

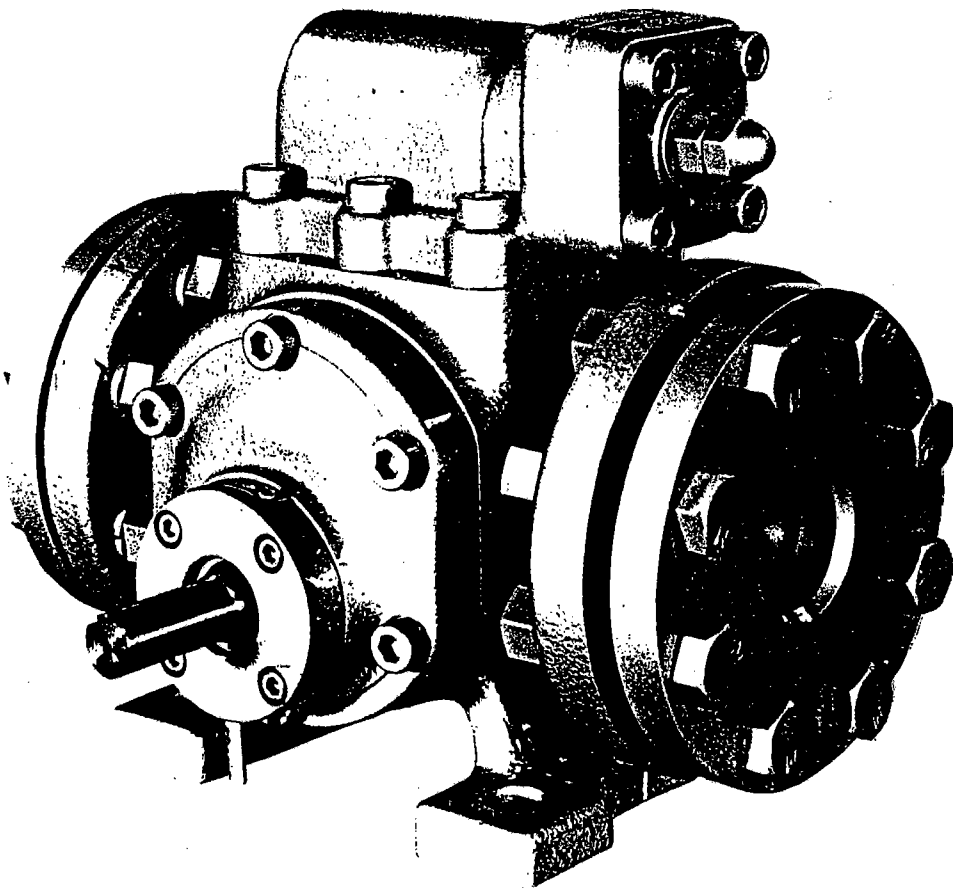
TDP-T03-56

MYCOM OIL PUMP

M50P

M60P

Handling Manual



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## 1. Introduction

The MYCOM oil pump, a specially designed high quality screw gear pump, has been developed out of MYCOM's extensive experience in manufacturing refrigeration screw compressors for many years.

The pump incorporates a specially designed rotor profile, a male rotor with four(4) lobes and a female rotor provided with six(6) lobes.

The MYCOM oil pump, therefore, has the following special characteristics not found on usual gear pumps:

### Features:

#### 1) Assures higher pumping efficiency

In comparison with usual gear pumps, the MYCOM screw gear pump assures for higher pumping efficiency.

#### 2) Compactness and high performance

The MYCOM oil pump has larger displacement per rotation than other gear pumps provided with gear profile of the same size (Dia. x Width) as the screw gear pump rotor.

The dimensions of the MYCOM oil pump are therefore relatively smaller than those of other pumps of equivalent capacity.

#### 3) Wide selection of r.p.m. and displacement

The MYCOM oil pump offers a wide selection of r.p.m. specs from low to high speed, and pump displacement can easily be selected based on r.p.m..

#### 4) No axial thrust means longer life

Axial thrust has been completely eliminated in the MYCOM oil pump by utilization of a double helical rotor profile. This minimizes bearing wear and assures longer life of the pump.

- 5) Less noise and vibration during operation
- 6) High sealing efficiency

The mechanical seal material has approximately two times of the frictional durability of parts made of cemented carbide.

The mechanical seal of the MYCOM oil pump is made of silicon carbide to assure long service life.

## 2. Standard specifications

### 2-1. Standard specifications

Design pressure	:20(kg/cm <sup>2</sup> )
Viscosity range	:3~500(cst)
Max. temperature	:80(°C)
Adjustable range of the relief valve	:1~4(kg/cm <sup>2</sup> )
Driving direction	:Clockwise
Suction	:Right side
Discharge	:Left side

### 2-2. Capacity

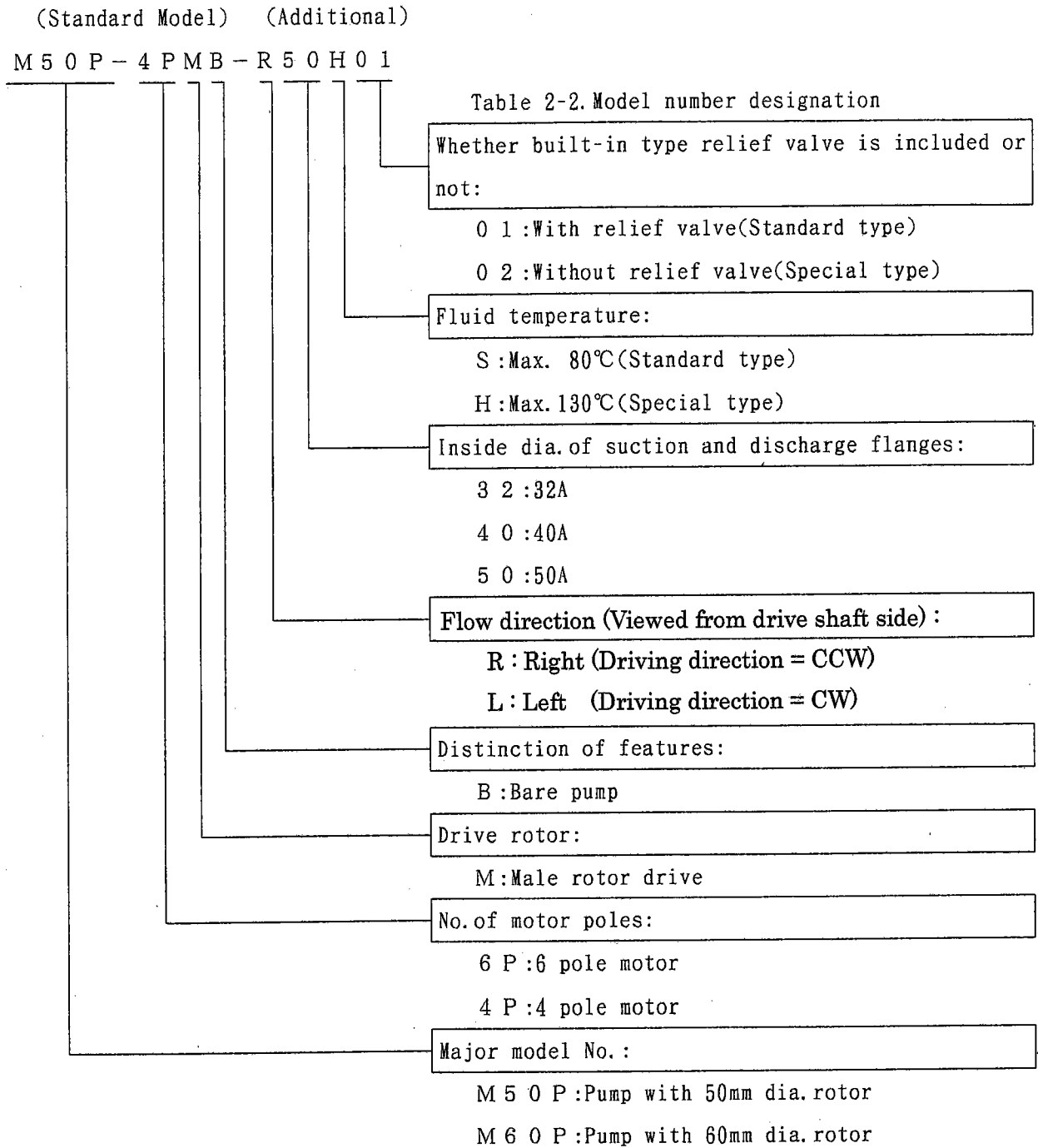
The standard capacity of the MYCOM MP series oil pump is shown in Table 2-1 below:

Table 2-1. Capacity and Brake KW of MYCOM MP series oil pump

Model No.	Total pressure kgf/cm <sup>2</sup>	50Hz			60Hz		
		Displacement l/min.	Brake KW KW	rpm	Displacement l/min.	Brake KW KW	rpm
M50P-6PM	3	65	0.57	950	79	0.71	1150
M50P-4PM	3	102	0.94	1450	123	1.20	1750
M60P-6PM	3	133	1.20	950	162	1.46	1150
M60P-4PM	3	208	1.98	1450	252	2.54	1750

Note: Figures shown above are based on 100cSt oil viscosity.

2-3. Model number designation



### 3. Component parts

#### 3-1. Component parts

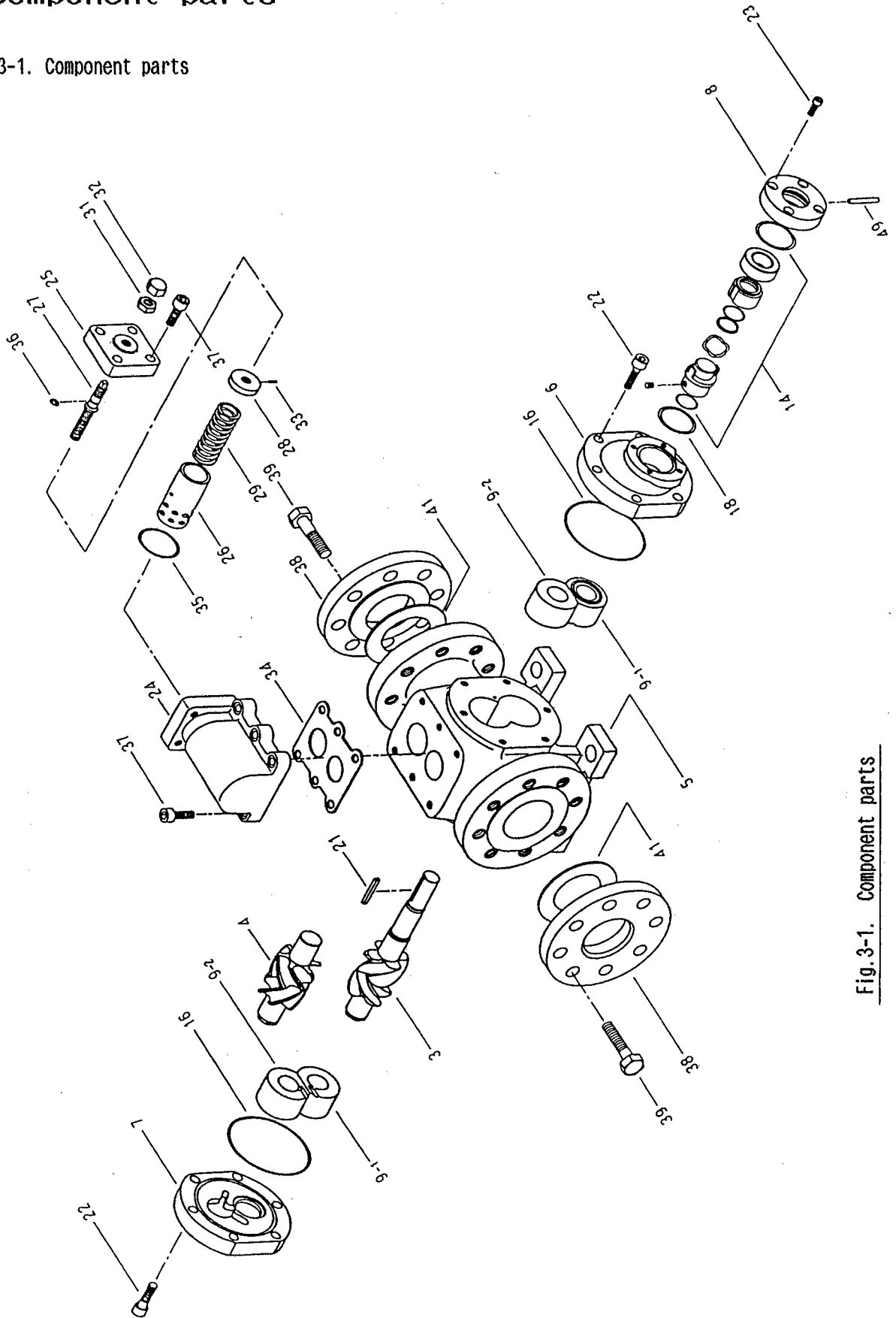


Fig. 3-1. Component parts



## 3-2. Table of component parts

Table 3-1. Component parts of the pump

(1)M50P

No.	PARTS NAME	DRW. No.	Q' ty	REMARKS
3	Drive rotor	05P10300	1	
4	Idle rotor	05P10400	1	
5	Gear casing	05P10500	1	
6	Seal cover	05P10600	1	
7	Bearing cover	05P10700	1	
8	<b>Seal retainer</b>	05P10800	1	
9-1	Drive rotor bearing	05P10910	1set	2 pcs/set
9-2	Idle rotor bearing	05P10920	1set	2 pcs/set
14	Mechanical seal assembly	05P11400	1set	
16	"O" rings	05P11600	2	JIS B 2401 G95
18	"O" ring	05P11800	1	JIS B 2401 G45
21	Key	05P12100	1	5×5×40
22	Hexagon socket head bolts	05P12200	12	M10×35
23	Hexagon socket head bolts	05P12300	4	M6×20
24	Relief valve body	05P22400	1	
25	Body flange	05P22500	1	
26	Piston	05P22600	1	
27	Adjusting bolt	05P22700	1	
28	Spring guide	05P22800	1	
29	Spring	05P22900	1	
31	Hexagon nut	05P23100	1	JIS M12, Class 3
32	Hexagon cap nut	05P23200	1	JIS M12, Class 3
33	Locking pin	05P23300	1	φ3×8
34	Gasket	05P23400	1	
35	"O" ring	05P23500	1	JIS B 2401 G45
36	"O" ring	05P23600	1	JIS B 2401 P9
37	Hexagon socket head bolts	05P23700	10	M10×30
38	Counter flanges	05P13800	2	JIS20K
39	Counter flange bolts	05P13900	16	M16×55
41	Flange gaskets	05P14100	2	JIS20K
49	Drain pipe	05P14900	1	φ6

Table 3-1. Component parts of the pump

(2)M60P

No.	PARTS NAME	DRW.No.	Q' ty	REMARKS
3	Drive rotor	06P10300	1	
4	Idle rotor	06P10400	1	
5	Gear casing	06P10500	1	
6	Seal cover	06P10600	1	
7	Bearing cover	06P10700	1	
8	Seal cover	06P10800	1	
9-1	Drive rotor bearing	06P10910	1set	2 pcs/set
9-2	Idle rotor bearing	06P10920	1set	2 pcs/set
14	Mechanical seal assembly	06P11400	1set	
16	"O" rings	06P11600	2	JIS B 2401 G125
18	"O" ring	06P11800	1	JIS B 2401 G55
21	Key	06P12100	1	8×7×45
22	Hexagon socket head bolts	06P12200	12	M10×30
23	Hexagon socket head bolts	06P12300	6	M6×20
24	Relief valve body	06P22400	1	
25	Body flange	06P22500	1	
26	Piston	06P22600	1	
27	Adjusting bolt	06P22700	1	
28	Spring guide	06P22800	1	
29	Spring	06P22900	1	
31	Hexagon nut	06P23100	1	JIS M12, Class 3
32	Hexagon cap nut	06P23200	1	JIS M12, Class 3
33	Locking pin	06P23300	1	φ3×8
34	Gasket	06P23400	1	
35	"O" ring	06P23500	1	JIS B 2401 G45
36	"O" ring	06P23600	1	JIS B 2401 P9
37	Hexagon socket head bolts	06P23700	10	M10×30
38	Counter flanges	06P13800	2	JIS20K
39	Counter flange bolts	06P13900	16	M16×45
41	Flange gaskets	06P14100	2	JIS20K
49	Drain pipe	06P14900	1	φ6

Table 3-2. Component parts of the mechanical seal

( M 5 0 P )

No.	DRW. No.	PARTS NAME	MATERIAL	Q'ty	REMARKS
14	05P11400	Assembly, mechanical seal	Sic+Sic	1set	
141	05P11410	Set screw	SCM435	2	401601-M6 ×6
142	05P11420	Wave washer	SK-5M	1	W25
145 -1	05P11450-1/2	'O' ring	VITON	1	φ25.12 × 1.78 For FREON
145 -2	05P11450-2/2	'O' ring	NBR	1	φ25.12 × 1.78 For NH3
145 -A	05P11450-A	Adapter	TEFLON	1	490173-#79
146	05P11460	Seal ring	Sic'Z3S'	1	39-437020
147 -1	05P11470-1/2	'O' ring	VITON	1	JIS B 2401 P42 For FREON
147 -2	05P11470-2/2	'O' ring	NBR	1	JIS B 2401 P42 For NH3
148	05P11480	Insert	Sic'Z3S'	1	39-437021
149	05P11490	Collar	SUS403	1	47-437022
151 -1	05P11510-1/2	'O' ring	VITON	1	φ21.95 × 1.78 For FREON
151 -2	05P11510-2/2	'O' ring	NBR	1	φ21.95 × 1.78 For NH3

Table 3-2. Component parts of the mechanical seal

( M 6 0 P )

No.	DRW. No.	PARTS NAME	MATERIAL	Q'ty	REMARKS
14	08P11400	Assembly, mechanical seal	Sic+ CARBON	1set	
141	08P11410	Rotating ring	Sic/ SUS430	1	
142 -1	08P11420-1/2	'O'ring (JIS Hs 90 )	VITON	1	JIS B 2401 G35 For FREON
142 -2	08P11420-2/2	'O'ring	NBR	1	JIS B 2401 G35 For NH3
143	08P11430	Floating ring	CARBON	1	C8
144 -1	08P11440-1/2	'O'ring (JIS Hs 90 )	VITON	1	JIS W 1516 P24 For FREON
144 -2	08P11440-2/2	'O'ring	NBR	1	JIS W 1516 P24 For NH3
145	08P11450	Spring	SUS316	9	
146	08P11460	Spring retainer	SUS304	1	
147	08P11470	Set screw	SUS316	2	
148	08P11480	Back-up ring	SUS304	1	
149 -1	08P11490-1/2	'O'ring (JIS Hs 90 )	VITON	1	JIS W 1516 G4 For FREON
149 -2	08P11490-2/2	'O'ring	NBR	1	JIS W 1516 G4 For NH3
151	08P11510	Stopper ring	SUS430	1	
152 -1	08P11520-1/2	'O'ring	VITON	1	JIS W 1516 P21 For FREON
152 -2	08P11520-2/2	'O'ring	NBR	1	JIS W 1516 P21 For NH3

3-3. Sectional view of the pump assembly

Fig.3-2. Sectional view of Model M50P

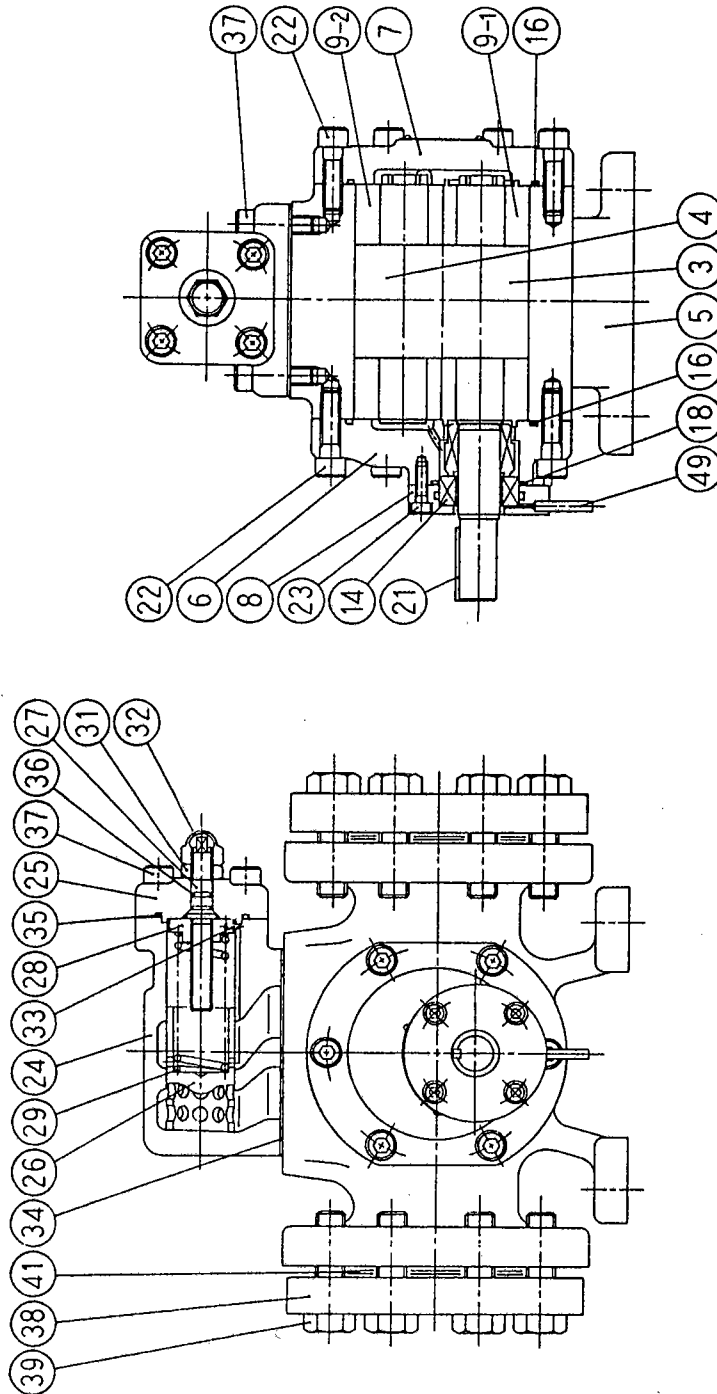


Fig.3-2. Sectional view of Model M50P, M60P

## 4. Special cautions

### 4-1. Installation

#### 1) Installation point

The suction pipe end should be as close to the fluid source as possible and longer than the height of the suction header.

The fewer accessories on the suction side improve on the suction resistance.

#### 2) Foundation

The foundation of the pump should be strong enough to bear motor driving torque and keep shaft of the pump and the motor aligned.

#### 3) Centering

Centering should be carried out after installation is completed.

Centering adjustment should comply with the following allowable specifications:

Parallel error	.....	Less than 0.05 mm
Inclination error	.....	Less than 0.10 mm

Remarks : Poor centering adjustment may cause rapid wear of moving parts, vibration, noise, etc..

### 4-2. Care must be taken with piping work

#### 1) Resistance in the suction side piping should be kept to a minimum.

Suction strainer : 100 to 200 (mesh)

#### 2) With piping work, care must be taken to prevent prestressing of piping due to welding strain. Sharp pipe bending is to be avoided to minimize fluid resistance.

- 3) During piping work, all openings of the pump should be provided with the blind covers to prevent foreign matter from entering the pump.

Do not forget to remove blind covers after piping work finished.

## 5. Operation

### 5-1. Precautions when starting

- 1) Confirm driving direction of the electric motor. (Disconnect the motor coupling.)
- 2) Confirm that suction line is arranged for satisfactory drawing of fluid by the pump.
- 3) Fully open both suction and discharge valves of the pump. When the pump is provided with the relief valve, leave the relief valve as is when starting and carry out adjustment after commencing operation.
- 4) Turn coupling by hand to confirm smooth rotation. If coupling rotation is not smooth, the pump should not be started until rubbing is eliminated.
- 5) When starting operation, first switch on for several seconds to confirm normal operation, then commence operation.

### 5-2. Caution during operation

- 1) After continuous operation has been started, check for abnormal pressure, vibration, noise, shaft seal mechanism, etc. and remedy if necessary.

### 5-3. Caution after operation shut down

- 1) Suction and discharge valves should be closed after the motor is stopped.

### 5-4. Other cautions

- 1) The pump should be operated strictly in accordance with specifications given.
- 2) A strong shock to on or forcible packaging of the pump are to be avoided.

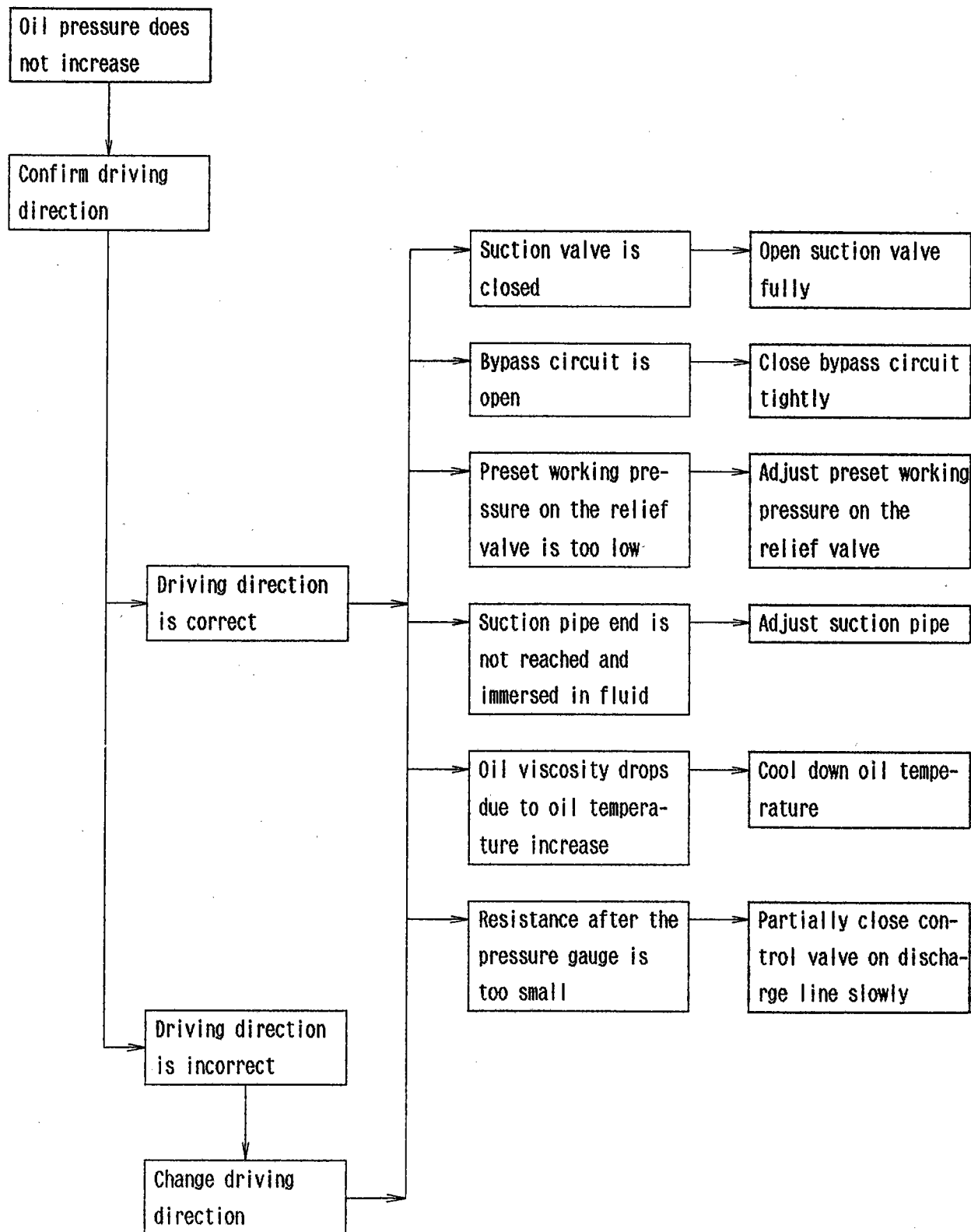
## 6. Routine checks

- 1) Leakage from the mechanical seal should not exceed Max.3 cc/hr.
- 2) Leakage from casings other than the mechanical seal should be checked for constantly.
- 3) Check for changes in pressure and flow rate.
- 4) Mechanical noise should be monitored.
- 5) Abnormal temperature increases of the component parts should be located as soon as possible.

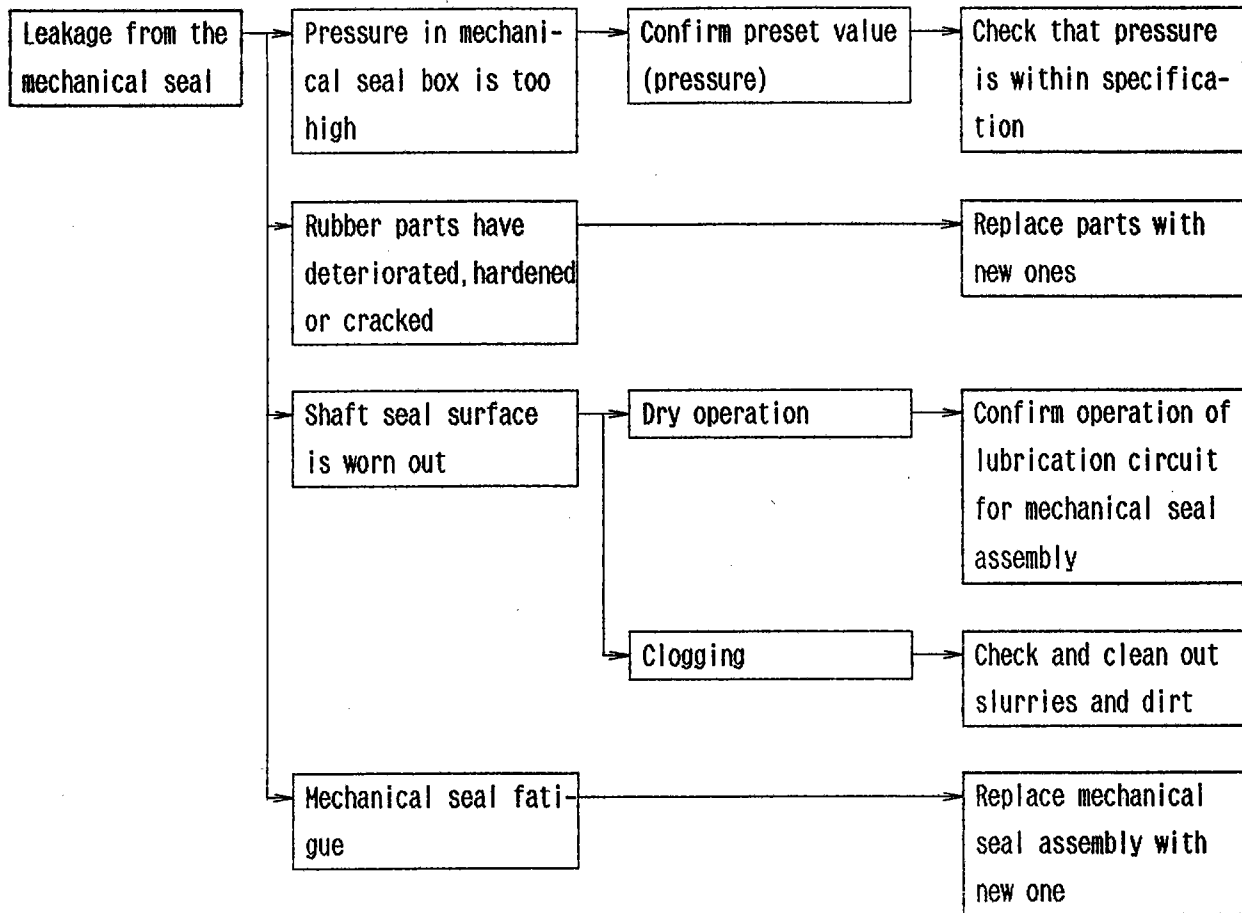


## 7. Troubles and remedies

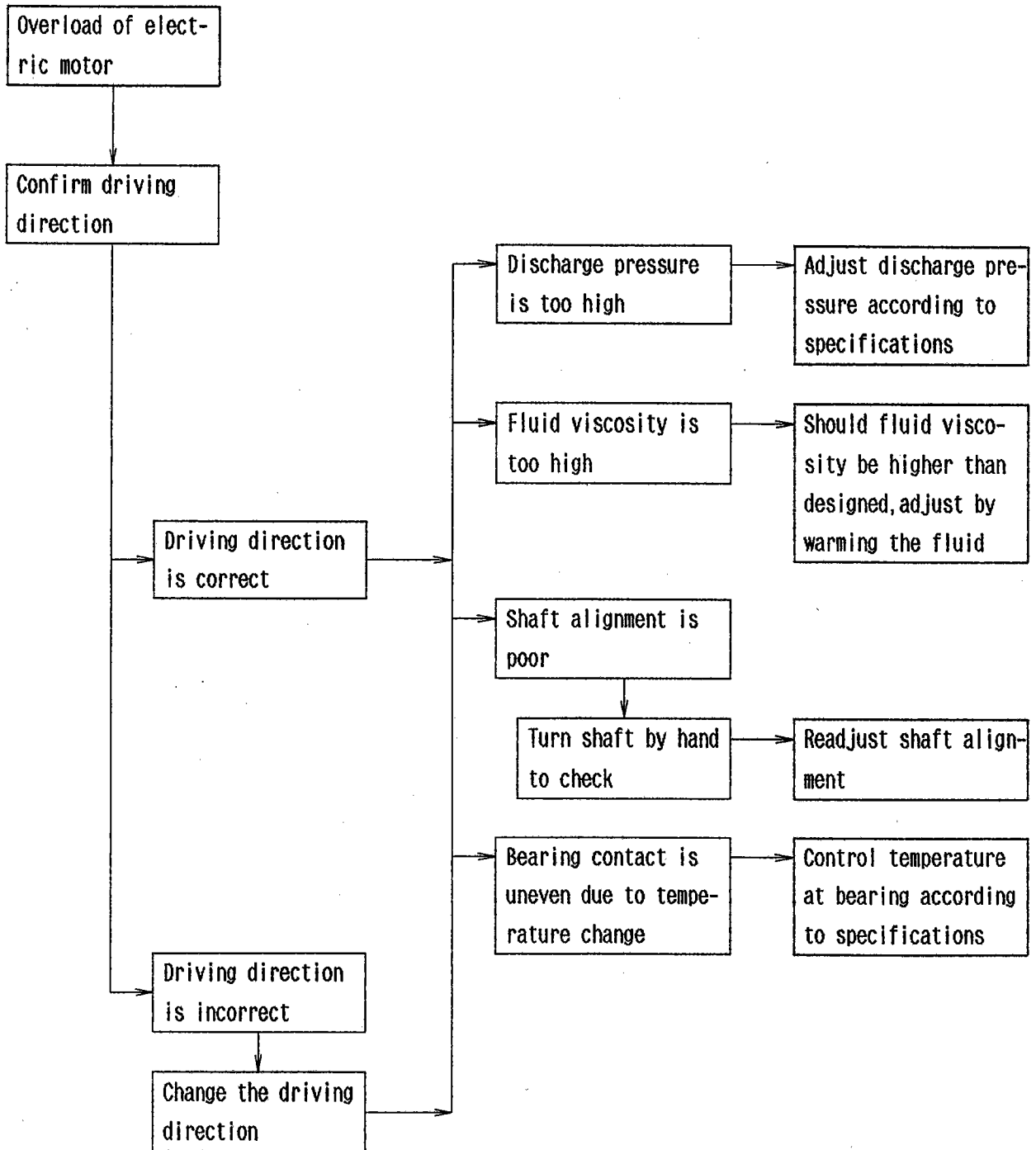
### 7-1. Oil pressure does not increase



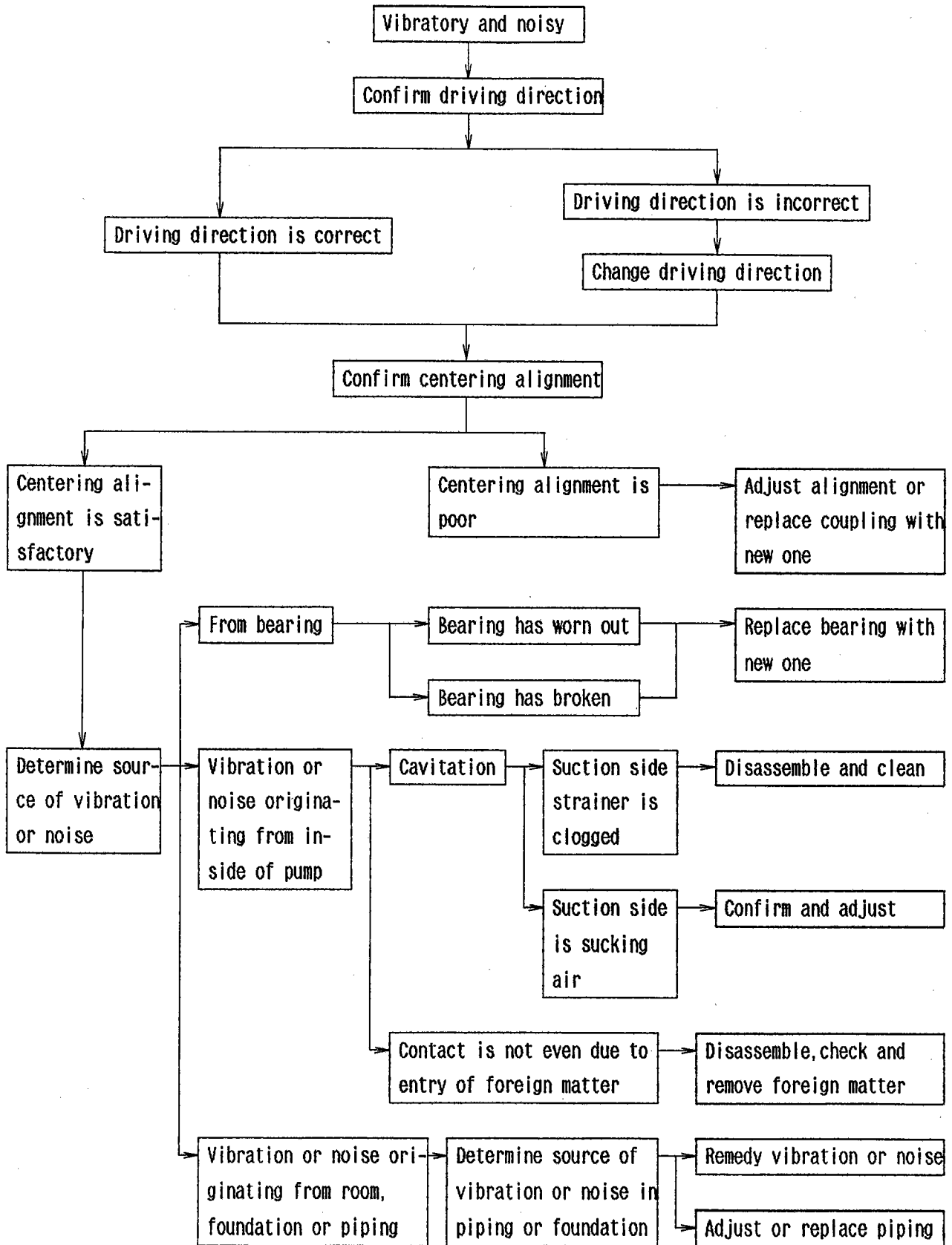
7-2. leakage from the mechanical seal



### 7-3. Overload of electric motor



7-4. Vibration and noise



## 8. Disassembly/assembly

### 8-1. Disassembly of the pump

Disconnect the coupling. Remove the pump from the common base. Loose the set screw on the coupling. Draw the coupling out of the shaft.

- 1) Remove the relief valve from the pump, if there are.
- 2) Remove the seal retainer(8) from the seal cover(6).
- 3) Remove the seal cover(6) from the gear casing(5).
- 4) Loose the set screw(141) of the collar(149).
- 5) Remove the mechanical seal(14) from the drive rotor(3).
- 6) Remove the blind cover(7) from the gear casing(5).
- 7) Draw the rotors(3 and 4) from the blind cover side of the gear casing(5).

\*1 If it is difficult, tap the shaft end softly with a plastic mallet.

\*2 The bearings(9-1 and 9-2) at the blind cover side draw with the rotors(3 and 4).

\*3 If temperature of bearings exceeds 30°C, do not remove until temperature drops below 30°C.

\*4 Drive rotor and idle rotor cannot be disassembled.

- 8) Draw the bearings(9-1 and 9-2) at the seal cover side from the gear casing(5).

### 8-2. Assembly of the pump

Clean the all parts listed in table 3-1, and arrange them on a clean and dry cloth.

- 1) Fit the interlocking marks of the drive rotor(3) and the idle rotor(4), and interlock the rotors.
- 2) Insert the rotors(3 and 4) into the blind cover side of the gear casing(5).
- 3) Coat the all surfaces of bearing with oil.
- 4) Point the groove of the bearing(9-1 and 9-2) to the discharge side, and mount the bearings to the rotors(3 and 4).
- 5) Coat the blind cover(7) and the 'O'ring(16) with oil.
- 6) Set the 'O'ring(16) to the blind cover(7).
- 7) Install the blind cover(7) to the gear casing(5).

- 8) Assemble the mechanical seal assembly(14), the seal cover(6) and the seal retainer (8).

Refer to details of 8-5, procedure of the mechanical seal assembly.

- 9) In case the pump has the relief valve(24), install the relief valve to the gear casing(5). If not so, install the blind plate(50) to the gear casing(5).

### 8-3. Disassembly of the relief valve

Remove the relief valve(24) from the pump.

- 1) Remove the hexagon cap nut(32).
- 2) Loosen the relief valve adjusting bolt(27) by turning counterclockwise fully.
- 3) Remove the hexagon nut(31).
- 4) Draw the hexagon socket head bolts(37).
- 5) Remove the relief valve flange(25) with the relief valve adjusting bolt(27) and the spring guide(28).
- 6) Draw the relief valve adjusting bolt(27) with the 'O'ring(36) from the relief valve flange(25).
- 7) Remove the spring guide(28) by turning clockwise.
- 8) Draw the spring(29) and the piston(26) from the relief valve(24).

### 8-4. Assembly of the relief valve

Arrange the parts listed in No.24 ~37 of table 3-1 on a clean and dry cloth.

- 1) Coat the piston(26) with oil.
- 2) Insert the piston(26) and the spring(29) to the relief valve(24).
- 3) Mount the 'O'ring(36) to the relief valve adjusting bolt(27).
- 4) Insert the relief valve adjusting bolt(27) to the relief valve flange(25).
- 5) Screw the spring guide(28) to the relief valve adjusting bolt(27).
- 6) Coat the 'O'ring(35) with oil.
- 7) Set the 'O'ring(35) in the relief valve flange(25).
- 8) Install the relief valve flange(25) to the relief valve(24).

\* Point the locking pin(33) into the groove of the relief valve(24).

9) Screw the hexagon cap nut(32)

\*Install the relief valve to the pump in exactly direction.

For oil pressure adjustment of the relief valve, refer to page 19~20.

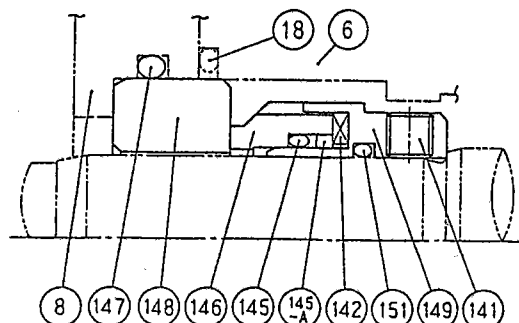
#### 8-5. Procedure of the mechanical seal assembly

Arrange the parts in peaces listed in Fig. 8-1, 8-2 on a clean and dry cloth.

##### 8-5-1. M50P

- 1) Coat the "O" ring(151) with oil.
- 2) Set the "O" ring(151) in the collar(149).
- 3) Mount the collar(149) to the drive rotor(3).
- 4) Screw the set screw(141) on the collar(149).
- 5) Insert the wave washer(142) in the collar(149).
- 6) Coat the "O" ring(145) with oil.
- 7) Set the "O" ring(145) in the seal ring(146).
- 8) Insert the adapter(145-A) in the seal ring(146).
- 9) Mount the seal ring(146) in the collar(149).
- 10) Coat the "O" ring(16) with oil.
- 11) Set the "O" ring(16) to the seal cover(6).
- 12) Install the seal cover(6) to the gear casing(5).
- 13) Coat the "O" ring(147) with oil.
- 14) Set the "O" ring(147) in the seal retainer(8).
- 15) Mount the insert(148) to the seal retainer(8).
- 16) Coat the "O" ring(18) with oil.
- 17) Set the "O" ring(18) to the seal cover(6).
- 18) Install the seal retainer(8) to the seal cover(6).

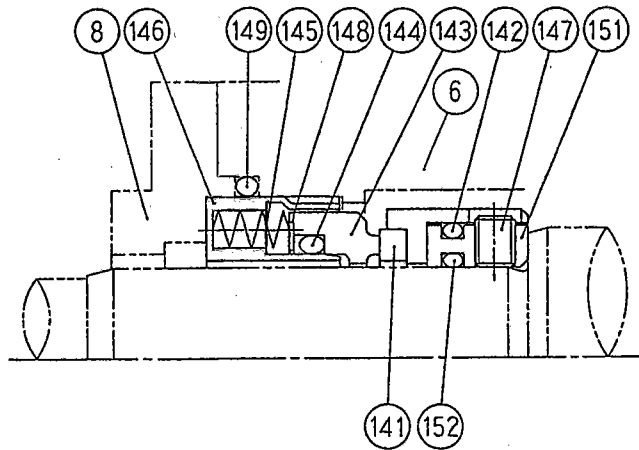
Fig. 8-1. Sectional view of mechanical seal assembly



8-5-2. M60P

- 1) Coat the "O" ring(152) with oil.
- 2) Set the "O" ring(152) in the stopper ring(151).
- 3) Mount the rotating ring(141) to the drive rotor(3).
- 4) Screw the set screw(147) on the rotating ring(141).
- 5) Coat the "O" ring(144) with oil.
- 6) Set the "O" ring(144) in the floating ring(143).
- 7) Coat the "O" ring(149) with oil.
- 8) Set the "O" ring(149) in the seal retainer(8).
- 9) Mount the spring retainer(146) to the seal retainer(8).
- 10) Mount the floating ring(143) in the spring retainer(146).
- 11) Coat the "O" ring(16) with oil.
- 12) Set the "O" ring(16) to the seal cover(6).
- 13) Install the seal cover(6) to the gear casing(5).
- 14) Coat the "O" ring(18) with oil.
- 15) Set the "O" ring(18) to the seal cover(6).
- 16) Install the seal retainer(8) to the seal cover(6).

Fig. 8-2. Sectional view of mechanical seal assembly





## 9. Adjustment of the relief valve (24 through 32)

Fig.9-1. Sectional view of the relief valve

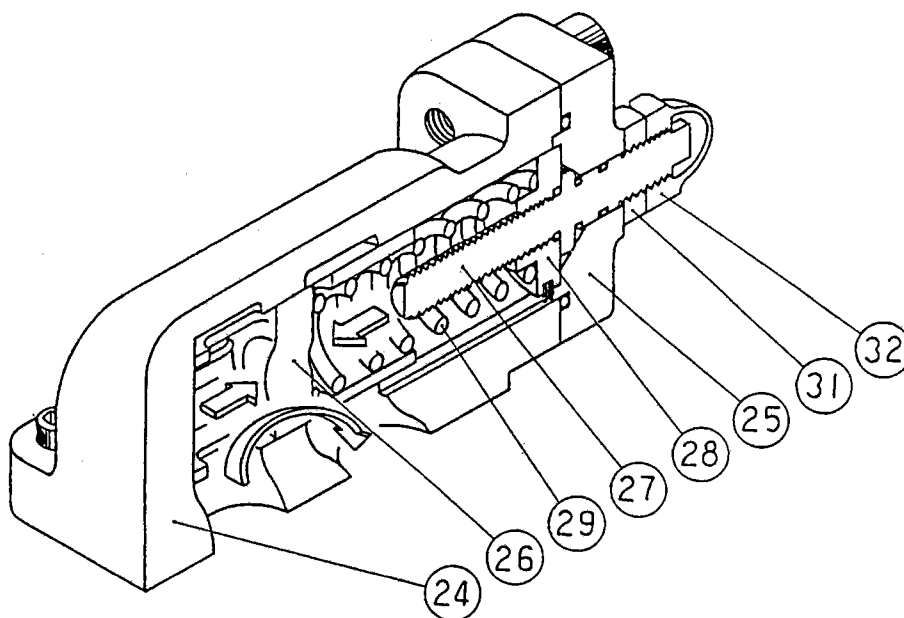


Table 9-1. Parts of the relief valve

No.	PARTS NAME	No.	PARTS NAME
24	Relief valve body	28	Spring guide
25	Body flange	29	Spring
26	Piston	31	Hexagon nut
27	Adjusting bolt	32	Hexagon cap nut

9-1. Take off hexagon cap nut(32) and loosen hexagon nut(31).

9-2. Turn adjusting bolt(27) clockwise to increase oil pressure and counterclockwise to decrease.

Remarks :

1) Pressure increase per rotation of adjusting bolt is approximately as shown below :

Model No.	Pressure increase per turn(kgf/cm <sup>2</sup> )
M50P	0.20 ~ 0.25
M60P	0.25 ~ 0.30

2) Maximum effective rotation of adjusting bolt is 16 turns from fully open status position turning counterclockwise.