JM (O) SERIES

INSTALLATION MANUAL

OPERATION AND MAINTENANCE

Keep this Manual at hand so that you can read it any time. Read it thoroughly and have a proper understanding of it before you use the product.

NAKAKIN

SAFETY PRECAUTIONS

(Read the Security Precautions carefully to use the product correctly.)

※If the warnings, notices and/or attentions in this Manuals are not observed, material damages and injuries, even death may occur.

NEVER FAIL TO OBSERVE THESE SAFETY PRECAUTIONS.

[LABELING]

※The degree of the dangers, risks and/or damages are described with the following labeling:

⚠ WARNING	WARNING presumes death or heavy injury when disregarded.
⚠ IMPORTANT	IMPORTANT assumes injury or material damage when disregarded.

[Icons]

※Different precautions are classified by icons.

⚠	This icon means your due attention should be drawn to what follows.
 Prohibition	This icon indicates part actions that are prohibited. What follow this icon or what are described in the vicinity of this icon are forbidden.
	This icon means that some actions are "mandatory" ; what follows this symbol should be executed without fail.

※Keep this reference at hand so as to refer to them any time.

Thank you very much for selecting NAKAKIN' s Rotary Pump. Nakakin Rotary Pumps have been designed, manufactured and inspected carefully to assure maximum safety.

Please note that these pumps are highly mechanical precise machine. Make sure to thoroughly read this Manual, before the use, handling and/or maintenance/inspection of the pumps. Any misuse or erroneous operation/handling may cause unexpected troubles and/or accidents.

Keep this Manual at hand.

Any change to the specifications of your pump system should be communicated to our personnel in charge of sales for confirmation.

CONTENTS

⚠ 1. IMPORTANT

1) Thoroughly read this Manual and have a full understanding of Nakakin' s Rotary Pumps and its auxiliaries/accessories before actual use.

2) Never fail to periodically maintain and inspect Nakakin' s Rotary Pumps.

Nakakin' s rotary pumps being mechanically precise machines, they may cause unexpected troubles if they are misused or operated erroneously. Any maintenance and/or inspection work shall be carried out with reference to 19. MAINTENANCE AND INSPECTION (Page 25).

3) Should any scratches and/or contact damage occur in the wetted parts, remove or finish them.

If left as such, the defects will spread and cause damage or failure to the pumps.

4) Any piping or tubing to be connected with the pumps shall be completely washed to remove any foreign matter and/or dirt/dust.

Foreign matter and/or dirt generated during piping work may penetrate into the pumps and cause damage and/or troubles to the pumps.

5) Never try to do the shut-off operation on both the suction side and discharge side.

When the pump is operated with the two ends shut, the in-pump pressure will rise abnormally.

6) Do not try idling the pumps.

Idling may heat and consequently damage the seal. It will not only shorten the service life of the seal, but it may cause damages and troubles to the pump itself. However, please consult us if cannot be avoided.

7) Always observe the instructions given on the WARNING label of the pump.

Never peel off the WARNING label attached to the pump.
If the label is worn out, replace it with a new one.

8) Extreme caution must be taken not to be in the direct vicinity of any turning bodies while the pump is running.

9) Never touch the pump body when the temperature of the liquid is high, since the temperature of the pump becomes high.

10) Never run the pump beyond the rotation number, pressure and/or temperature as prescribed in the specifications.

If you must use the pump beyond such limits or sheer necessity, never fail to contact us for confirmation of safety.

11) Never use the pump under any abnormal conditions.

If any anomaly is found, remove the cause of such abnormality immediately.

12) If there is any problem in use or in parts, do not hesitate to consult us.

⚠ 2. NSPECTIONS

A. Inspection before Starting the Pump

1. Make sure that the electric wires have been connected correctly and that the voltage is within the specified values for the motor.
2. To avoid the risk of leak, connect the ground without fail. We recommend attaching an earth leakage breaker.
3. Confirm that the couplings and V-pulleys for the pumps and speed change gears are properly connected.
4. Confirm that the rotational direction of the pump coincides with that of the motor.
5. Confirm the appropriate oil levels of the pump, speed change gear and the like.
6. Remove, from the operation area, any and all materials, tools and others that may cause any personal injury or damages to pumps.
7. Be sure that the pumps are ready for operation with all the piping duly secured.
8. Make sure that there is a liquid on the suction side of the pump and that the liquid can flow into the pump when it begins to run.
9. Check that all the indicating lamps. valves, pressure gages, and any other safety devices and/or indicators can function normally.

B. Inspection after Stopping the Pump

1. Check that the pump comes to a standstill with the power supply, air source and hydraulic oil shut off.
2. Make sure that all the valves of the process line and valves of bypass line nearest to the suction and discharge openings in the pump have been completely shut off.
3. Drain the liquid remaining in the piping and make sure there be no liquid or pressure left in the pump.
4. Check that the temperature of the pump and piping has lowered down to the degree that would not cause any burns.

⚠ 3. CONFIRMATION OF PUMP MODELS AND SPECIFICATIONS

A. Manufacturer' s Serial Number

Nakakin' s Sanitary Rotary Pumps have each the name plates with their manufacturer' s serial numbers stamped. Casings and casing covers have their numbers stamped on their surface too.
Any inquiry or parts order shall indicate these numbers.

B. Pump Models

There are eleven (11) types of J series pumps: 2 to 300.
Other pump series are RM, RO, RMU, RXU and HPM.

C. Piping Bore

The pipe bore for each pump is stamped on the respective name plates.

D. Rated Pressure

The rated pressure for each pump is stamped on the respective name plates.
The rated pressures are based on the technical calculations and test results. The individual rated pressures have been checked independently at the time of delivery.
Note that these rated pressures are valid only when the number of rotation is within the allowable maximum rotational number.

⃠ CAUTION No.1

Never run the pumps beyond their respective rated pressure.

Should any pressure highly than the rated one be applied while the pump is running, the rotor may come into contact with the casing or casing cover. Such contact may cause galling that may lead to pump failure and/or damages of their parts. If any contact damages occur in the rotor and the like, immediately repair and/or correction the damage.
If any process may produce a pressure exceeding the rated pressure, protect the pumps by attaching a relief valve or safety valve.

E. Pressure Specification

Note that the specified pressure, which has been selected based on the individual specification of the pumps, is less than the rated pressure.

⃠ CAUTION No.2

Never use any pump beyond its specified pressure.

Extreme caution should be taken to the fact that if any pressure higher than the specified one is applied while operating the pump, the motor will run short of its motive power.
Care and attention should be paid to the fact that insufficient motive force may damage motors, speed change gears, and the like.

F. Allowable Rotation Number

Allowable rotation speed has been pre-determined for each pumps (refer to Page 5).
However, the actual rotation number may depend on the specifications and/or nature of the liquid conveyed. In such case, please consult us for further information.
Note that the allowable rotation speed may fall below 100 rpm or less if any solids mingle with the liquid.

⃠ CAUTION No.3

Never try to use the pumps beyond their allowable rotation speed.

Any running of pumps beyond their respective allowable rotation speed may cause the deflection of bearing, cavitation and other inconveniences thereby causing the rotor to contact the casing or casing cover.
Since such contact will cause galling which may damage the parts or cause pump failure, immediately repair or correct the damage if any rotor or the like suffers such contact damage.
Notice that the allowable rotation speed may depend on the viscosity and other properties of the liquid.
When you change the liquid or other important factors, consult us for confirmation.

G. Rated Temperature

The rated temperature of standard pumps is max. 95℃.
The rated temperature for HT (high temperature) specification, max. 150℃.

⃠ CAUTION No.4

Never use the pumps in any manner whatsoever beyond their rated temperature.

If the process liquid temperature exceeds the rated temperature or if the pump is run under abrupt temperature change, the rotor may come into contact with the casing or casing cover.
Since such contact will cause galling which may damage the parts or cause pump failure, immediately repair or correction the damage if any rotor or the like suffers such contact damage.

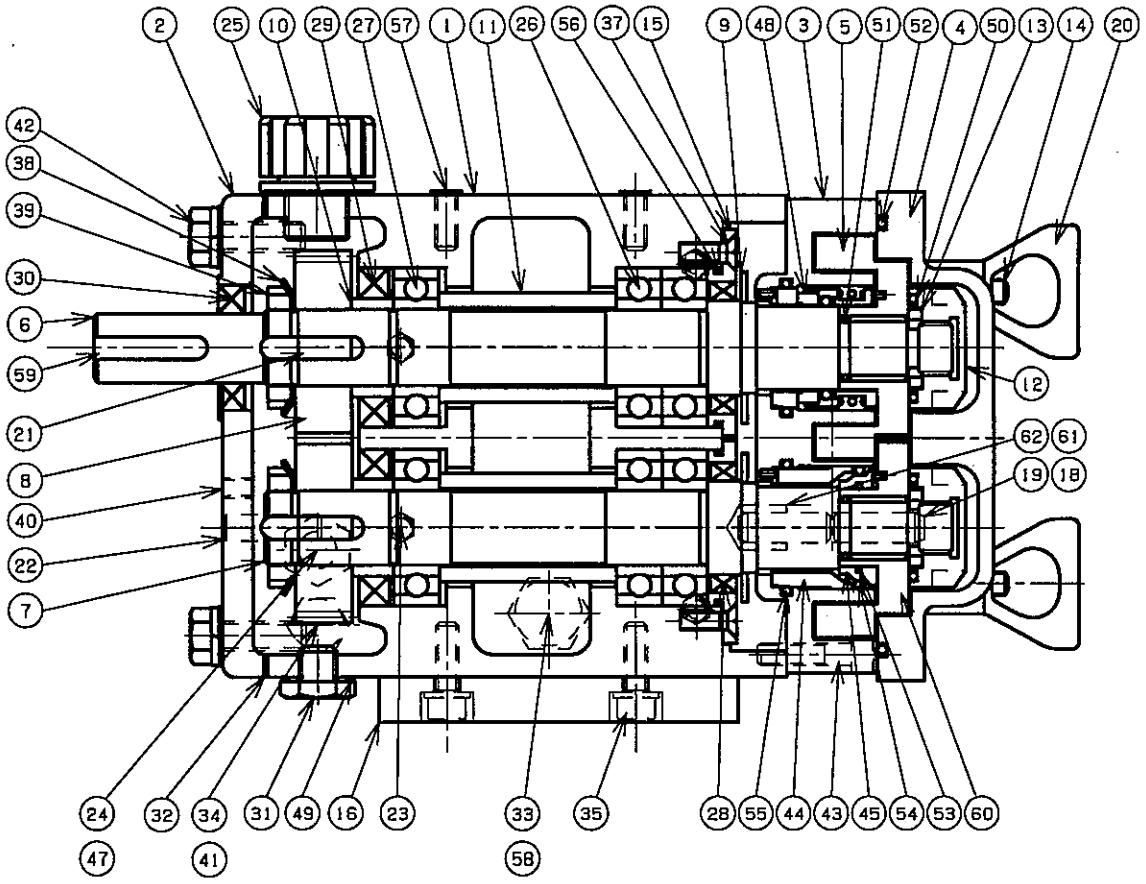
4. PUMP SPECIFICATIONS

Model of Pump	Piping Bore (Sanitary)	Max. Number of Rotation (rpm)	Max. Discharge (L/min)	Discharge (L/rev)	Max. Discharge Pressure
JM(O) 2	1 S	800	8	0.010	0.7MPa 7kgf/cm²
JM(O) 4	1 S	800	20	0.025	0.7MPa 7kgf/cm²
JM(O) 10	1 1/2 S	800	40	0.05	1.5MPa 15kgf/cm²
JM(O) 16	1 1/2 S	600	60	0.10	1.5MPa 15kgf/cm²
JM(O) 25	1 1/2 S 3 S × 2 S	450	100	0.22	1.5MPa 15kgf/cm²
JM(O) 40	2 S 3 S × 2 S	450	135	0.30	1.5MPa 15kgf/cm²
JM(O) 55	2 S 3 S × 2 S	450	270	0.60	1.5MPa 15kgf/cm²
JM(O)125	2 1/2 S 3 S	450	410	0.92	1.5MPa 15kgf/cm²
JM(O)160	4 S	450	550	1.22	1.5MPa 15kgf/cm²
JM(O)200	4 S	450	930	2.06	1.5MPa 15kgf/cm²
JM(O)300	6 S	450	1470	3.27	1.5MPa 15kgf/cm²

⊘CAUTION No.5

The table given above may be subject to modifications for improvements without prior notice. When using this table, please consult us for confirmation.

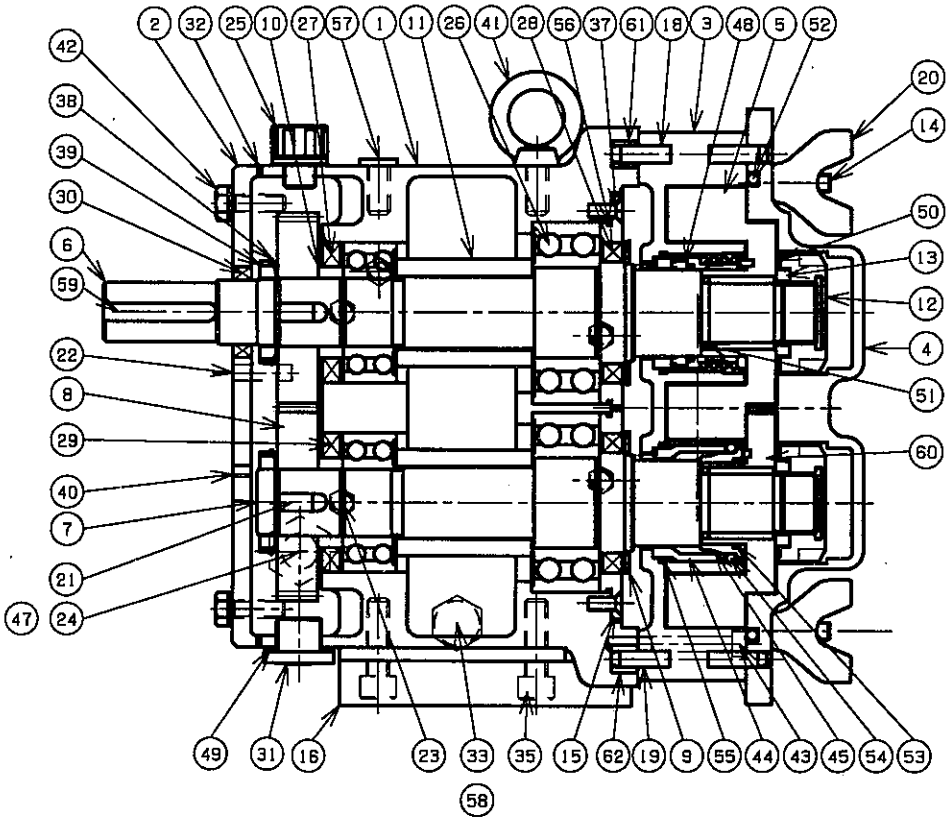
5. STRUCTURE OF JM(O) 2,4 TYPE



No.	NAME	Q' TY	MATERIAL
1	GEAR CASE	1	FC 200
2	GEAR COVER	1	FC 200
3	CASING	1	SUS 316
4	CASING COVER	1	SUS 316
5	ROTOR	2	NAKAMURA METAL
6	SHAFT (LONG)	1	SUS 316
7	SHAFT (SHORT)	1	SUS 316
8	HELICAL GEAR	1set	S45C
9	PLATE	2	SUS 304
10	SHAFT COLLAR	2	S45C
11	SPACER	2	S45C
12	CAP NUT	2	SUS 316
13	WASHER	2	SUS 316
14	STUD BOLT	4	SUS 304
15	BEARING RETAINER	2	S45C
16	BASE	1	FC 200
17			
18	KNOCK PIN	2	SUS 304
19	KNOCK PIN	2	SUS 304
20	BUTTERFLY NUT	4	SCS 13
21	KEY	2	SS 400
22	GEAR COVER KNOCK PIN	2	BS
23	GREASE NIPPLE	4	BSBM
24	OIL LEVEL GAGE	2	POLYCARBONNET
25	OIL PLUG	2	PLUSTIC
26	BEARING	2	SUJ2
27	BEARING	2	SUJ2
28	OIL SEAL	2	NBR
29	OIL SEAL	2	NBR
30	OIL SEAL	1	NBR
31	PLUG	2	SS 400

No.	NAME	Q' TY	MATERIAL
32	GEARCOVER PACKING	1	NON ASBEST
33	DRAIN PLUG	2	S20C
34	DRAIN BOLT	2	S20C
35	CAP BOLT	4	S20C
36			
37	BIS	8	SUS 304
38	LOCK WASHER	2	SS 400
39	BEARING NUT	2	SS 400
40	SET SCREW	2	SUS 304
41	DRAINBOLT PACKING	1	NON ASBEST
42	GEARCOVER BOLT	4	S20C
43	CAP BOLT	2	SUS 304
44	COLLAR FOR O-RINGSEAL	2	SUS 316
45	SLEEVE	2	SUS 316
46			
47	LEVELGAGE O-RING	1	NBR
48	MECHANICAL SEAL	2	CARBON&CERAMIC
49	PLUG O-RING	1	NBR
50	NUT O-RING	2	VITON
51	ROTOR O-RING	2	VITON
52	CASINGCOVER O-RING	1	VITON
53	SLEEVE O-RING	2	VITON
54	CASING O-RING	2	VITON
55	COLLAR O-RING	2	VITON
56	RETAINER O-RING	2	NBR
57	POLY CAP	8	POLYETHYLENE
58	DRAINBOLT PACKING	2	NON ASBEST
59	KEY	1	SS 400
60	ROTOR (O-RING TYPE)	2	NAKAMURA METAL
61	BUSH	1	SUS 304
62	BUSH	1	SUS 304

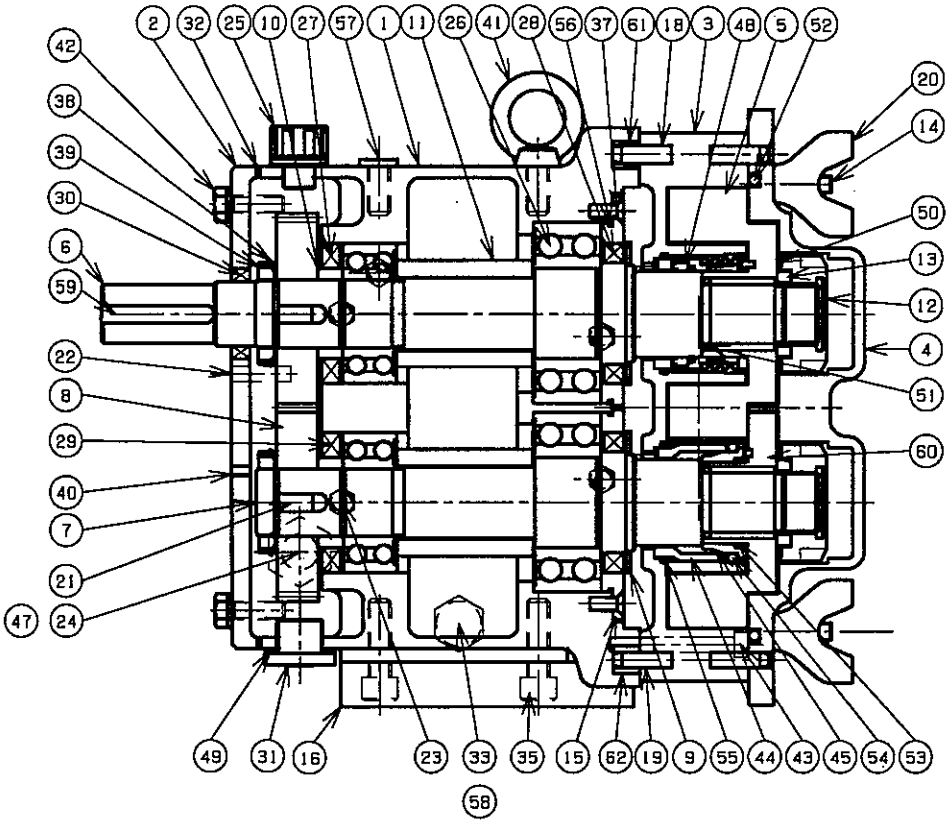
6. STRUCTURE OF JM(O) 10,16 TYPE



No.	NAME	Q' TY	MATERIAL
1	GEAR CASE	1	FC 200
2	GEAR COVER	1	FC 200
3	CASING	1	SUS 316
4	CASING COVER	1	SUS 316
5	ROTOR	2	NAKAMURA METAL
6	SHAFT (LONG)	1	SUS 316
7	SHAFT (SHORT)	1	SUS 316
8	HELICAL GEAR	1set	S45C
9	PLATE	2	SUS 304
10	SHAFT COLLAR	2	S45C
11	SPACER	2	S45C
12	CAP NUT	2	SUS 316
13	WASHER	2	SUS 316
14	STUD BOLT	8	SUS 304
15	BEARING RETAINER	2	S45C
16	BASE	1	FC 200
17			
18	KNOCK PIN	2	SUS 304
19	KNOCK PIN	2	SUS 304
20	BUTTERFLY NUT	8	SCS 13
21	KEY	2	SS 400
22	GEARCOVER KNOCK PIN	2	BS
23	GREASE NIPPLE	4	BSBM
24	OIL LEVEL GAGE	2	POLYCARBONNET
25	OIL PLUG	2	PLUSTIC
26	BEARING	2	SUJ2
27	BEARING	2	SUJ2
28	OIL SEAL	2	NBR
29	OIL SEAL	2	NBR
30	OIL SEAL	1	NBR
31	PLUG	2	SS 400

No.	NAME	Q' TY	MATERIAL
32	GEARCOVER PACKING	1	NON ASBEST
33	DRAIN PLUG	2	S20C
34			
35	CAP BOLT	2	S20C
36			
37	BIS	8	SUS 304
38	LOCK WASHER	2	SS 400
39	BEARING NUT	2	SS 400
40	SET SCREW	2	SUS 304
41	EYE BOLT	1	SS 400
42	GEARCOVER BOLT	6	S20C
43	CAP BOLT	2	SUS 304
44	COLLAR FOR O-RINGSEAL	2	SUS 316
45	SLEEVE	2	SUS 316
46			
47	LEVELGAGE O-RING	1	NBR
48	MECHANICAL SEAL	2	CARBON&CERAMIC
49	PLUG O-RING	1	NBR
50	NUT O-RING	2	VITON
51	ROTOR O-RING	2	VITON
52	CASINGCOVER O-RING	1	VITON
53	SLEEVE O-RING	2	VITON
54	CASING O-RING	2	VITON
55	COLLAR O-RING	2	VITON
56	RETAINER O-RING	2	NBR
57	POLY CAP	10	POLYETHYLENE
58	DRAINBOLT PACKING	2	NON ASBEST
59	KEY	1	SS 400
60	ROTOR (O-RING TYPE)	2	NAKAMURA METAL
61	BUSH	1	SUS 304
62	BUSH	1	SUS 304

7. STRUCTURE OF JM(O) 25,40,55,125 TYPE

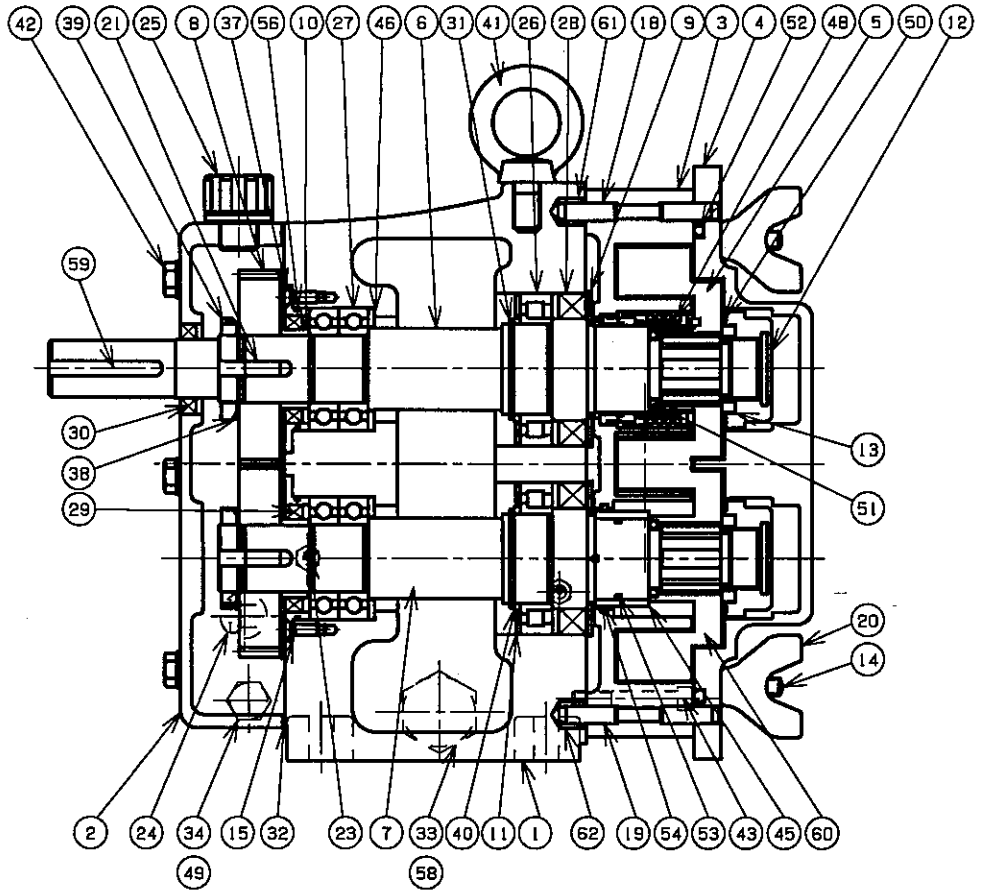


No.	NAME	Q' TY	MATERIAL
1	GEAR CASE	1	FC 200
2	GEAR COVER	1	FC 200
3	CASING	1	SUS 316
4	CASING COVER	1	SUS 316
5	ROTOR	2	NAKAMURA METAL
6	SHAFT (LONG)	1	SUS329JI (NOTE. 1)
7	SHAFT (SHORT)	1	SUS329JI (NOTE. 1)
8	HELICAL GEAR	1set	S45C
9	PLATE	2	SUS 304
10	SHAFT COLLAR	2	S45C
11	SPACER	2	S45C
12	CAP NUT	2	SUS 316
13	WASHER	2	SUS 316
14	STUD BOLT	8	SUS 304
15	BEARING RETAINER	2	S45C
16	BASE	1	FC 200
17			
18	KNOCK PIN	2	SUS 304
19	KNOCK PIN	2	SUS 304
20	NUT	8	SCS 13
21	KEY	2	SS 400
22	GEARCOVER KNOCK PIN	2	BS
23	GREASE NIPPLE	4	BSBM
24	OIL LEVEL GAGE	2	POLYCARBONNET
25	OIL PLUG	2	PLUSTIC
26	BEARING	2	SUJ2
27	BEARING	2	SUJ2
28	OIL SEAL	2	NBR
29	OIL SEAL	2	NBR
30	OIL SEAL	1	NBR
31	PLUG	2	SS 400

No.	NAME	Q' TY	MATERIAL
32	GEARCOVER PACKING	1	NON ASBEST
33	DRAIN PLUG	2	S20C
34			
35	CAP BOLT	2	S20C
36			
37	BIS	8	SUS 304
38	LOCK WASHER	2	SS 400
39	BEARING NUT	2	SS 400
40	SET SCREW	2	SUS 304
41	EYE BOLT	1	SS 400
42	GEARCOVER BOLT	6	S20C
43	CAP BOLT	2	SUS 304
44	COLLAR FOR O-RINGSEAL	2	SUS 316
45	SLEEVE	2	SUS 316
46			
47	LEVELGAGE O-RING	1	NBR
48	MECHANICAL SEAL	2	CARBON&CERAMIC
49	PLUG O-RING	1	NBR
50	NUT O-RING	2	VITON
51	ROTOR O-RING	2	VITON
52	CASINGCOVER O-RING	1	VITON
53	SLEEVE O-RING	2	VITON
54	CASING O-RING	2	VITON
55	COLLAR O-RING	2	VITON
56	RETAINER O-RING	2	NBR
57	POLY CAP	11	POLYETHYLENE
58	PACKING	2	NON ASBEST
59	KEY	1	SS 400
60	ROTOR (O-RING TYPE)	2	NAKAMURA METAL
61	BUSH	1	SUS 304
62	BUSH	1	SUS 304

(NOTE. 1) SUS 316 FOR JM25 TYPE

8. STRUCTURE OF JM(O) 160,200 TYPE

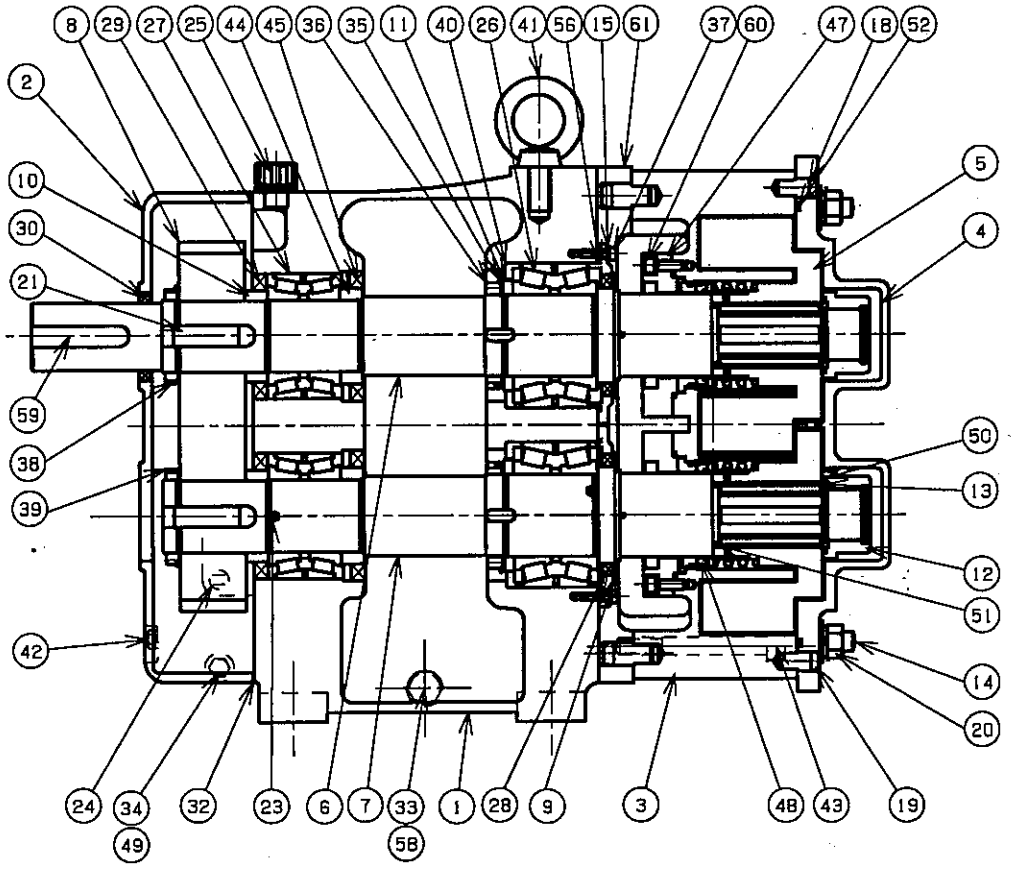


No.	NAME	Q' TY	MATERIAL
1	GEAR CASE	1	FC 200
2	GEAR COVER	1	FC 200
3	CASING	1	SUS 316
4	CASING COVER	1	SUS 316
5	ROTOR	2	NAKAMURA METAL
6	SHAFT (LONG)	1	SUS 329J1
7	SHAFT (SHORT)	1	SUS 329J1
8	HELICAL GEAR	1set	S45C
9	PLATE	2	SUS 304
10	SHAFT COLLAR	2	S45C
11	SPACER	2	S45C
12	CAP NUT	2	SUS 316
13	WASHER	2	SUS 316
14	STUD BOLT	8	SUS 304
15	BEARING RETAINER	2	S45C
16			
17			
18	KNOCK PIN	2	SUS 304
19	KNOCK PIN	2	SUS 304
20	BUTTERFLY NUT	8	SCS 13
21	KEY	2	SS 400
22			
23	GREASE NIPPLE	4	BSBM
24	OIL LEVEL GAGE	2	POLYCARBONNET
25	OIL PLUG	2	PLUSTIC
26	BEARING	2	SUJ2
27	BEARING	2	SUJ2
28	OIL SEAL	2	NBR
29	OIL SEAL	2	NBR
30	OIL SEAL	1	NBR
31	RING	2	SK 5

No.	NAME	Q' TY	MATERIAL
32	GEARCOVER PACKING	1	NON ASBEST
33	DRAIN PLUG	2	S20C
34	DRAIN BOLT	2	S20C
35			
36			
37	BIS	8	SUS 304
38	LOCK WASHER	2	SS 400
39	BEARING NUT	2	SS 400
40	RING	2	S30C
41	EYE BOLT	1	SS 400
42	GEARCOVER BOLT	6	S20C
43	CAP BOLT	2	SUS 304
44			
45	SLEEVE	2	SUS 316
46	COLLAR	2	S45C
47			
48	MECHANICAL SEAL	2	CARBON&CERAMIC
49	DRAINBOLT PACKING	1	NON ASBEST
50	NUT O-RING	2	VITON
51	ROTOR O-RING	2	VITON
52	CASINGCOVER O-RING	1	VITON
53	SHAFT O-RING	2	VITON
54	CASING O-RING	2	VITON
55			
56	RETAINER O-RING	2	NBR
57			
58			
59	KEY	1	SS 400
60	ROTOR (O-RING TYPE)	2	NAKAMURA METAL
61	BUSH	1	SUS 304
62	BUSH	1	SUS 304

(NOTE. 2) JM160, 200 TYPE NON-INTERCHANGE FOR JO TYPE

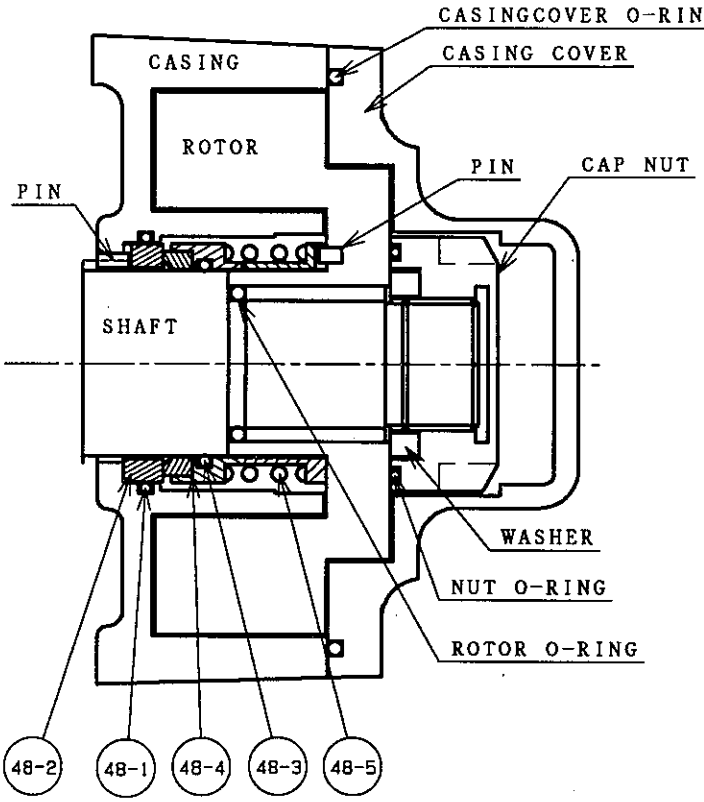
9. STRUCTURE OF JM300 TYPE



No.	NAME	Q' TY	MATERIAL
1	GEAR CASE	1	FC 200
2	GEAR COVER	1	FC 200
3	CASING	1	SUS 316
4	CASING COVER	1	SUS 316
5	ROTOR	2	NAKAMURA METAL
6	SHAFT (LONG)	1	SUS 316
7	SHAFT (SHORT)	1	SUS 316
8	HELICAL GEAR	1set	S45C
9	PLATE	2	SUS 304
10	SHAFT COLLAR	2	S45C
11	SPACER	2	S45C
12	CAP NUT	2	SUS 316
13	WASHER	2	SUS 316
14	STUD BOLT	8	SUS 304
15	BEARING RETAINER	2	S45C
16			
17			
18	KNOCK PIN	2	SUS 304
19	KNOCK PIN	2	SUS 304
20	NUT	8	SCS 13
21	KEY	2	SS 400
22			
23	GREASE NIPPLE	4	BSBM
24	OIL LEVEL GAGE	2	POLYCARBONNET
25	OIL PLUG	2	PLUSTIC
26	BEARING	2	SUJ2
27	BEARING	2	SUJ2
28	OIL SEAL	2	NBR
29	OIL SEAL	2	NBR
30	OIL SEAL	1	NBR
31			

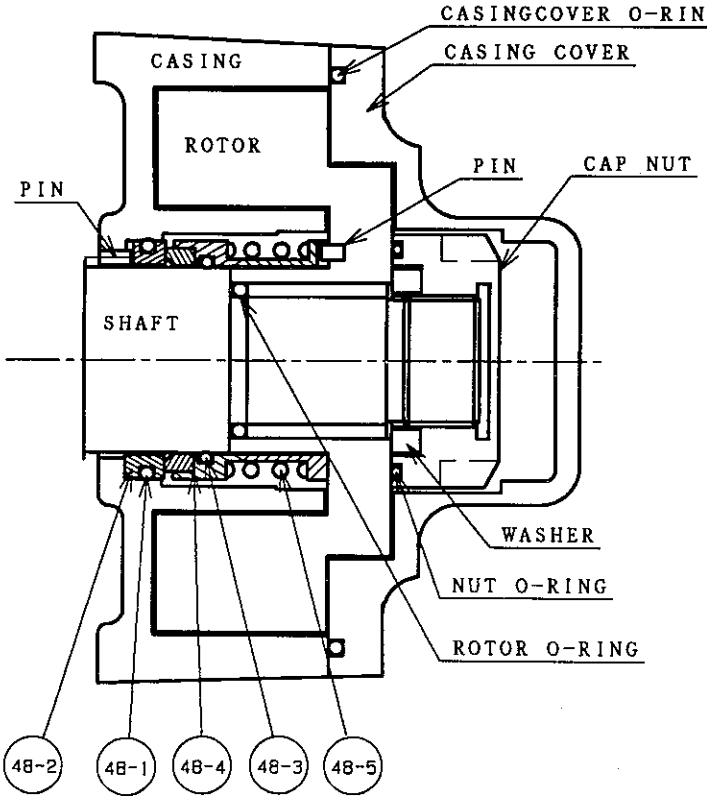
No.	NAME	Q' TY	MATERIAL
32	GEARCOVER PACKING	1	NON ASBEST
33	DRAIN PLUG	2	S20C
34	DRAIN BOLT	2	S20C
35	LOCK WASHER	2	SS 400
36	BEARING NUT	2	SS 400
37	BOLT	8	SUS 304
38	LOCK WASHER	2	SS 400
39	BEARING NUT	2	SS 400
40	RING	2	S30C
41	EYE BOLT	1	SS 400
42	GEARCOVER BOLT	6	S20C
43	CAP BOLT	2	SUS 304
44	COLLAR	2	S45C
45	OIL SEAL	2	NBR
46			
47	MECHASEAL RETAINER	2	S45C
48	MECHANICAL SEAL	2	CARBON&CERAMIC
49	DRAINBOLT PACKING	1	NON ASBEST
50	NUT O-RING	2	VITON
51	ROTOR O-RING	2	VITON
52	CASINGCOVER O-RING	1	VITON
53			
54			
55			
56	RETAINER O-RING	2	NBR
57			
58	PLUG PACKING	1	NON ASBEST
59	KEY	1	SS 400
60	MECHA RETAINER BOLT	8	SUS 304
61	FLONT SPACER	1	SUS 304
62			

10. MECHANICALSEAL OF JM 2,4,10,16 TYPE



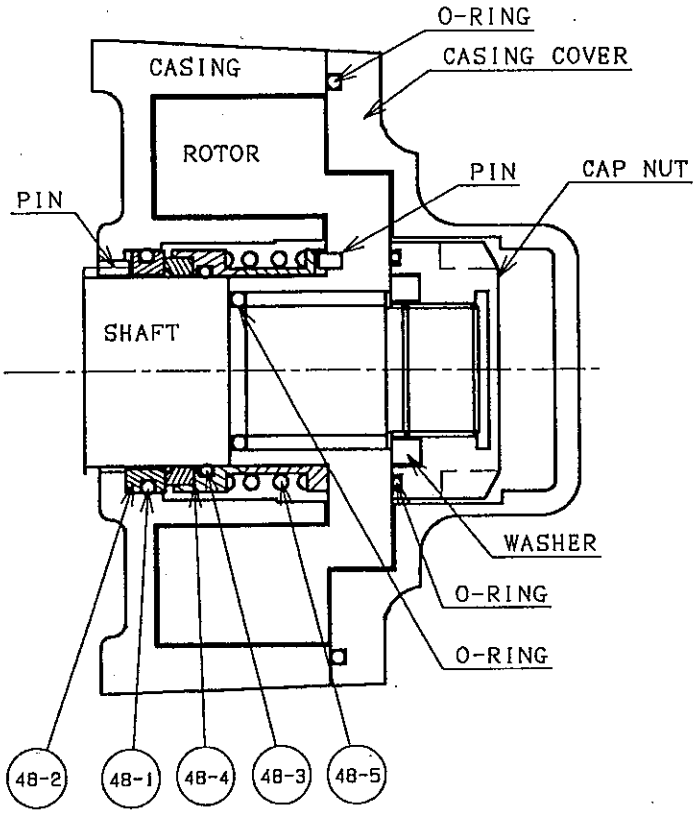
No.	NAME	MATERIAL
48-1	O-RING	VITON
48-2	MATING RING	CERAMIC
48-3	O-RING	VITON
48-4	PRIMARY RING	CARBON/SUS316
48-5	SPRING	SUS 316

11. MECHANICALSEAL OF JM 25,40,55,125 TYPE



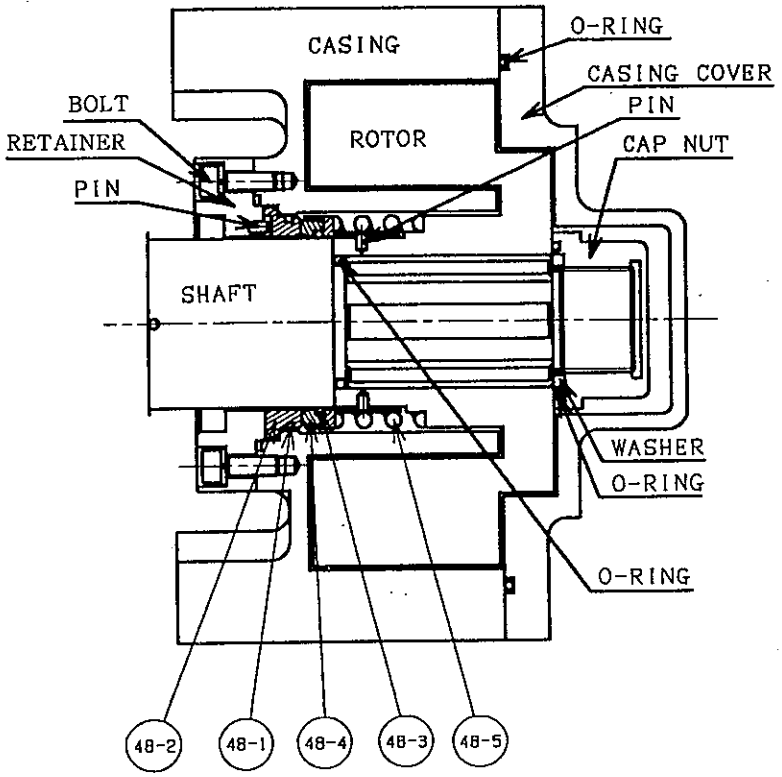
No.	NAME	MATERIAL
48-1	O-RING	VITON
48-2	MATING RING	CERAMIC
48-3	O-RING	VITON
48-4	PRIMARY RING	CARBON/SUS316
48-5	SPRING	SUS 316

12. MECHANICALSEAL OF JM 160,200 TYPE



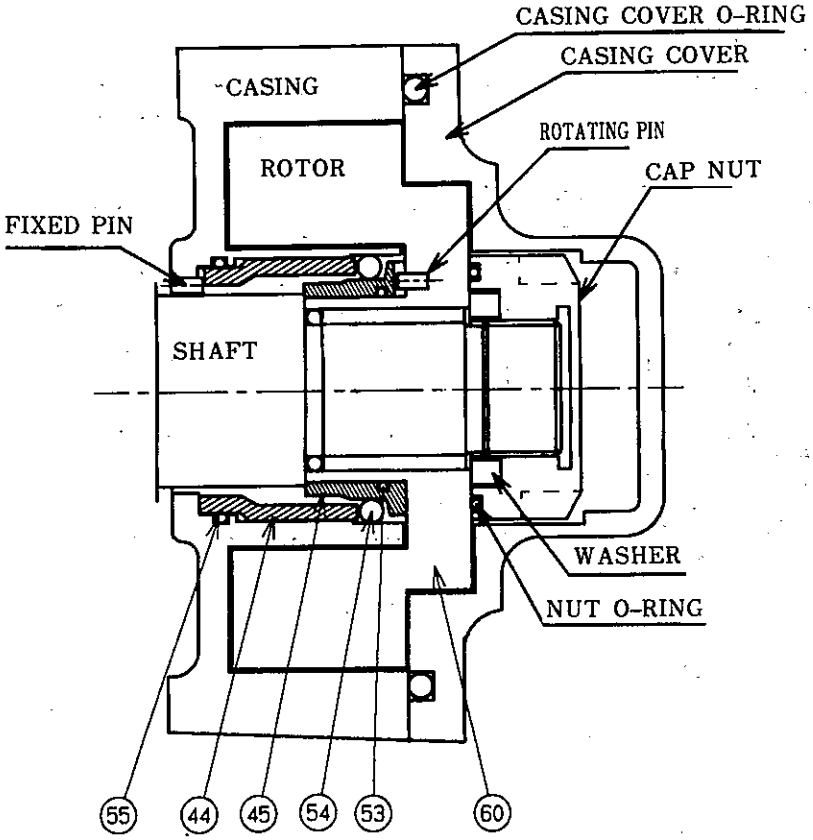
No.	NAME	MATERIAL
48-1	O-RING	VITON
48-2	MATING RING	CERAMIC
48-3	O-RING	VITON
48-4	PRIMARY RING	CARBON/SUS316
48-5	SPRING	SUS 316

13. MECHANICALSEAL OF JM 300 TYPE



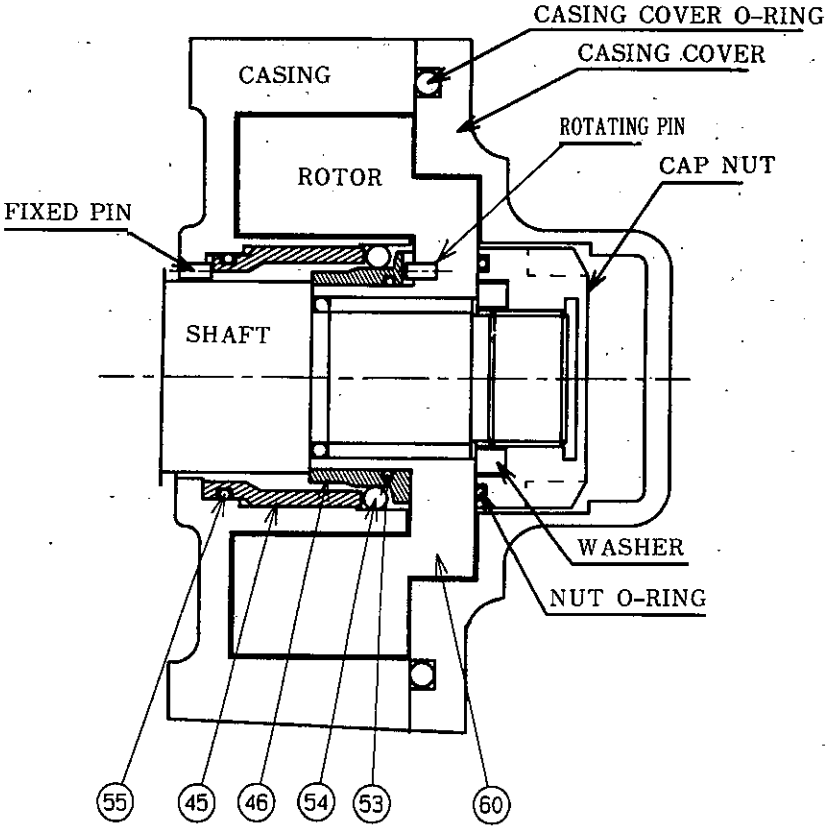
No.	NAME	MATERIAL
48-1	O-RING	VITON
48-2	MATING RING	CERAMIC
48-3	O-RING	VITON
48-4	PRIMARY RING	CARBON/SUS316
48-5	SPRING	SUS 316

14. STRUCTURAL DRAWING OF O-RING SEAL FOR JO-2 TO -125



Part No.	DESCRIPTION	STANDARD MATERIAL
44	COLLAR FOR O-RING SEAL	SUS 316
45	SLEEVE	SUS 316
53	SLEEVE O-RING	VITON
54	CASING O-RING	VITON
55	COLLAR O-RING	VITON
60	ROTOR (FOR O-RING)	NAKAMURA METAL

STRUCTURAL DRAWING OF O-RING SEAL FOR JO-25 TO -125



Part No.	DESCRIPTION	STANDARD MATERIAL
44	COLLAR FOR O-RING SEAL	SUS 316
45	SLEEVE	SUS 316
53	SLEEVE O-RING	VITON
54	CASING O-RING	VITON
55	COLLAR O-RING	VITON
60	ROTOR (FOR O-RING)	NAKAMURA METAL

15. HOW TO OVERHAUL THE PUMP HEAD (WETTED PART)

⚠ CAUTION No. 6

Make sure to thoroughly read the Safety Inspection (Page 4) before proceeding to overhaul the pump head.

⚠ CAUTION No. 7

Be sure that the pump temperature has lowered down enough before overhauling the pump head.

⚠ CAUTION No. 8

Drain the liquid in the piping and check that there is no liquid left in the pump.

⚠ CAUTION No. 9

Make sure that the power supply and motive power source have been shut off and that the pump has come to a standstill.

⚠ CAUTION No. 10

Never try to forcibly open the pump head using a screwdriver and or a hammer.

⚠ CAUTION No. 11

If the rotor cannot be drawn out smoothly, use a rotor extraction tool (option) or pulley extractor.
Never try to pull it out forcibly with a screwdriver or the like.
If the rotor or casing is damaged by hitting, unexpected accident or damaged parts may result.

⚠ CAUTION No. 12

Never try to disintegrate the housing side except for overhauling. When overhauling, thoroughly read the Pump Manual in advance. If you have any doubts or unclear points, do not hesitate to consult us.

⚠ CAUTION No. 13

Handle the mechanical seal with care because they are susceptible to breakage or damage.

A. Overhauling Procedures of Pump Head

(1) Prepare the following items when overhauling the pump head:

1. Rubber mat or some other soft floorcloth.
2. Plastic hammer
3. Spanner wrench dedicated to the rotor lock nut (standard accessory)
4. Hexagonbar spanner wrench for casing fixing bolt (standard accessory)
5. Antirotation bar (standard accessory)

Place the dismantled parts on the mat so that they may not be damaged.

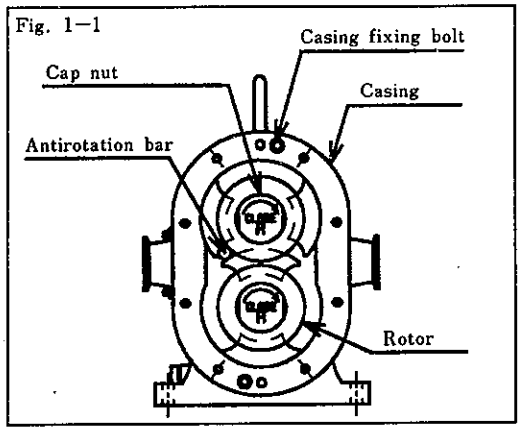
(2) Never fail to disjoin the piping on the discharge and suction sides of the pump before proceeding to overhaul the pump head.

(3) Loosen eight butterfly nuts with the plastic hammer. Then turn and remove them with hand.

(4) Disconnect the casing cover from the knock pin with the plastic hammer. Following the stud bolt, pull the cover straight out.

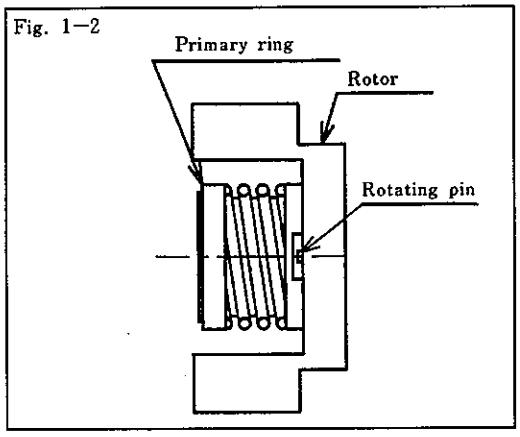
(5) Insert the antirotation bar between the rotor vanes as shown in Fig. 1-1. Loosen and disjoin the cap nut using the dedicated spanner wrench. The tightening direction is indicated by an arrow marked on the surface of the nut. Make sure to loosen in the direction opposite to the arrow indication.

Fig. 1–1



(6) Draw out the rotor straight along the spline of the shaft. As shown in Fig. 1-2, the primary ring side of the mechanical seal can be detached along with the rotor. Notice that damaged or notched seal surface may cause liquid leakage (only for coil hooking type).

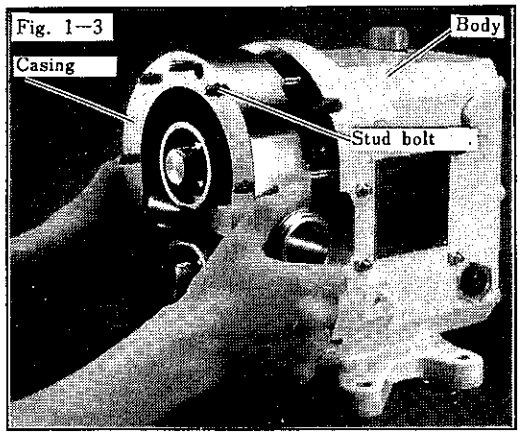
Fig. 1–2



(7) Loosen and detach the two casing fixing bolts using the dedicated hexagonbar spanner wrench. Refer to Fig. 1-1.

(8) As shown in Fig. 1-3, pull out the casing from the pump head following the stud bolt. Now the overhauling of the wetted part is completed. Notice that the mechanical seal remaining in the casing should not fall out. When placing the mechanical seal, put it with its sealing face up. Otherwise, the seal face may be damaged, causing liquid leakage.

Fig. 1–3



16. HOW TO REASSEMBLE THE PUMP HEAD (WETTED PART)

CAUTION No. 14

Before proceeding to reassemble the pump head, check that the power supply is shut off and that the pump is at a standstill.

CAUTION No. 15

When inserting the mating ring into the casing, never try to hit the former into the latter. Beware that hitting will notch or break the mating ring, which will cause liquid leakage.

CAUTION No. 16

Never try to apply any lubricant on the sealing face of the mechanical seal. If applied, the lubricant will cause liquid leakage.

CAUTION No. 17

When inserting the rotor with mechanical seal into the shaft, care should be taken not to let the tip of the mechanical seal come into contact with the shaft. Such contact will damage or notch the mechanical seal, which in turn will cause liquid leakage.

CAUTION No. 18

When inserting the rotor into the shaft, never try to hit the former into the latter.
Mounting the rotor forcibly will cause galling, and the rotor will be stuck in the shaft.

A. Overhauling Procedures of Pump Head (Mechanical Seal Type)

(1) Prepare the following items when overhauling the pump head:

1. Rubber mat or some other soft floorcloth.
2. Plastic hammer
3. Spanner wrench dedicated to the rotor lock nut (standard accessory)
4. Hexagonbar spanner wrench for casing fixing bolt (standard accessory)
5. Antirotation bar (standard accessory)
6. Food or pharmaceuticals that can be used as lubricant.

All the parts to be reassembled shall be fully washed and put on the mat in good order so that they may not be damaged. Check if they suffer any such defects that will interfere with the operation. If any defects are found out, remove them.

(2) Mount the shaft O-ring into the furthest depth of the spline.

(3) Insert the mating ring of mechanical seal in the casing according to the following procedure.

Incorporate the O-ring into the mating ring and apply suitable lubricant onto the O-ring. However, for pumps JM16 and younger, push the O-ring into the O-ring groove of the casing as shown in Fig. 1-4. Push in the mating ring using the plastic hammer and the like so that the sealing surface is not damaged.

At that time, incorporate the mating ring so that the fixed pin of the casing fits in to the concave portion of the mating ring as shown in Figs. 1-4 and 1-5.

Confirm, from the reverse side, that the rotor O-ring has been securely mounted.

Fig. 1–4

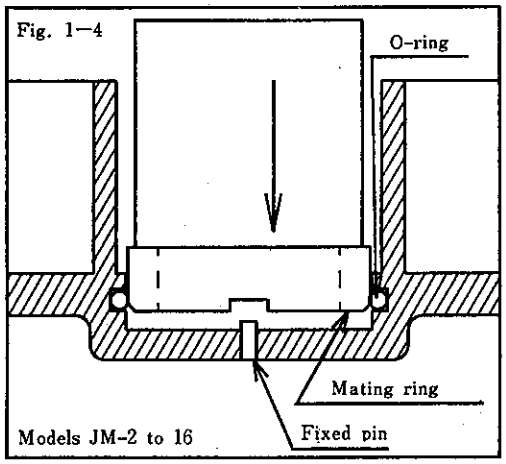
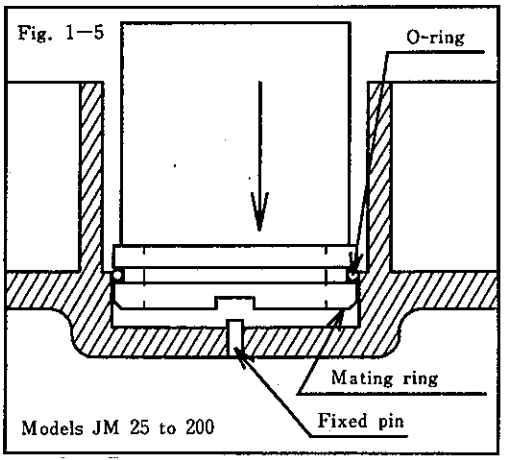


Fig. 1–5

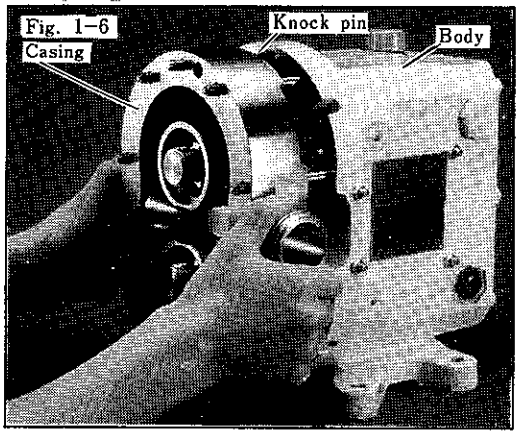


(4) Mount the casing onto the body as shown in Fig. 1-6.

Note that the casing should be mounted in a particular position.

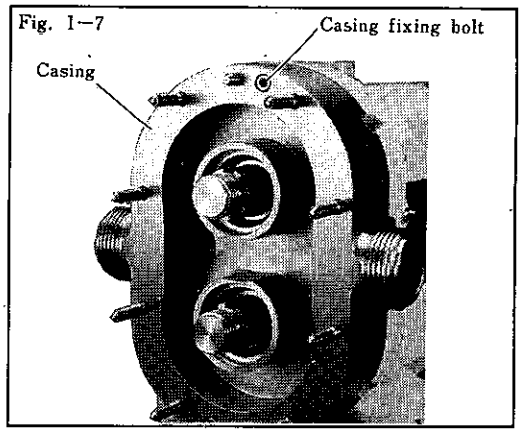
Mount it after confirming that two knock pins of different thickness are provided (that of drive side is thicker). The casing cannot be mounted in the reverse position.

Fig. 1–6



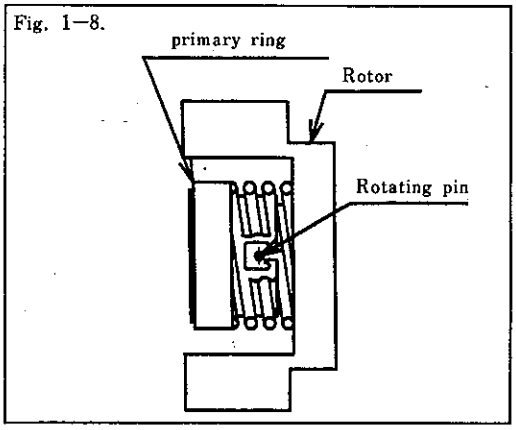
(5) Fasten the casing onto the housing with the casing fixing bolts as shown in Fig. 1-7.

Fig. 1-7



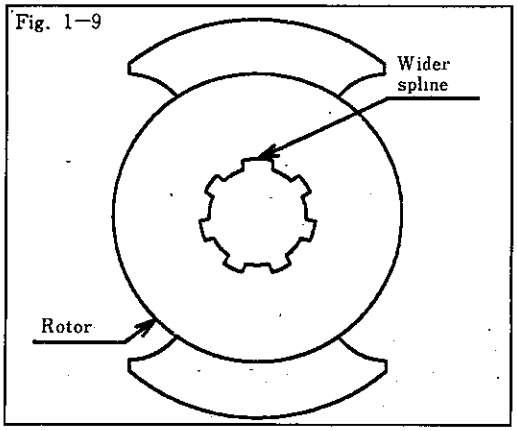
(6) Apply appropriate lubricant onto the O-ring on the primary ring side of the mechanical seal. Then mount the primary ring side onto the rotor as shown in Fig. 1-8. Assemble them so that the rotating pin of the rotor fits into the concave portion of the primary ring as shown in

Fig. 1-8.



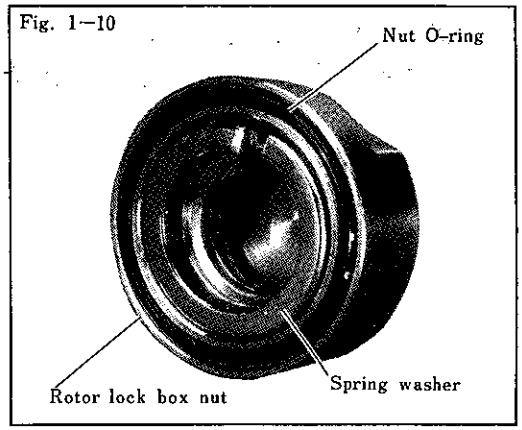
(7) Insert the rotor into the shaft straight along the spline of the shaft. Notice that the spline is wider only at one point as shown in Fig. 1-9. Therefore insert the rotor after confirming the position of the spline and matching the rotor with the shaft spline.

Fig. 1-9



(8) Mount the nut O-ring into the O-ring groove of the rotor lock box nut as shown in Fig. 1-10, and then fit the spring washer into the nut O-ring.

Fig. 1-10



(9) Fix the rotor with the rotor lock box nut as shown in Fig. 1-11. Note that the tightening direction of the nut is indicated by an arrow marked on the head of the box nut.
Insert the antirotation bar between the vanes of the rotor so that the rotors will not come in contact with each other, as shown in Fig. 1-12. Tighten them using the dedicated spanner wrench.
Draw out the antirotation bar, and check that there is about 0.05 to 0.1 mm of level difference on the front side of the casing and the front side of the rotor vane as shown in Fig. 1-11.
Confirm that the rotor turns smoothly by turning it gently with a spanner wrench.
Should there be any anomaly, repeat the operation under this Step (9).

(10) Mount the cover O-ring into the O-ring groove of the casing cover as shown in Fig. 1-13. Fit it in the casing cover straight along the stud bolts, and set it in so it matches the knock pin of the casing. Note that the casing is provided with two (2) knock pins of different thickness (that on the drive side thicker). Mount the cover after confirming this difference.
The casing cannot be mounted in the reverse direction.

(11) Fasten the casing cover onto the casing using eight (8) wing nuts. Tighten them further with the plastic hammer. Now the reassembling is completed.

(12) After the completion of the reassembly of the pump head, mount the pipings.

Fig. 1-11

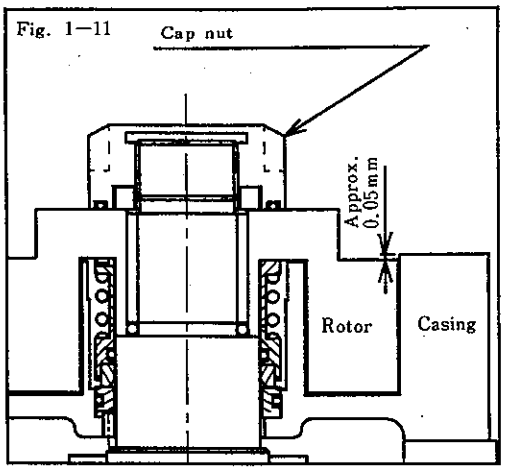


Fig. 1-12

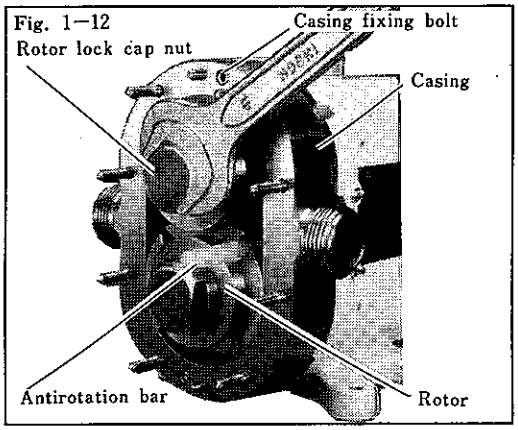
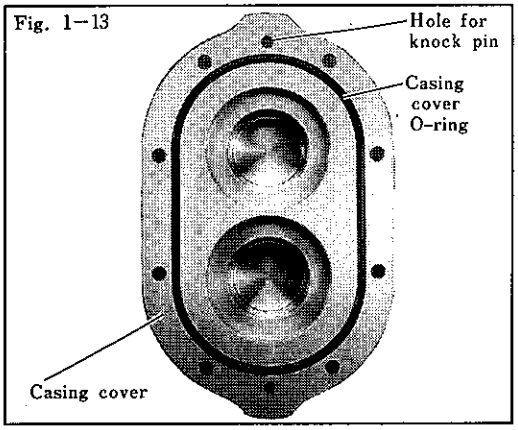


Fig. 1-13



B. Overhauling Procedures of Pump Head (O-ring Seal Type)

Before proceeding to the reassembly, refer to the Structural Drawing of O-ring seal for JO-2 to -125 (Page 13).

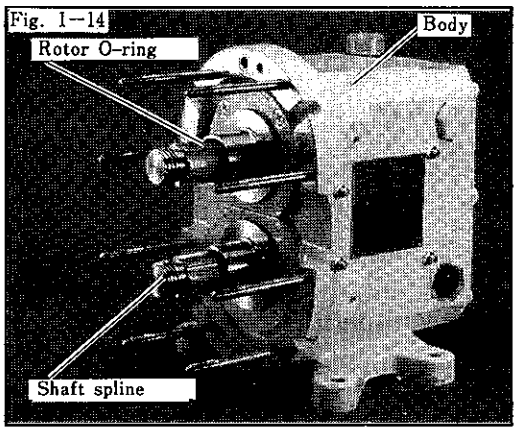
(1) When reassembling the pump head, prepare the following items:

1. Rubber mat or some other soft floorcloth.
2. Plastic hammer
3. Spanner wrench dedicated to the rotor lock nut (standard accessory)
4. Hexagonbar spanner wrench for casing fixing bolt (standard accessory)
5. Antirotation bar (standard accessory)
6. Food or pharmaceuticals that can be used as lubricant.

All the parts to be reassembled shall be fully washed and put on the mat in good order so that they may not be damaged. Check if they suffer any such defects that will interfere with the operation. If any defects are found out, remove them.

(2) Mount the rotor O-ring to the furthest depth of the spline of the shaft of the body as shown in Fig. 1-14.

Fig. 1—14



(3) Insert the collar for O-ring seal into the casing as shown in Figs. 1-15 and 1-16 in accordance with the following procedures.
Incorporate the O-ring into the O-ring groove of the collar for O-ring seal and apply them with suitable lubricant. However, for pumps JO16 and younger, put the O-ring into the O-ring groove of the casing as shown in Fig. 1-15.
Push in the O-ring seal collar using the plastic hammer.
Incorporate them so that the fixed pin of the casing fits into the concave portion of the back of the collar as shown in Figs. 1-15 and 1-16.
Make sure to confirm from the reverse side that the items are securely fastened.

Fig. 1—15

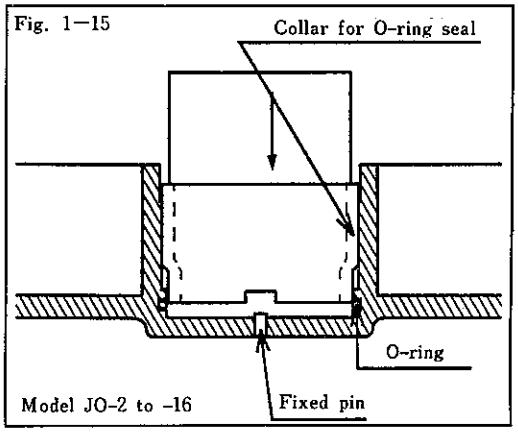
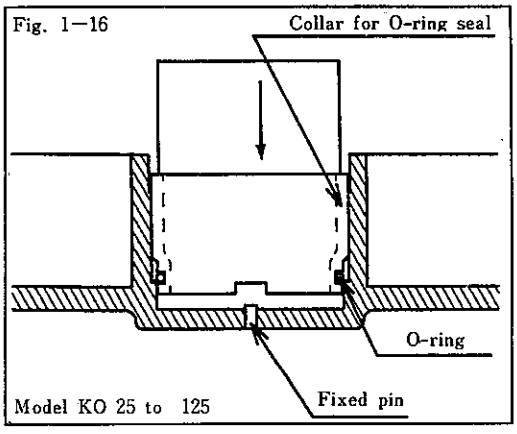


Fig. 1—16

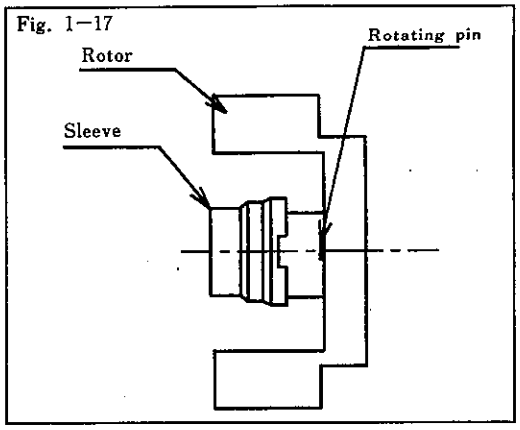


(4) Set the casing O-ring on the collar and apply adequate lubricant.

(5) Mount the casing onto the body and fasten it with the casing fixing bolts.

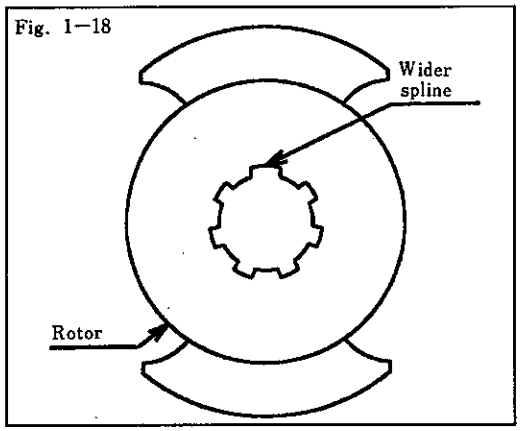
(6) Set the Sleeve O-ring on the sleeve and mount them onto the rotor boss. Match the rotating pin of the rotor with the slot of the sleeve as shown in Fig. 1-17.

Fig. 1—17



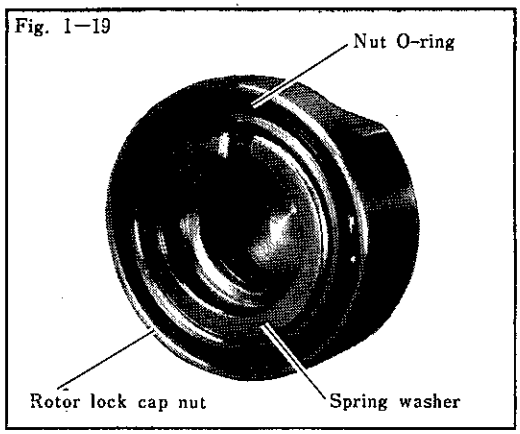
(7) Insert the rotor into the shaft straight along the spline of the shaft.
Notice that the spline is wider only at one point as shown in Fig. 1-18. Insert the rotor after confirming the position of the spline and matching the rotor with the shaft spline.

Fig. 1—18



(8) Mount the nut O-ring into the O-ring groove of the rotor lock cap nut as shown in Fig. 1-19, and then fit the spring washer into the nut O-ring.

Fig. 1—19



(9) Fix the rotor with the rotor lock box nut as shown in Fig. 1-20. Note that the tightening direction of the nut is indicated by an arrow marked on the head of the box nut. Insert the antirotation bar between the vanes of the rotor so that the rotors will not come in contact with each other, as shown in Fig. 1-20. Tighten them using the dedicated spanner wrench. Draw out the antirotation bar, and check that there is about 0.05 to 0.1 mm of level difference on the front side of the casing and the front side of the rotor vane as shown in Fig. 1-21. Confirm that the rotor turns smoothly by turning it gently with a spanner wrench. Should there be any anomaly, repeat the operation under this Step .

Fig. 1-20

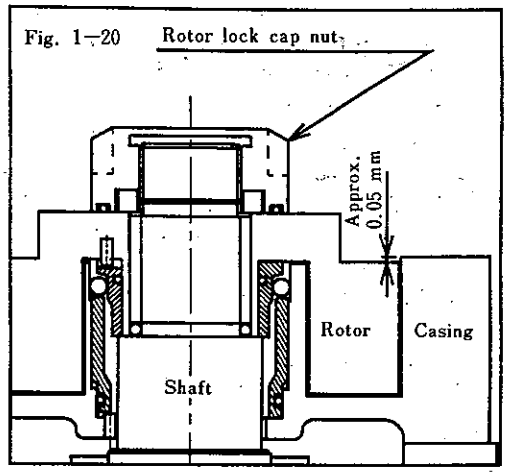
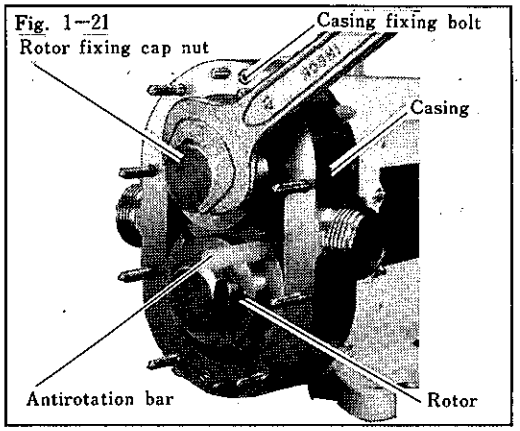
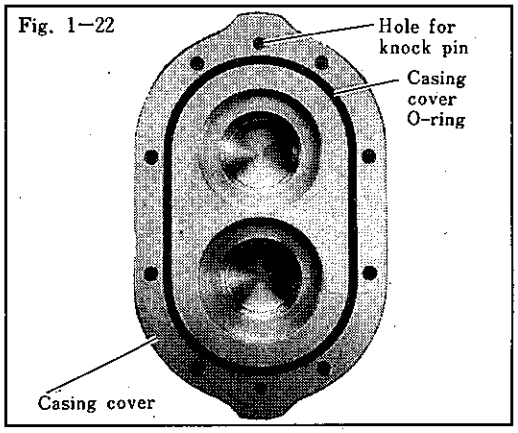


Fig. 1-21



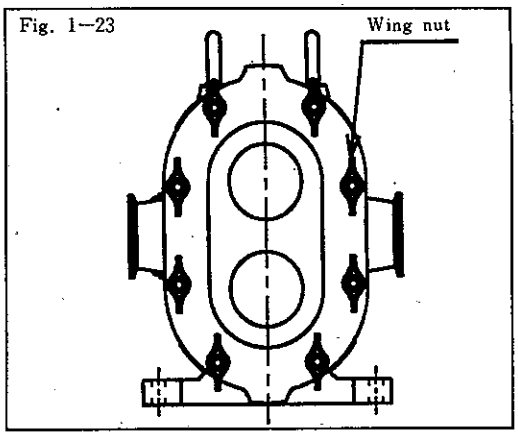
(10) Mount the cover O-ring into the O-ring groove of the casing cover as shown in Fig. 1-22. Fit it in the casing cover straight along the stud bolts, and set it in to match the knock pin of the casing. Note that the casing is provided with two knock pins of different thickness (that on the drive side is thicker). Mount the cover after confirming this difference. The casing cannot be mounted in the reverse position.

Fig. 1-22



(11) Fasten the casing cover onto the casing using eight wing nuts as shown in Fig. 1-23.
Tighten them further with the plastic hammer. Now the reassembly is completed.

Fig. 1-23



(12) After the completion of the reassembly of the pump head, mount the piping.

17. HANDLING OF THE VENTED COVER

CAUTION No. 19

Before using the vented cover, consult us regarding your liquid, pressure and other factors.

Notice that no adjustment is possible in case when the set pressure of the vented cover is too low.

Please be aware that the structure of the vented cover depends upon the pump model.

A. Principle of Vented Cover

The vented packing is subject to the discharge pressure from bypass A. If the discharge pressure surpasses the packing holding force of the discharge pressure, the vented packing will open up and the liquid will flow from the bypass A to the bypass B, thus reducing or annihilating the discharge quantity.

Thus, mounting the vented cover onto the pump allows us to use the following functions:

1. Relief valve
2. Flow control valve

B. How to Use the Vented Cover

The vented packing is pressed down by a piston as shown in Figs. 1-24, -25 and -26.

The piston in its turn is held down by the adjusting bolt through a spring. The spring force varies according to the degree of tightening of the adjustment bolt. Therefore the vented cover has been designed so that the pressure of the vented packing can be regulated by adjusting the bolThe adjustment bolt tightens when turned clock wise and loosens when turned counter-clockwise.

However, since the relief amount differs according to the viscosity of the fluid, discharge pressure and the rotational speed of the pump, an exact regulation requires the following adjustments while the pump is under operation in the actual line:

(1) Loosen the adjustment bolt until the spring force disappears.

(2) Operate the pump, and gradually close the valve on the discharge side to reach the set pressure while watching the pressure gage on the discharge side. With the adjustment bolt loosened, the values will fall below the setting. However, should the valve exceed the setting, discontinue the operation. The reason for the high valve can be traced to too low a setting or too high a viscosity. Please consultus first in such case.

(3) Tighten the adjustment bolt while watching the pressure gage until the pressure reaches the set pressure.

(4) When the pressure reaches the setting, lock the adjustment bolt with a lock nut.

(5) Open the valve on the discharge side and bring the pump to a standstill. Now all the adjustments are completed.

Fig. 1-24 Models BJM-2,4,10,16,25 and 40

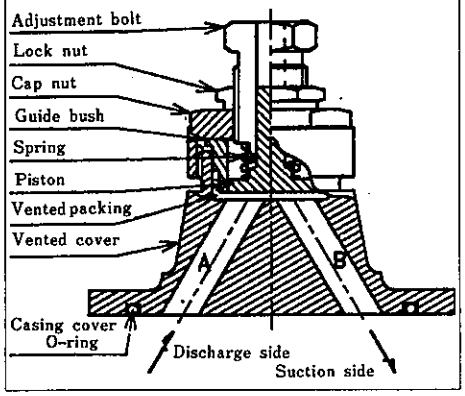


Fig. 1-25 Models BJM-55 and 125

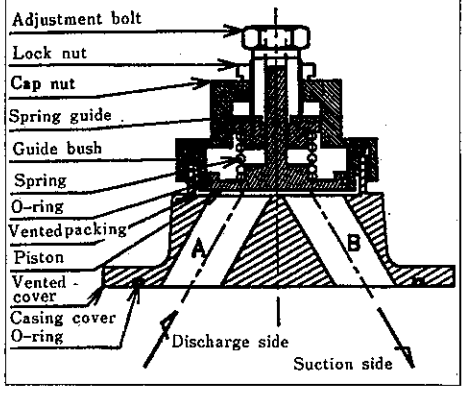
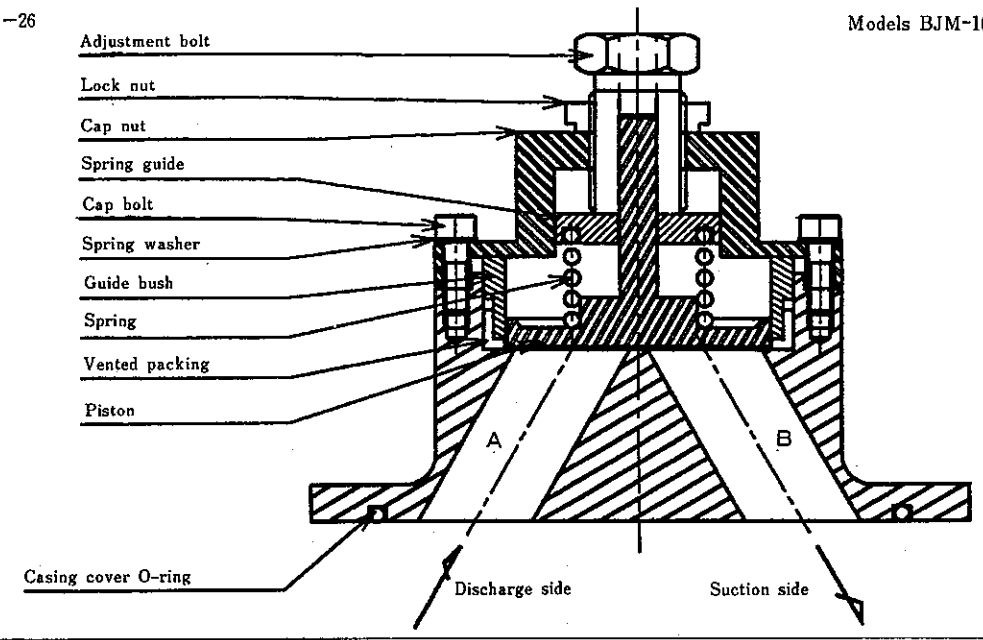


Fig. 1–26

Models BJM-160 and 200



18. SINGLE VANED ROTOR

CAUTION No.20

Too high a rotation number is likely to break the solids. It is therefore recommended that the rotor be used under 100 rpm or less, though it will depend on the size of the solids.

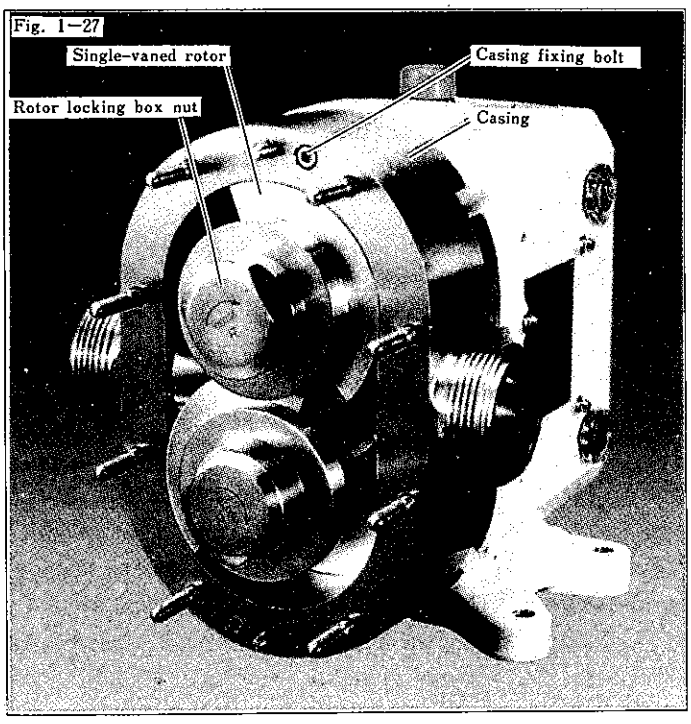
A. Principle of Single-Vaned Rotor

Two rotors shaped as shown in Fig. 1-27 rotate smoothly by the timing gear. The pump therefore can convey even liquids with some solids mingled while keeping solids breakage to a minimum.

The pump is ideal for any liquids mingled with items such as gizzards, strawberries, cherries, frozen vegetables, mashed beanpaste, etc.

The two-vaned rotor and single-vaned rotor are interchangeable.

Fig. 1–27



19. MAINTENANCE AND INSPECTION

CAUTION No.21

Should any anomaly be found after the inspection of pump, remove the anomaly and its cause as soon as possible.
When repairing any contact defect or indentation, use a smooth cut file, sand paper and such. Never fail to finish with the burs completely removed.
Extreme care should be given to the fact that too much cutting will lead to too wide a clearance, which in turn may cause severe malfunction.
If you have any doubts or unclear points, do not hesitate to contact us.

CAUTION No.22

Keep at hand any expendable supplies, gear oil, grease and the like.
If your pumps are used in any major line, it is desirable that you have spare machine and or spare parts.

CAUTION No.23

It is advised that the following steps be carried out with reference to the maintenance and inspection list.

CAUTION No.24

Refer to the Pump Manual before proceeding to execute pump overhauling.
Note that this pump is a precision machine. If you have any doubts or unclear points about the pump, please consult us. Upon request we will perform inspection, repairing and overhauling of the pumps.

A. Frequency of Gear Oil Change

Initial: After one month or 250 hours of operation
The 2nd and subsequent oil change: Every 6 months or for every 1500 hours of operation
Be sure to use gear oil for high temperature during high temperature specification (100 to 150℃).
For the types of lubricants recommended and their volume, refer to the back cover.

B. Grease up Frequency

Grease up the pump every 3 months or every 750 hours of operation.
However the grease up frequency should be once for every month (250 hours) for any continuous or high temperature operation.
Use the grease intended for high temperature under high temperature specifica tions (100 to 150℃). For recommended grease, please refer to the back cover.
Note) Please be aware of the fact that too much grease may detach the oil seal or cause grease leakage. Open the drain port and examine the volume of grease.

20. PRECAUTIONS TO BE TAKEN WHEN INSTALLING

⚠ CAUTION No. 25

When installing the pump, ensure a space where maintenance and inspection can be performed without difficulty.

A. Installation Location

1. Install the pump in a location where the suction pipe can be kept as short as possible.
2. Install the pump at a location where the suction pipe can be kept as straight as possible.
3. Do not install the pump at a location lower than the suction tank.
4. Install the pump as horizontally as possible.
5. Ensure that a space for pump maintenance is secured.
6. For large sized pumps, provide a crane or hoist at a position where the maintenance of the pump can be performed.
7. If the pumps are provided with casters firmly fix the pump with stoppers.

B. Piping

1. The suction pipe shall be as large in diameter as short and as straight as possible.
2. Make an exact leveling of the piping and pump so that no excessive load should be imposed on the pump.

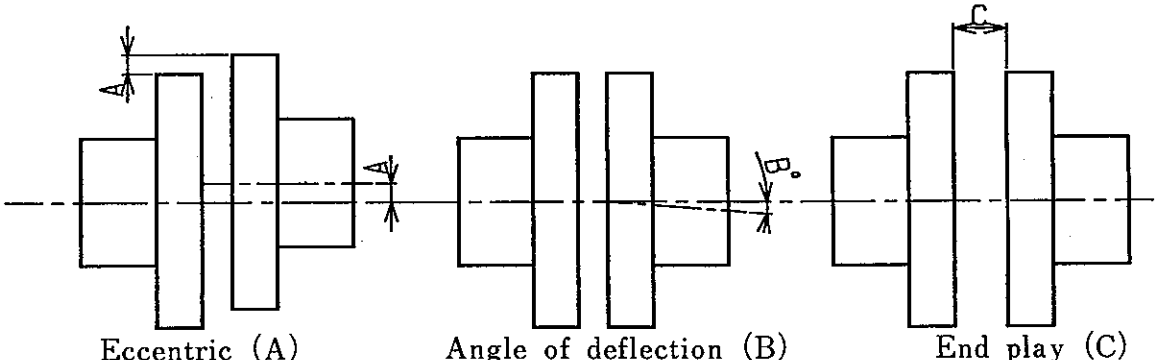
21. PRECAUTIONS TO BE TAKEN WHEN REASSEMBLING THE UNITS

❗ CAUTION No. 26

Never try to hit or strike the drive shaft of the pump nor give it any impact load.

Any such action may damage the shaft, bearings, mechanical seal and the like.

1. The base shall be common thick base that is reinforced so as to endure vibration and load. Any large sized pumps shall be installed on a rigid foundation with anchor bolts.
2. If, for example, the pumps are to be directly connected with couplings, an exact alignment is required.
   When aligning, use straight edge, dedicated gages and dial gage.



Eccentric (A) (Parallel error between two shaft centers)
Angle of deflection (B) (Angular error between two shaft centers)
End play (C) (Displacement in axial direction)

3. For V belt or chaining, attention should be paid to the following points:
   1) Set the rotation ratio at 1:4 or less. If the ratio is greater than this value, the V pulley must take larger load causing damage to the pump.
   2) Alignment should be conducted accurately. Inaccurate alignment may cause shaft deviation or abnormal vibration resulting in pump damage.
   Use straight edge, dedicated gages and dial gage for alignment.
   3) Tension the V belt accurately. Too weak or too tight a tension may cause shaft deviation or abnormal vibration resulting in pump damage.

TABLE OF RECOMMENDED OIL GREASE FOR ROTARY PUMPS

Manufacturer / Use	Grease		Gear Oil	
	Standard Specification	High Temperature Specification	Standard Specification	High Temperature Specification
Mitsubishi Oil	Diamond Multipurpose Grease No. 2	Diamond Heat resisting Grease No. 2	Diamond Super Gear Lube SP150	Diamond Super Gear Lube SP460
Idemitsu Kosan	Daphny Coronex No. 2	Daphny XCC No. 2	Daphny CE Compound 150S	Daphny CE Compound 46
Nippon Oil	Multi Knock No. 2	Summer Knock No. 2	Bon Knock SP150	Bon Knock SP460
Shell	Shell Alvania Grease No. 2	Shell Dalina Grease No. 2	Shell Omala Oil 150	Shell Omala Oil 460

TABLE OF GEAR OIL QUANTITY FOR ROTARY PUMP

Pump Model	Quantity of Oil
JM 2 , JM 4	50 cc
VJM 2 , VJM 4	80 cc
JM 10 , JM 16	100 cc
VJM 10 , VJM 16	150 cc
JM 25 , JM 40	150 cc
VJM 25 , VJM 40	150 cc
JM 55 , JM125	250 cc
VJM 55 , VJM125	400 cc
JM160 , JM200	360 cc
JM300	2000 cc

PAINTING

Painting Specification: Phthalate paint
Painting Color: Munsell 7.5 GY 9/2

Representative:	**NAKAKIN CO.,LTD.** Industrial Precision Machine Dept. Headquarter: 15—8, 2—chome, Kasugano, Hirakata, Osaka 573—0137 Osaka Sales Office: TEL 8[illegible]72-852 FAX. Tokyo Sales Office: Kanda Bldg. 6—2, 1—chome, Kameido, Kohtoh—ku, Tokyo 136 TEL. 03—5609—7201 FAX. 03—5609—7205
Person in charge:	Person in charge: