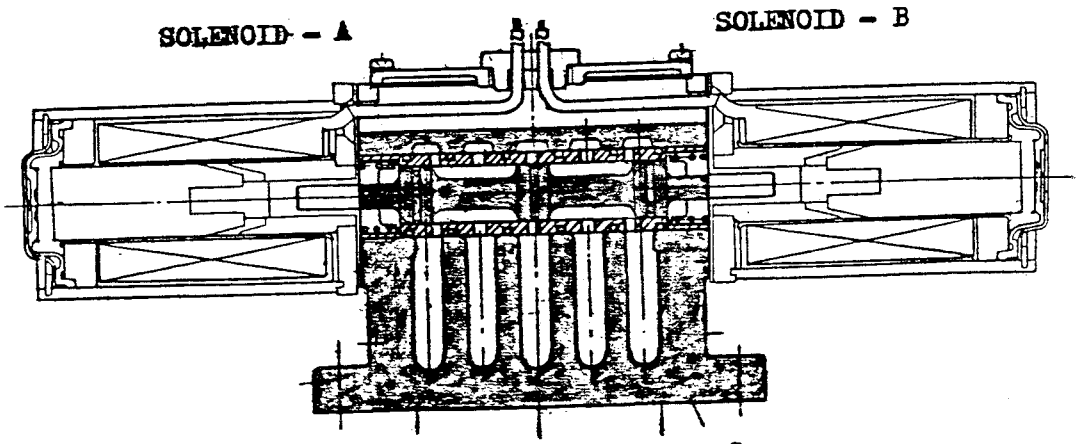
Solenoid " A " is maintained during the energized cycle to hold the valve spool in the position where "IN" port open to "CYL-1" while "CYL-2" port exhaustes via "EXH-2".



EXH-1 CYL-I IN CYL-2 EXH-2

BOTH SOLENOIDS DE-ENERGIZED :

Springs at both ends of the valve return and keep the spool in the center position where all ports are open.

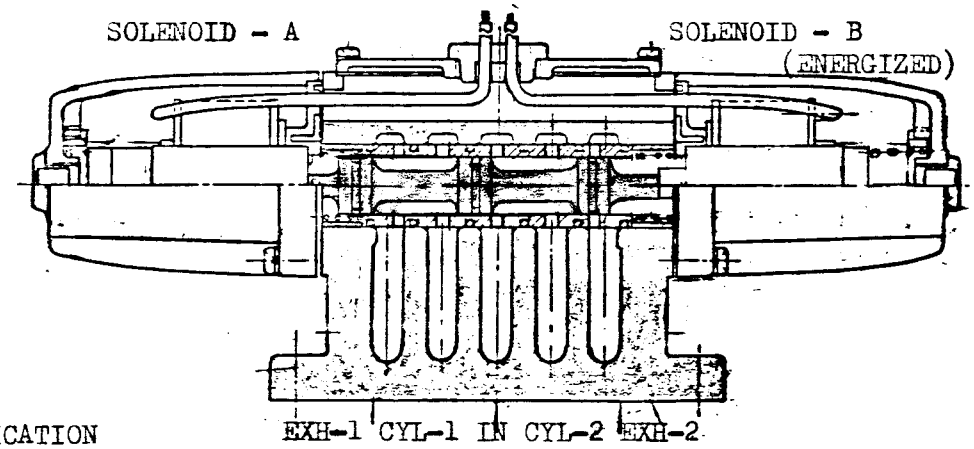


EXH-1 CYL-1 IN CYL-2 EXH-2

Discontinue

SOLENOID " B " ENERGIZED :

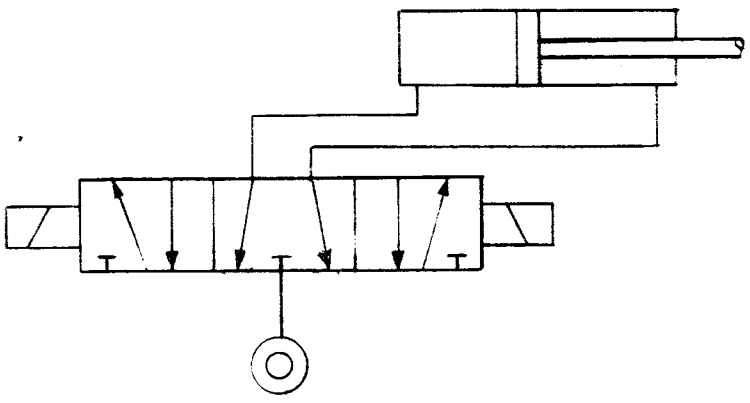
Maintained electric signal to solenoid " B " keeps the valve spool in the position where "IN" port open to "CYL-2" while "CYL-1" port exhaustes via "EXH-1".



APPLICATION

FDO Series valves combine a standard 4-way action with a neutral position (Solenoid de-energized) in which all ports are open and air is exhausted in both ends of the cylinder.

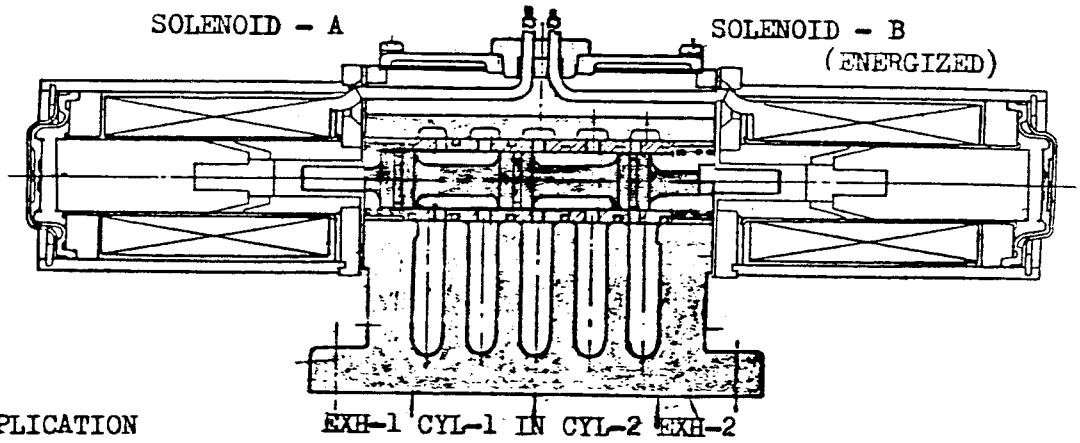
* Double acting cylinder



Discontinue

SOLENOID " B " ENERGIZED :

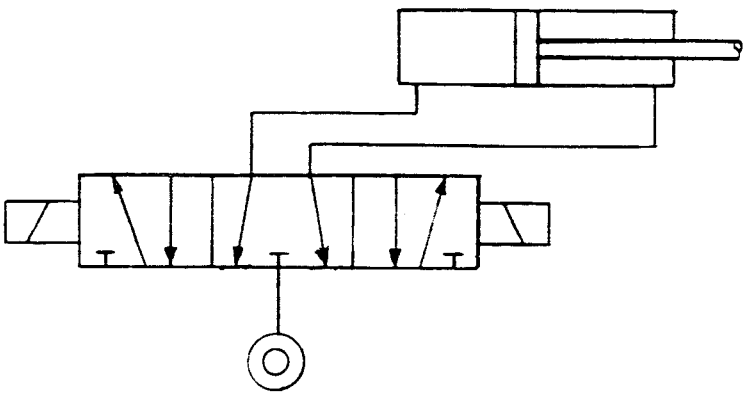
Maintained electric signal to solenoid " B " keeps the valve spool in the position where "IN" port open to "CYL-2" while "CYL-1" port exhaustes via "EXH-1".



APPLICATION

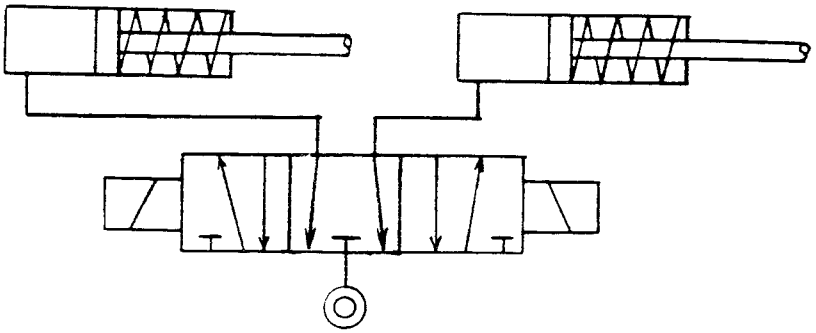
FDO Series valves combine a standard 4-way action with a neutral position (Solenoid de-energized) in which all ports are open and air is exhausted in both ends of the cylinder.

* Double acting cylinder



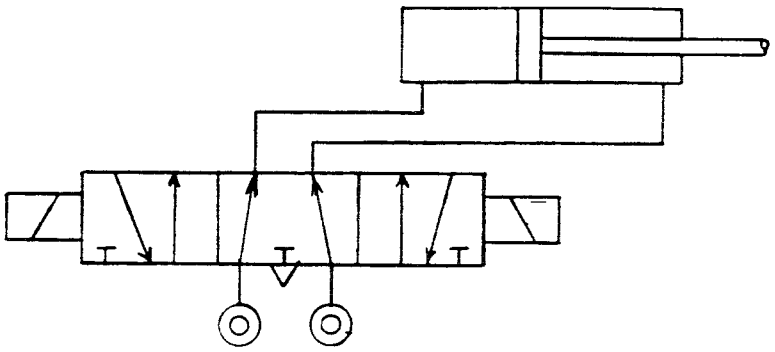
Discontinue

* 2-single acting cylinders

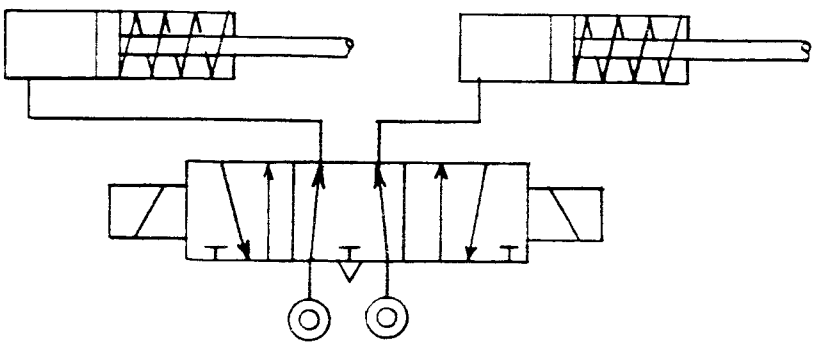


These valve may be used as dual pressure 4-way or 3-way by piping tow pressures into exhaust ports "EXH-1" & "EXH-2". The center port "IN" then becomes a common exhaust.

* Double acting cylinder



* 2-single acting cylinders

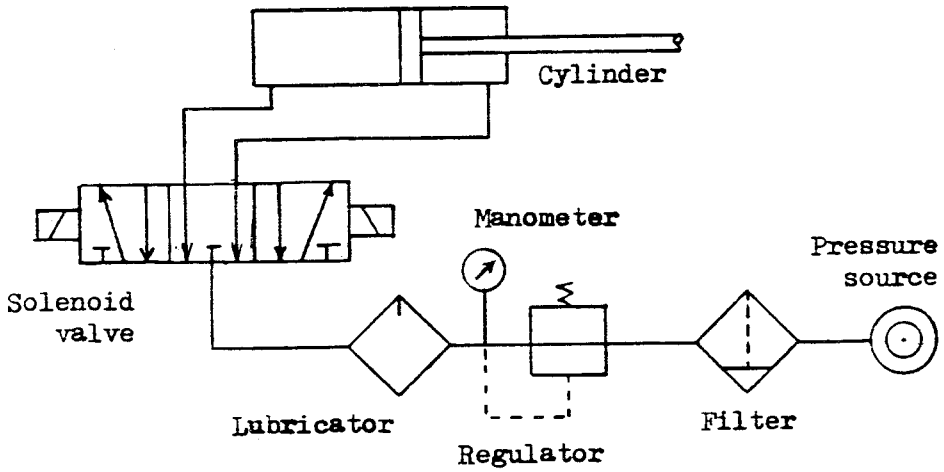


INSTALLATION

(A) SETTING UP

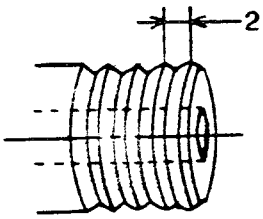
Install the solenoid valve at a level with a center axis of both sides solenoids or valve spool, if possible.

(B) PIPING



1. Clean pipes (inside) as thoroughly as possible before fixing an electro-magnetic valve.

(a)



Remove dust and other foreign substances thoroughly.

(b) Do not apply sealing agent upto the second crest from the end of the connection pipe or the nipples screw.

2. Install an air filter and a lubricator filled up turbine oil # 90 in front of valve inlet.

Discontinue

(C) WIRING

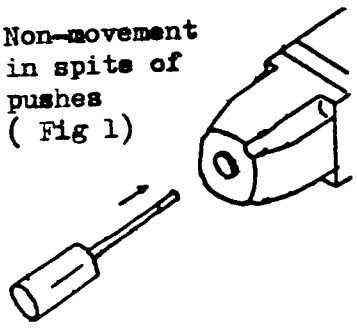
1. Use cabtyre cable, if possible, and connect to solenoid wires.
2. Use a snap-action switch or a relay for electric circuit.
3. Put a fuse into electric circuit against damage to solenoid coil.
4. Voltage indication is found on the name plate.

MAINTENANCE

(A) DISORDERS and COUNTERMEASUREMENTS

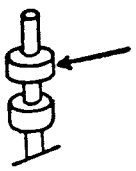
Disorder	Causes	Counter-measurements
Non-action	a) Burning out and disconnection of coil b) Locking spool by foreign particles c) Damage of spring	a) Replace b) Clean (Figl & 2) c) Replace
Leak	d) Fault on the surface of spool and sleeve	d) Replace (Fig 3)
Beat	e) Locking spool by foreign particles	e) Clean (Figl & 2)

Non-movement in spits of pushes (Fig 1)



(Fig 2)
Clean spool and sleeve in thinner after removal of "O" ring from the sleeve

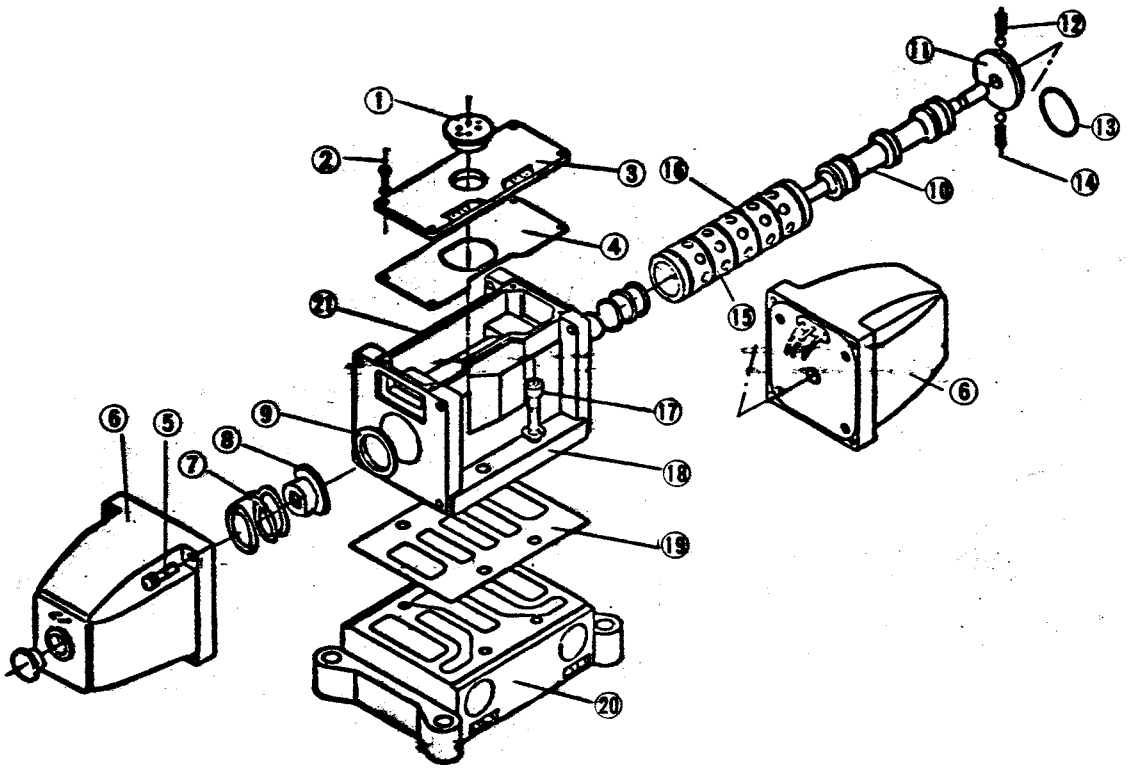
(Fig 3)
Scratch on the surface of spool



Discontinue

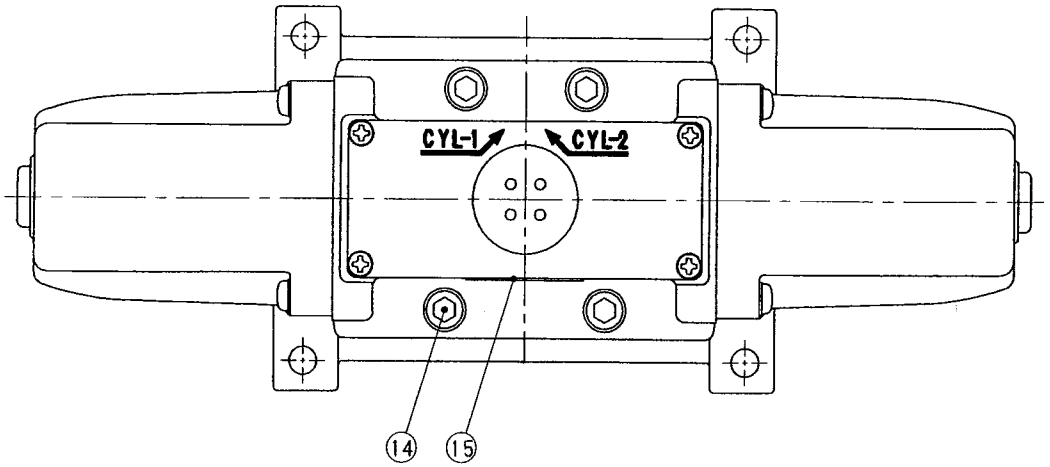
(B) DISASSEMBLY

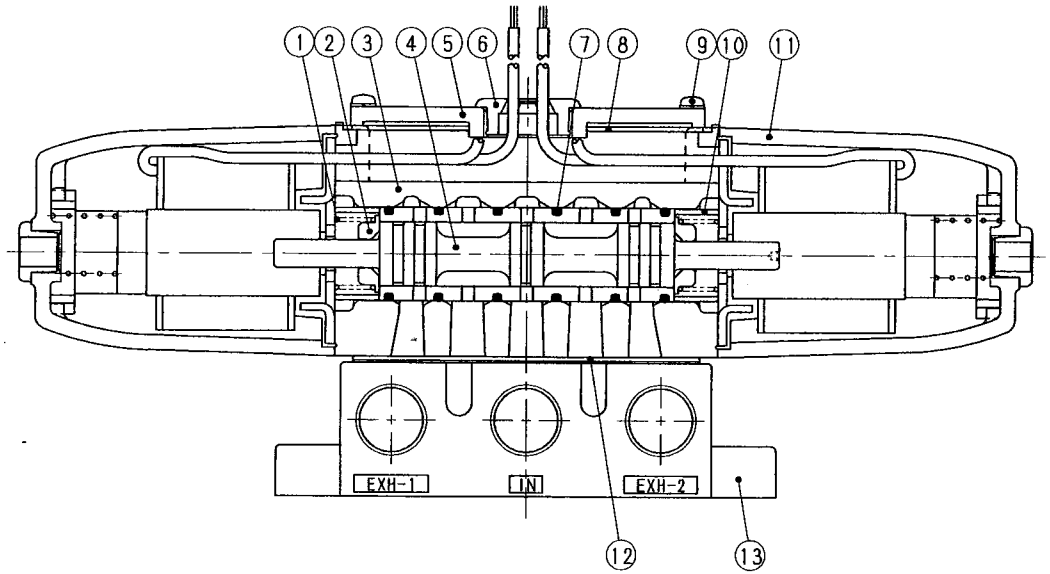
1. Cut off electric curcuit and leave residual pressured air open after stopped air supply.
2. Break up the solenoid valve in accordance with the disassembly drawing.

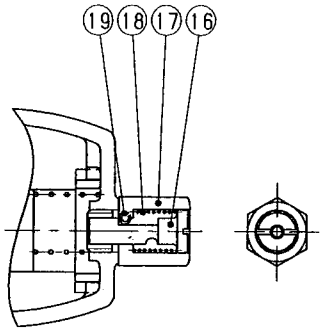


Note; ( ): Number

1 Bush (1) 2 Cross-recessed head machine screws (4)
3. Cover (1) 4. Gasket (1) 5 Cross-recessed head screws (8)
6 Solenoid (2) 7 Spring (2) 8 Holder (2) 9 Collar (2)
10 Spool (1) 11 Stopper "A" (1) 12 Steel ball (2)
13 Ring (1) 14 Spring (2) 15 Sleeve (1) 16 "O" ring(6)
17 Hexagon socket head bolt (4) 18 Body (1) 19 Gasket(1)
20 Sub-plate (1) 21 Name plate (1)







※3 P:Lock-type manual override

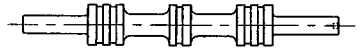
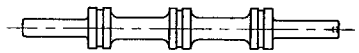
≪MODEL NUMBER SELECTION≫

◎This drawing shows the valve type

※1 ※2 ※3 ※4

FD C 3- 03 -4- nil Voltage .

For other types, please refer to the table below and select the suitable ones.

Model	Spool shape
FDC3	
FD03	

No	Part	Material	Q'ty	Remark
22	Gland	-	1	
21	Circular terminal box	-	1	
20	Connector assy.	-	2	
19	Spring pin	Steel	2	
18	Spring	Steel	2	
17	Guide	Steel	2	
16	Bushingrod	Steel	2	
15	Identification plate	Tetronfilm	1	
14	Hex. soc. hd. cap screw with spring washer	Alloy steel	4	M6x18
13	Sub base	Aluminim alloy die casting	1	
12	Gasket	Acrylonitrile-butadiene rubber	1	
11	Solenoid assy.	-	2	
10	Collar	Steel	2	
9	Pan head small screw with spring washer	Steel	4	M3x10
8	Gasket	Acrylonitrile-butadiene rubber	1	
7	O-ring	Acrylonitrile-butadiene rubber	6	
6	Bushing	Acrylonitrile-butadiene rubber	1	
5	Cover	Polyamide	1	
4	Sleeeve spool assy.	-	1	
3	Body	Aluminim alloy die casting	1	
2	Holder	Steel	2	
1	Spring	Steel	2	

Discontinue

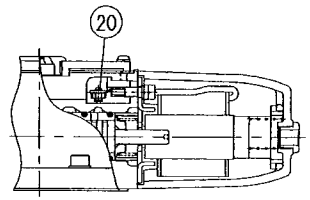
※1 Position	
C	3-pos all port closed
O	3-pos load ports open to exhaust ports

※2 Port size	
02	Rc1/4
03	Rc3/8
04	Rc1/2

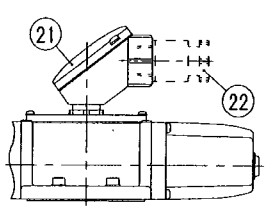
※3 Option	
No code	No option (Lead wire type)
P	Lock-type manual override
C	Push-in connector
B	Circular terminal box
G	Circular terminal box with gland
U	Acid proof painting

※4 Rated voltage	
AC100V	AC100V (50/60Hz)
AC200V	AC200V (50/60Hz)

C



B·G



MARK	REVISIONS	DATE	CH'D	APP'D
△x		· ·		
△x		· ·		
△x		· ·		
△x		· ·		

OA

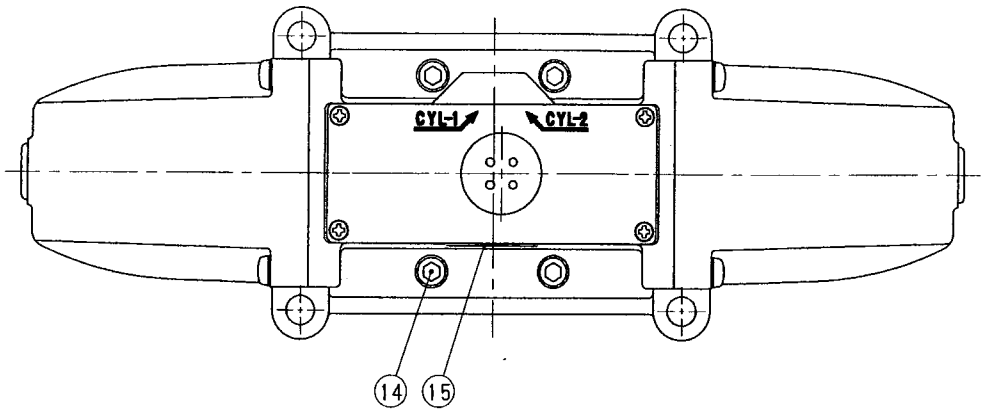
APP'D	CH'D	DES'D	第三角法
M. ITO		MAY. 08. 2003 M. KOIKE	SCALE NO SCALE

品番 NO	部品名 PARTS / 材質/図番 MATERIAL/DRAW No / 数量 Q'TY / 備考 REMARK
仕様書No SPEC No	
品名 DESCRIPTION	DIRECT OPERATED 4 WAY VALVE (Internal structure drawings)
形番 MODEL	※1 FD 3 ※2 - ※3 - 4 ※4 -
図番 DRAW No	F 3 - 8 7 0 1 4 1 - A

CKD Corporation CAD

TE-106

(原)



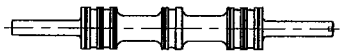
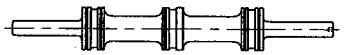
≪MODEL NUMBER SELECTION≫

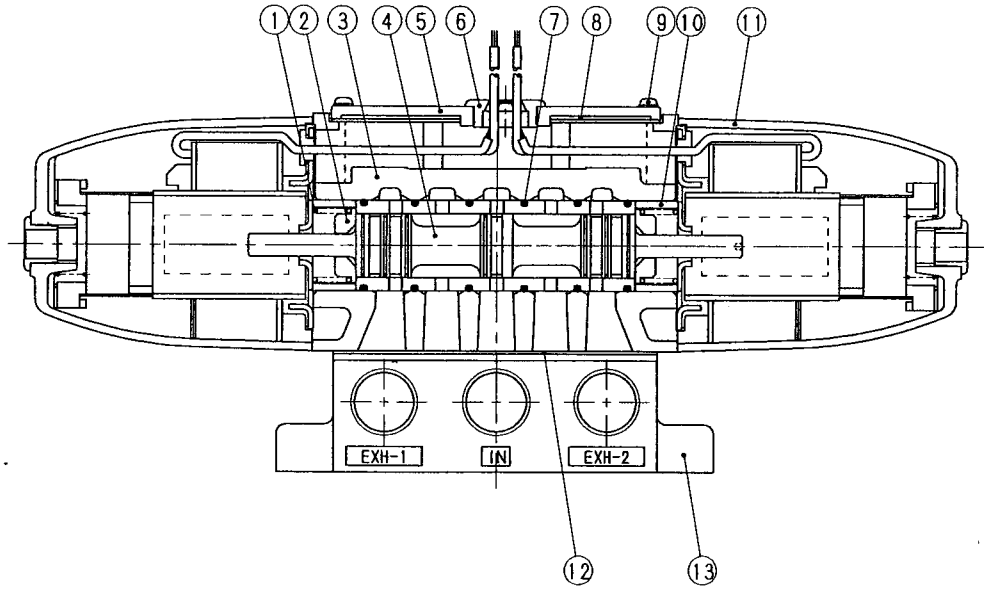
◎This drawing shows the valve type

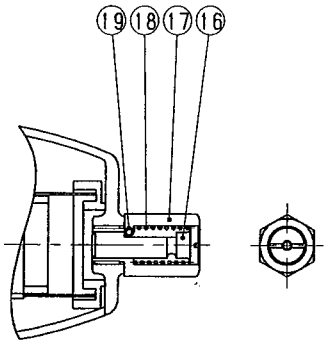
※1 ※2 ※3 ※4

FD C 4 - 04 - 4 - nil - Voltage .

For other types, please refer to the table below and select the suitable ones.

Model	Spool shape
FDC4	
FD04	





※3 P:Lock-type manual override

No	Parts	Material/Draw No	Q'ty	Remark
22	Gland	-	1	
21	Circular terminal box	-	1	
20	Connector assy.	-	2	
19	Spring pin	Steel	2	
18	Spring	Steel	2	
17	Guide	Steel	2	
16	Bushingrod	Steel	2	
15	Identification plate	Tetronfilm	1	
14	Hex. soc. hd. cap screw with spring washer	Alloy steel	4	M6x25
13	Sub base	Aluminim alloy die casting	1	
12	Gasket	Acrylonitrile-butadiene rubber	1	
11	Solenoid assy.	-	2	
10	Collar	Steel	2	
9	Pan head small screw with spring washer	Steel	4	M3x10
8	Gasket	Acrylonitrile-butadiene rubber	1	
7	O-ring	Acrylonitrile-butadiene rubber	6	
6	Bushing	Acrylonitrile-butadiene rubber	1	
5	Cover	Polyamide	1	
4	Sleeeve spool assy.	-	1	
3	Body	Aluminim alloy die casting	1	
2	Holder	Steel	2	
1	Spring	Steel	2	

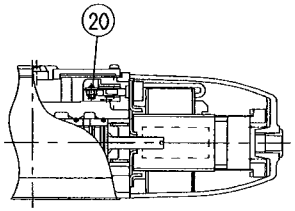
※1 Position	
C	3-pos all port closed
O	3-pos load ports open to exhaust ports

※2 Port size	
04	Rc1/2
06	Rc3/4

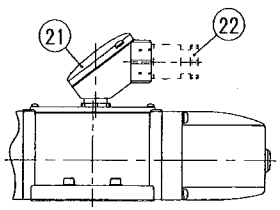
※3 Option

No code	No option (Lead wire type)
P	Lock-type manual override
C	Push-in connector
B	Circular terminal box
G	Circular terminal box with gland
U	Acid proof painting

C



B·G



※4 Rated voltage	
AC100V	AC100V (50/60Hz)
AC200V	AC200V (50/60Hz)

MARK	REVISIONS	DATE	CH'D	APP'D
△x				
△x				
△x				
△x				

OA

APP'D	CH'D	DES'D	第三角法
M. ITO		MI. KOIKE	
MAY. 08. 2003		MAY. 08. 2003	SCALE NO SCALE

品番 NO	
仕様書NO SPEC NO	
品名 DESCRIPTION	DIRECT OPERATED 4 WAY VALVE (Internal structure drawings)
形番 MODEL	FD ※1 4 - ※2 - 4 - ※3 - ※4
図番 DRAW NO	F 3 - 8 7 0 1 4 2 - A

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CAD

TE-106

Discontinue