

SECTION 7 DISASSEMBLY AND ASSEMBLY

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SECTION 7 DISASSEMBLY AND ASSEMBLY

GROUP 1 HYDRAULIC PUMP

1. NECESSARY TOOLS AND JIGS

The following tools and jigs are necessary to disassemble and reassemble the pump.

1) TOOLS

Name	Quantity	Size (Nominal)
Hexagonal bar spanner	One each	5, 6, 8, 10
Spanner	1	17, 24
Plastic hammer	1	Medium size
Snap ring pliers	1	For hole (Stop ring for 72)
Snap ring pliers	1	For shaft (Stop rings for 28 and 30)
Standard screw-driver	2	Medium size
Torque wrench	-	Wrench which can tighten at the specified torque
Grease	Small	-
Adhesives	Small	LOCTITE #270

2) JIGS

(1) Disassembling table.

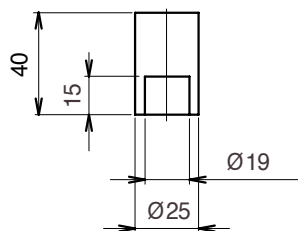


R55NM7HP01

This is plate to stand the pump facing downward.

A square block may be used instead if the shaft end does not contact.

(2) Bearing assembling jig



R55NM7HP02

2. CAUTIONS DURING ASSEMBLING AND DISASSEMBLING

1) CAUTIONS FOR DISASSEMBLING

- Never attempt operating the adjusting screw unless absolutely necessary. Otherwise, the set power may be changed, affecting adversely to the system.
- Take utmost care during disassembly not to knock or drop each part.

2) CAUTIONS FOR ASSEMBLING

- Wash each part thoroughly
- During assembling, take utmost care not to damage the part or allow foreign materials to enter.
- As a rule, the O-ring and oil seal should not be reused.
- In our assembly work, the torque wrench is used to control the torque. Be sure to use the torque wrench.

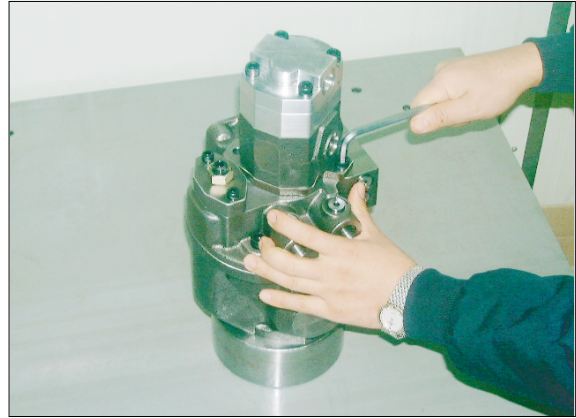
3. DISASSEMBLY PROCEDURE

1) DISASSEMBLING THE GEARED PUMP

Remove the hexagonal socket headed bolts (M10 x 25, 2 pieces)

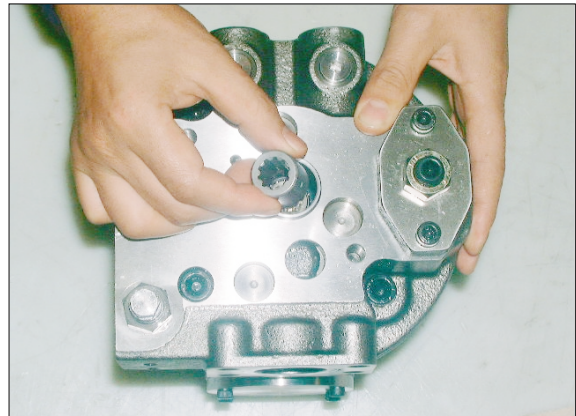
Hexagonal bar spanner
(Hex. side distance : 8)

Be careful because the O-ring and filter are provided to the match surface of the geared pump.



R55NM7HP03

Remove the coupling.



R55NM7HP04

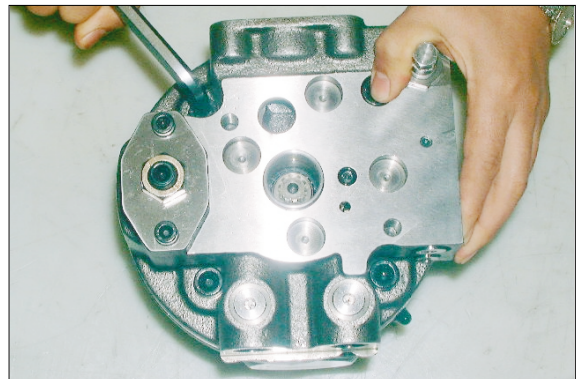
2) DISASSEMBLING THE MAIN PUMP

Remove the cover.

Remove the hexagonal socket headed bolts. (M12 x 30, 3pieces)

and (M12 x 55, 1piece)

Hexagonal bar spanner
(Hex. side distance : 10)



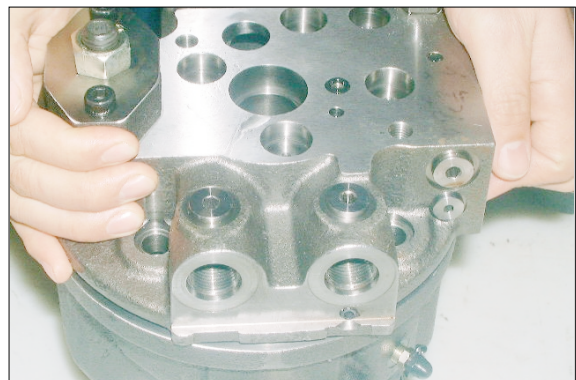
R55NM7HP05

Remove the cover in a horizontal condition.

Connect motor to work table.

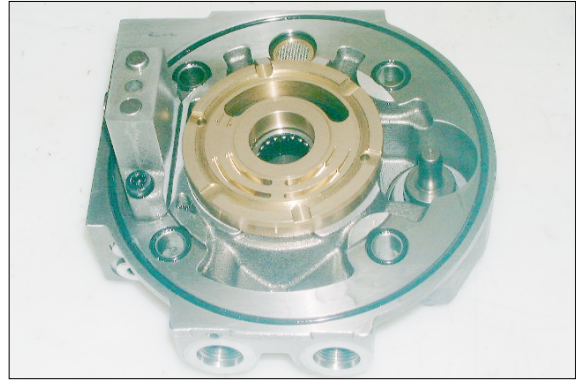
Be careful because the control plate is provided to the backside.

When the cover is difficult to remove, knock lightly with a plastic hammer.



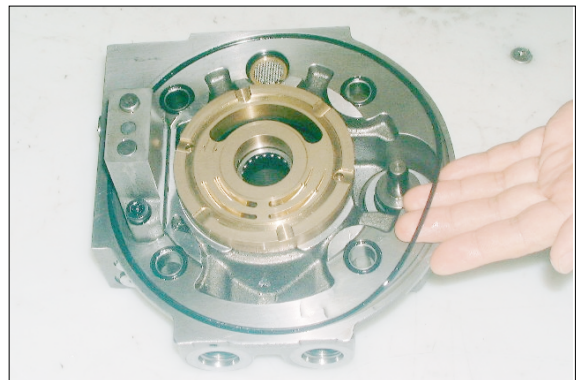
R55NM7HP06

This photo shows the state with the cover removed.



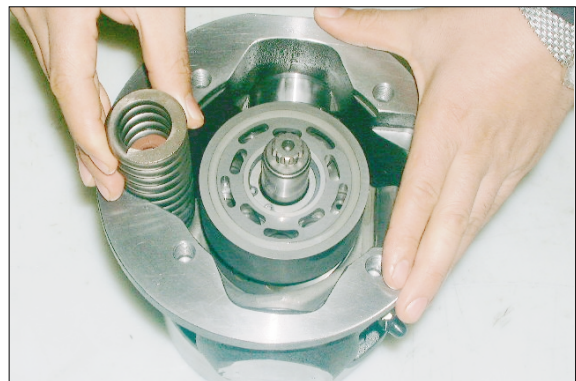
R55NM7HP07

Remove the O-ring from the cover.



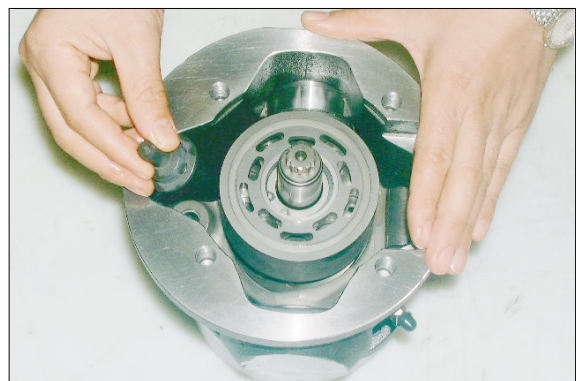
R55NM7HP08

(1) The removal of the control spring
Remove 2 springs (Inner and outer).



R55NM7HP09

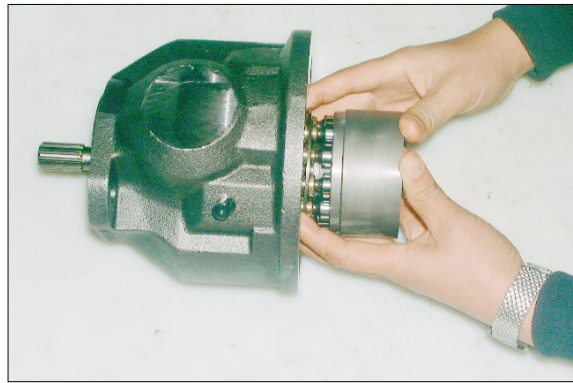
Remove the spring seat.



R55NM7HP10

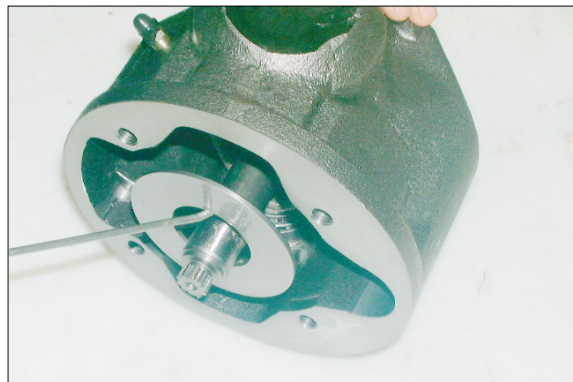
(2) The removal of rotary group

Lay the pump on the side and take out the rotary group from the shaft.



R55NM7HP11

Remove the plate.



R55NM7HP12

(3) The removal of the shaft

Remove the C-type stop ring.
(Snap ring pliers for hole)



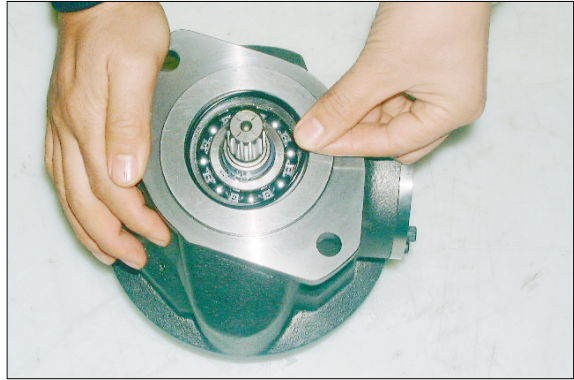
R55NM7HP13

Use two standard screw-drivers to remove the oil seal case.



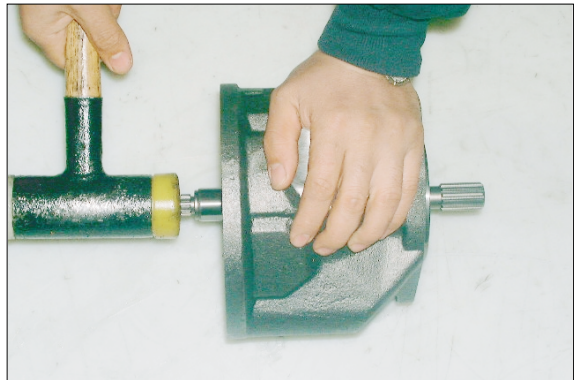
R55NM7HP14

Remove the O-ring.



R55NM7HP15

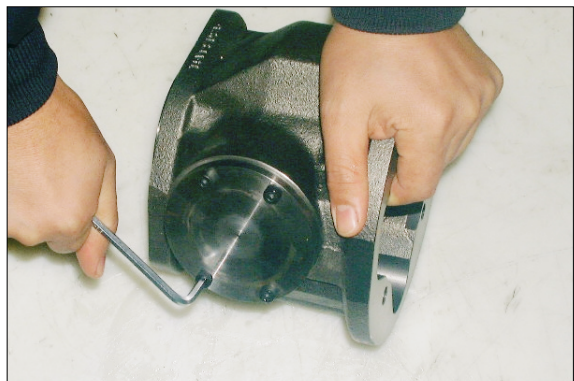
Remove it while knocking the shaft rear and lightly with a plastic hammer.



R55NM7HP16

(4) The removal of the hanger

Remove the hexagonal socket headed bolts (M6 x 16, 4pieces) and plate.
Hexagonal bar spanner
(Hex. side distance : 5)



R55NM7HP17

Remove the distance piece.



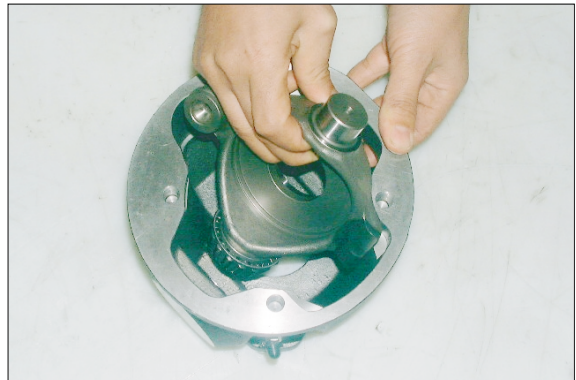
R55NM7HP18

Remove the bearing.



R55NM7HP19

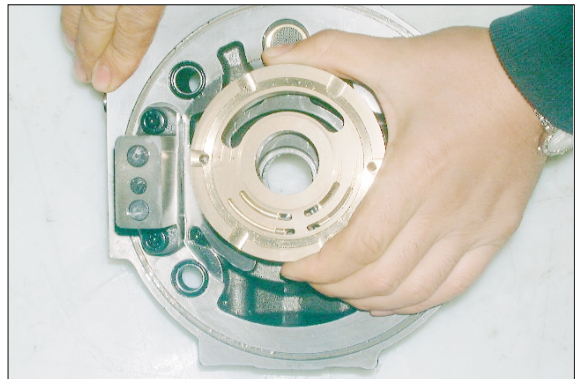
Remove the hanger.



R55NM7HP20

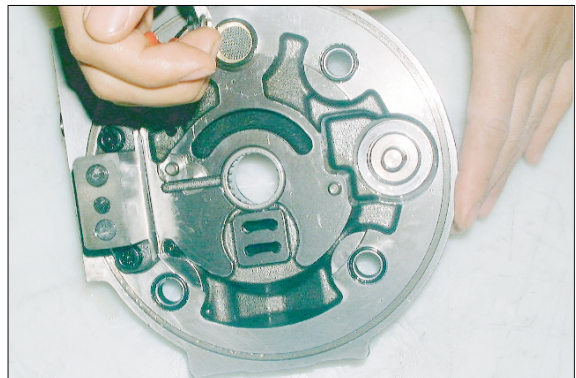
(5) The removal of the cover

Remove the control plate.



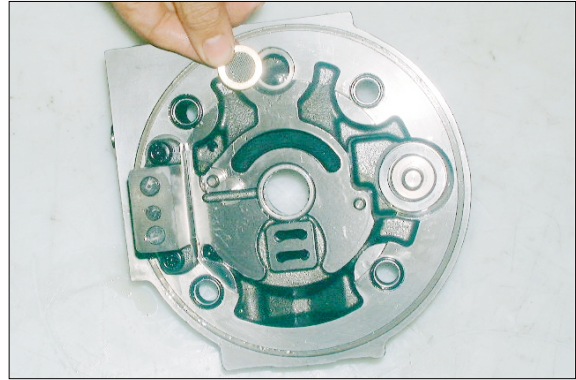
R55NM7HP21

Remove the C-type stop ring.



R55NM7HP22

Remove the filter.



R55NM7HP23

(6) The removal of the control piston

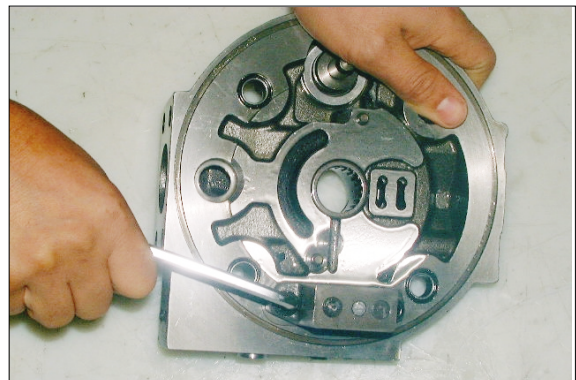
Remove the hexagonal socket headed bolts. (M8 x 25, 2pieces)

Hexagonal bar spanner

(Hex. side distance : 6)

The threaded portion of the bolt is coated with LOCTITE #270.

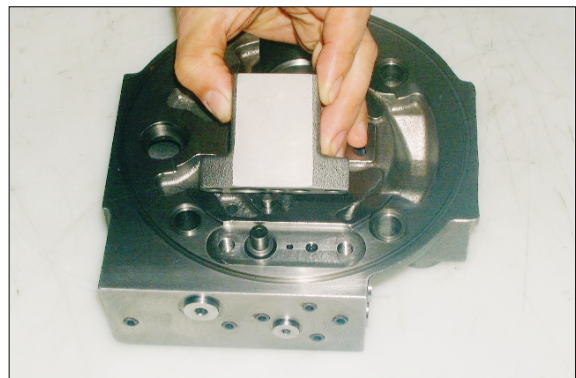
This disassembly must therefore be made only when necessary.



R55NM7HP24

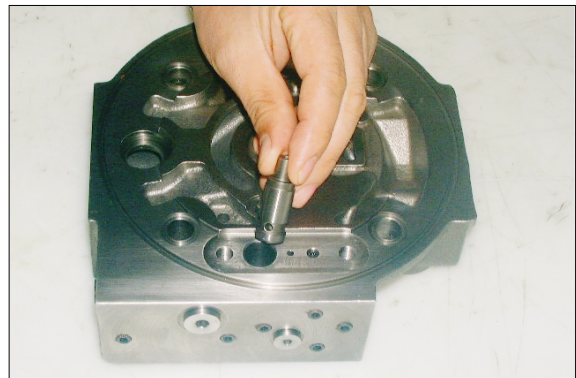
Remove the cylinder and parallel pin.

Be careful because 3 O-rings are provided to the cylinder.



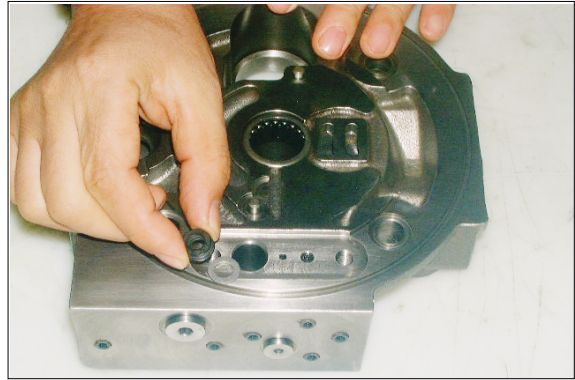
R55NM7HP25

Take out the piston.



R55NM7HP26

Take out three caned disk springs and spring seats.

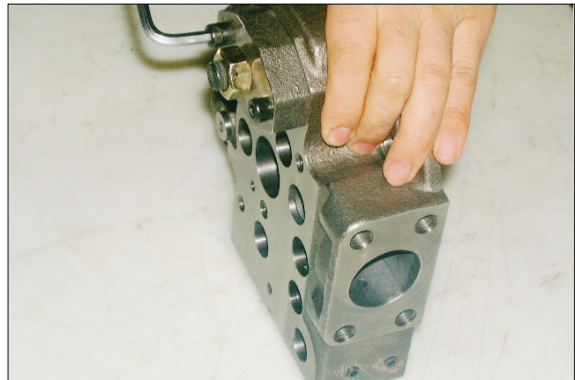


R55NM7HP27

(7) The removal of the control spring

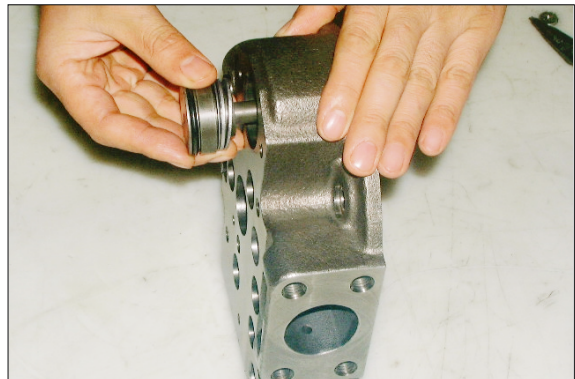
Remove the hexagonal socket headed bolts (M8 x 30, 2pieces) and remove the cover.

Hexagonal bar spanner
(Hex. side distance : 6).



R55NM7HP28

Remove othe spring seat.

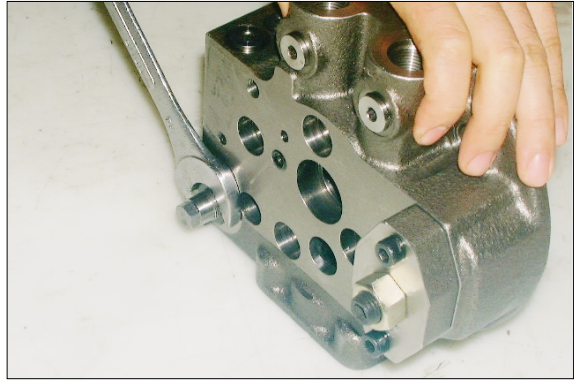


R55NM7HP29

(8) The removal of the relief valve

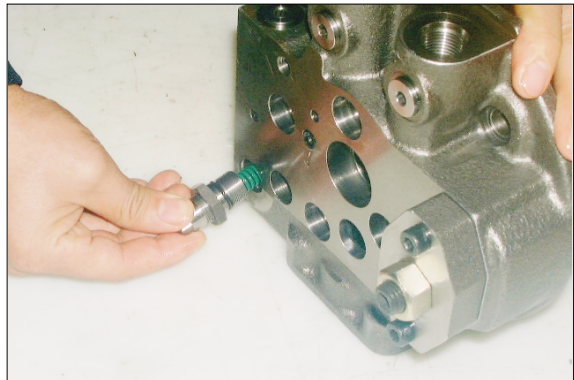
Remove the hexagonal nuts.
Since the pressure has been set, this assembly must be made only when necessary.

Spanner (Hex. side distance : 24).



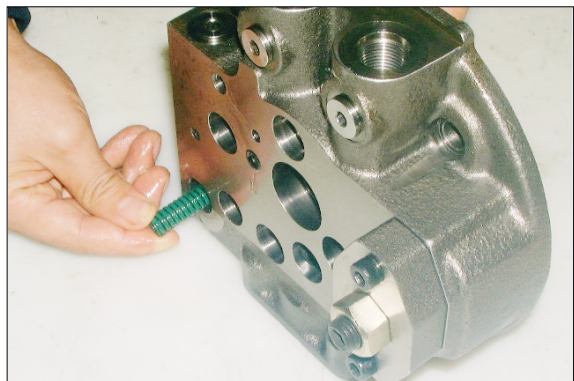
R55NM7HP30

Remove the adjusting screw.
Be careful because the shim is inserted.



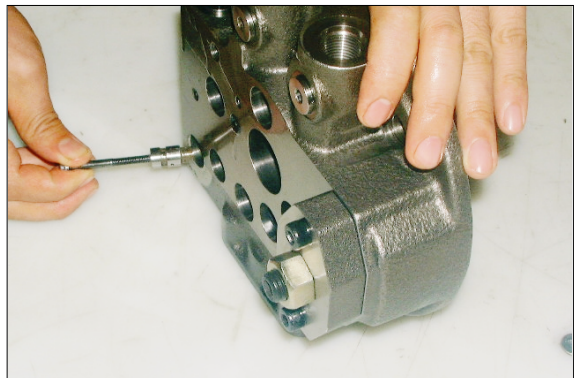
R55NM7HP31

Remove the spring.



R55NM7HP32

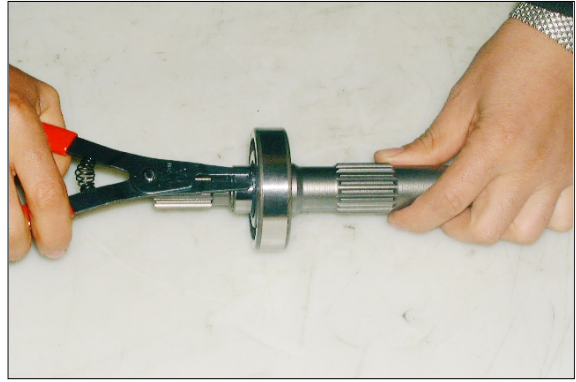
Remove the spool.



R55NM7HP33

(9) Disassembly of the shaft

- Remove the bearing.
- Remove the C-type stop ring.
- Snap ring pliers for shaft.



R55NM7HP34

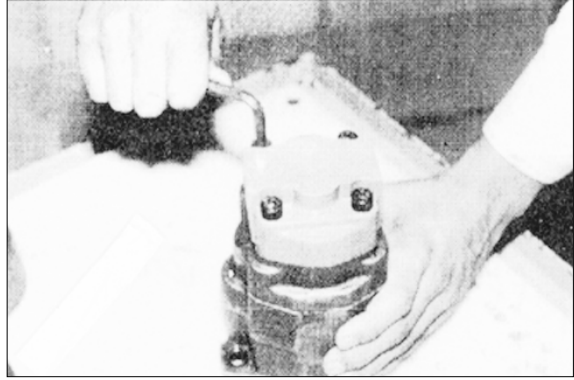
- Remove it while knocking the rear end of shaft lightly with a plastic hammer.



R55NM7HP35

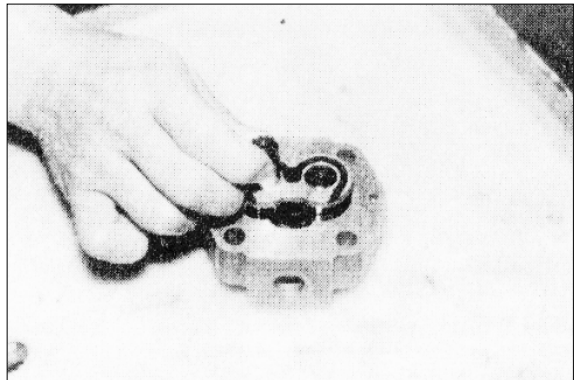
3) DISASSEMBLING THE GEARED PUMP (up to #1416)

- (1) Disassembling the geared pump(G1).
Remove the hexagonal socket headed bolts (M8 × 40, 4pieces).
Hexagonal bar spanner
(Hex. side distance : 6)



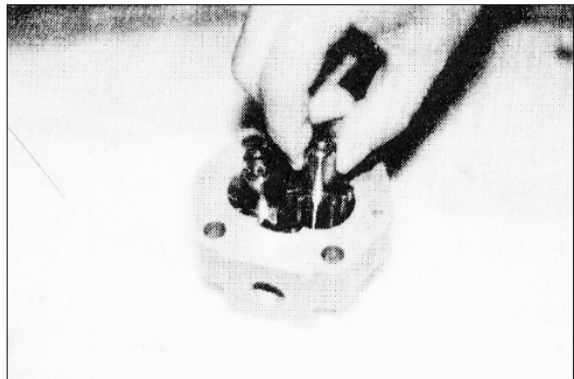
R55NMPH36

- (2) Disassembling the geared pump(G1).
Remove the side plate, back-up ring, square ring and gears while pulling out the drive gear.



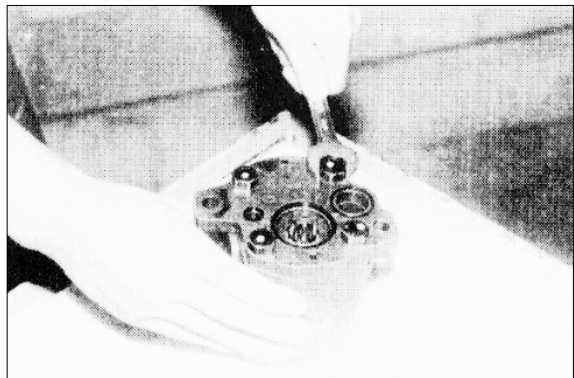
R55NMPH37

- (3) Remove the idle gear.



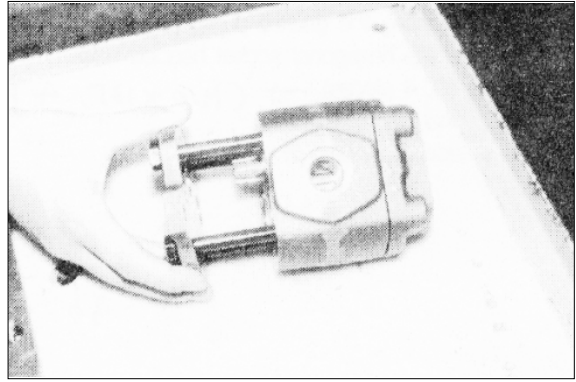
R55NMPH38

- (4) Disassembling the geared pump (GSP2).
Remove the hexagonal socket headed bolts (M10 × 85, 4pieces).
Spanner (Nominal : 17)
The O-ring and filter are provided to the match surface of the geared pump and should be removed.



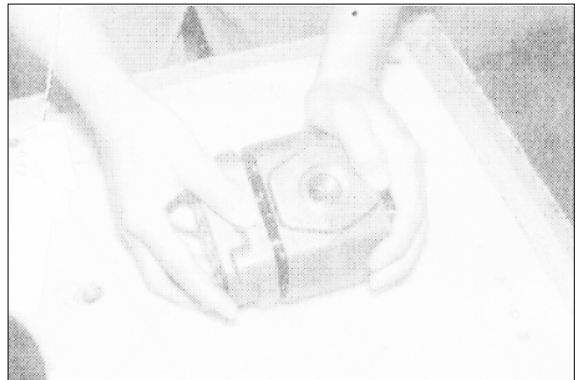
R55NMPH39

(5) Remove the front frame.



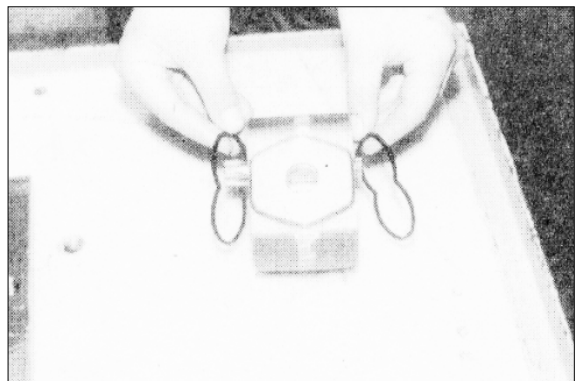
R55NMPH40

(6) Remove the intermediate frame.



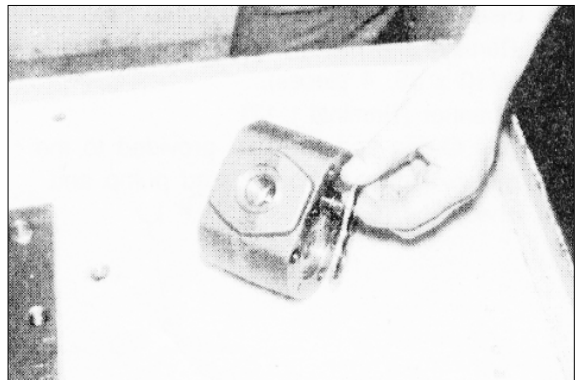
R55NMPH41

(7) Remove the square ring.



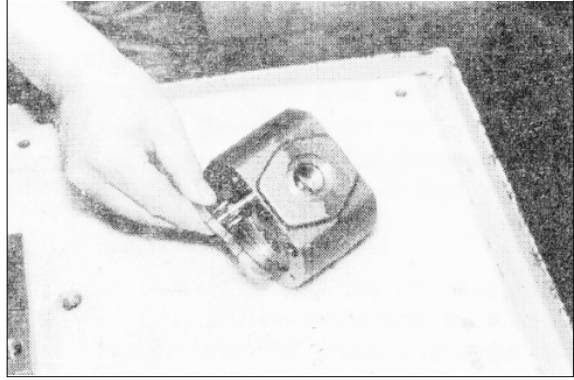
R55NMPH42

(8) Remove the plate, guide and O-ring.



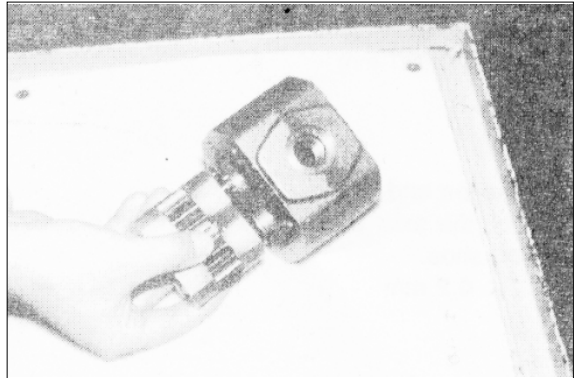
R55NMPH43

(9) Remove the plate.



R55NMPH44

(10) Remove the drive gear, idle gear and side plate.



R55NMPH45

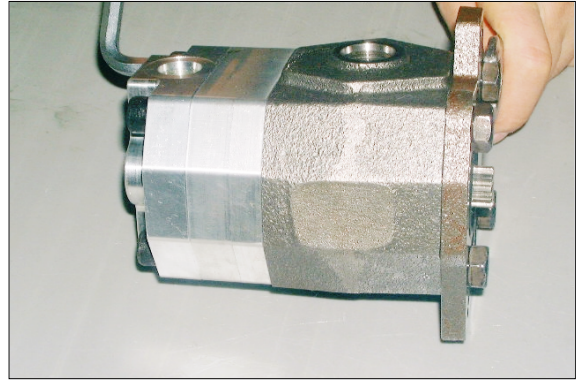
**4) DISASSEMBLING THE GEARED PUMP
(#1417 and up)**

(1) Disassembling the P3 and P4 pump

Removed hexagonal socket head bolt and nut.

Hexagonal socket wrench(8mm).

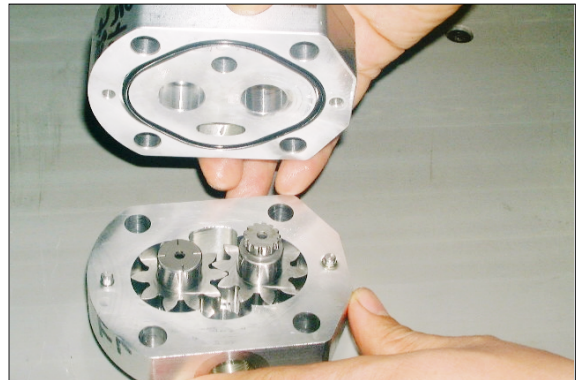
Hexagonal bar spanner(17mm).



R55NM7HP209

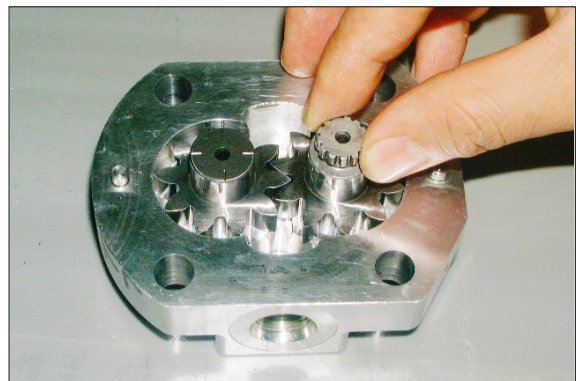
(2) Disassembling the geared pump (P4)

Remove the geared pump(P4) from the center frame.



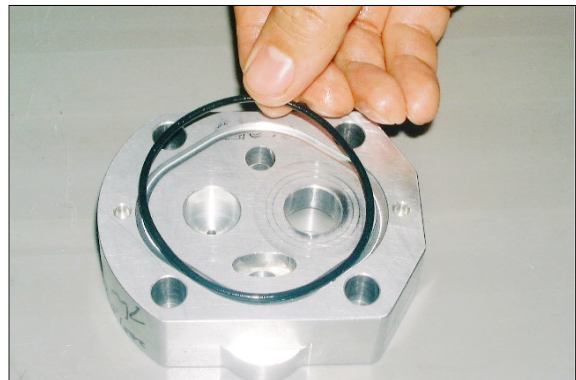
R55NM7HP208

Pulling out the drive gear and the idle gear.



R55NM7HP207

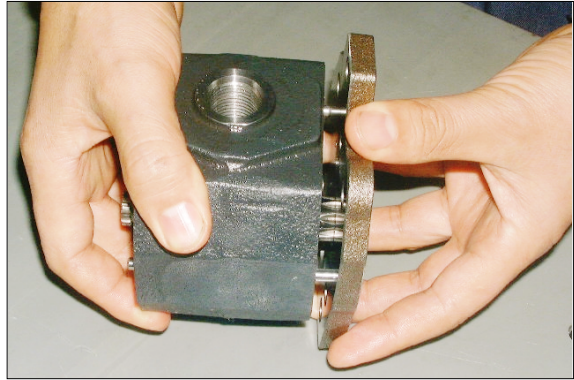
Remove the O-ring from the center frame.



R55NM7HP206

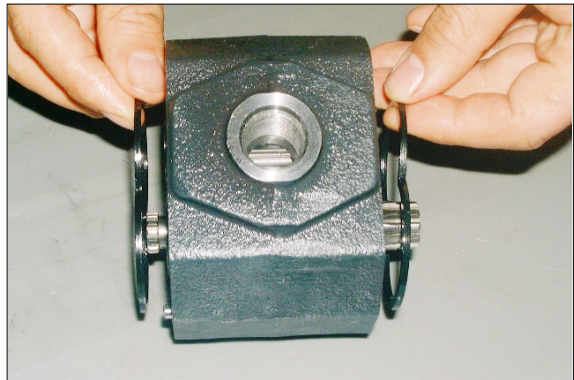
(3) Disassembling the geared pump (P3)

Remove the front cover.



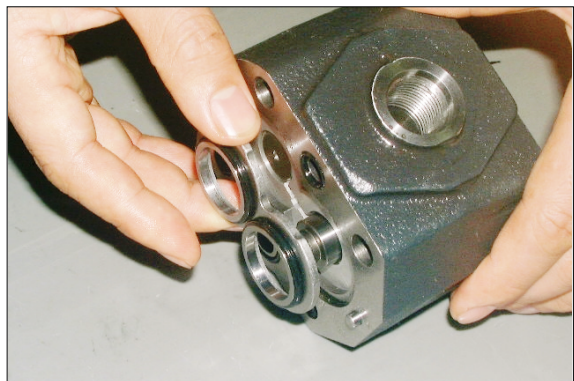
R55NM7HP205

Remove the square ring(2-pieces).



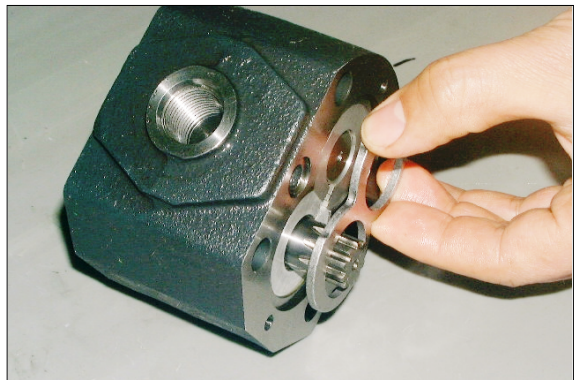
R55NM7HP204

Remove the plate and the guide ring(2-pieces).
Remove the O-ring from guide ring.



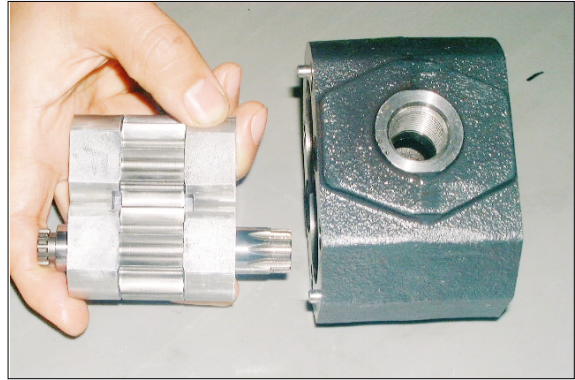
R55NM7HP203

Remove the plate.



R55NM7HP202

Remove the drive and idle gear and the side plate assembly.



R55NM7HP201

4. MAINTENANCE AND SERVICE STANDARD

Before inspection, wash the parts well and dry them completely.

Inspect the principal parts with care and replace them with new parts when any abnormal wear exceeding the allowable limit or damage considered harmful is found.

Replace the seal also when any remarkable deformation and damage are found.

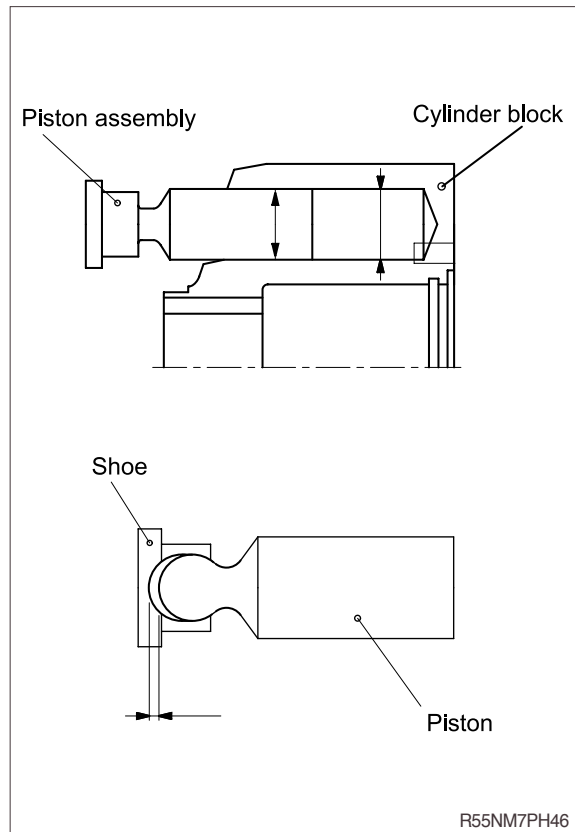
1) PISTON ASSEMBLY AND CYLINDER BLOCK

- (1) Check the appearance visually.

No damage, scouring, abnormal wear (Particularly, in the slide portion) should be found.

- (2) Check the clearance between the piston outside dia and cylinder block inside dia.

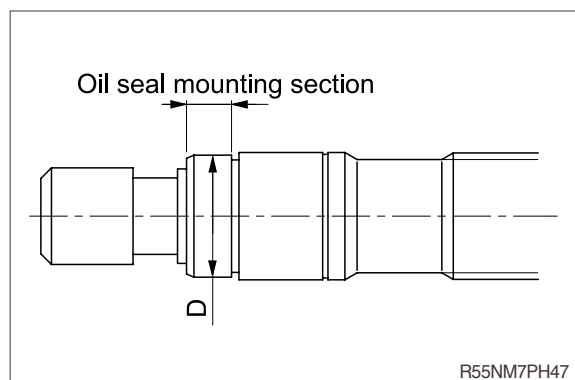
$D-d$ 0.050mm



2) PISTON SHOE AND PISTON

- (1) Check the axial play of the piston and piston shoe.

0.2mm



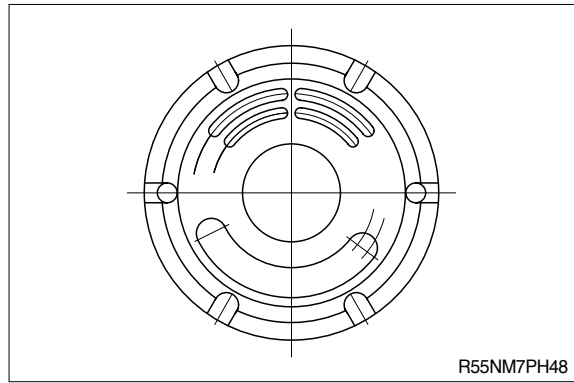
3) SHAFT

- (1) Check the wear amount of the oil seal mounting section.

Wear mount 0.025mm

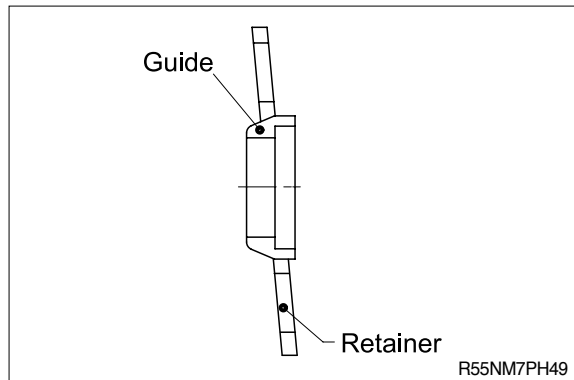
4) CONTROL PLATE

- (1) Check the slide surface for any damage.
When the damage is large, replace the plate with new one.



5) GUIDE AND RETAINER

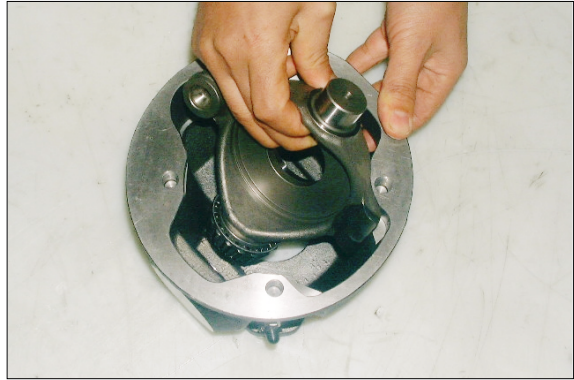
- (1) Check for scouring or stepped wear.
If this can not be corrected, replace the guide and retainer with new full-set.
- (2) Fine scouring or damage can be corrected with lapping.
Carry out thorough washing after lapping.



5. ASSEMBLING PROCEDURE

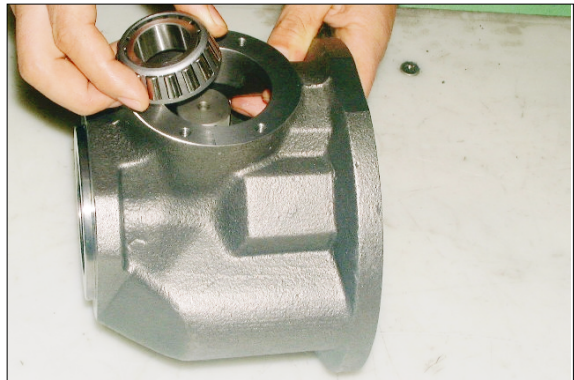
1) ASSEMBLING THE MAIN PUMP

(1) Assembling the hanger.



R55NM7HP50

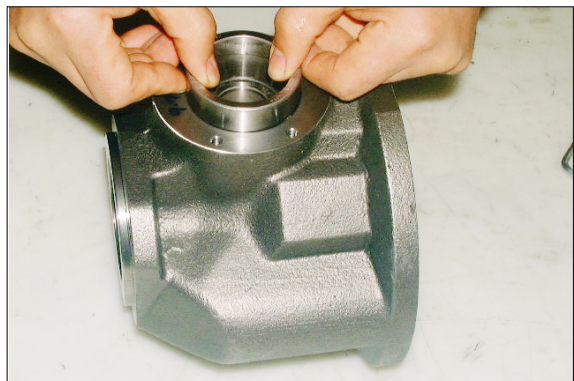
(2) Install the bearing.



R55NM7HP50A

(3) Install the distance piece.

Confirm that pre-load is 0.1 ± 0.2 .



R55NM7HP51

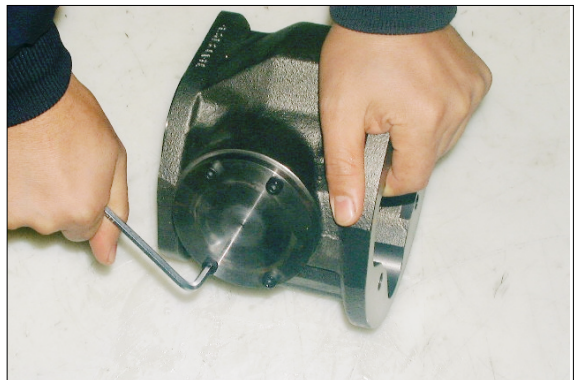
(4) Fix the plate with the hexagonal socket headed bolts (M6 × 16, 4pieces).

Hexagonal bar spanner

(Hex. side distance : 5)

Tightening torque : $1.2 \sim 1.5 \text{ kgf} \cdot \text{m}$

($12 \sim 15 \text{ N} \cdot \text{m}$)



R55NM7HP52

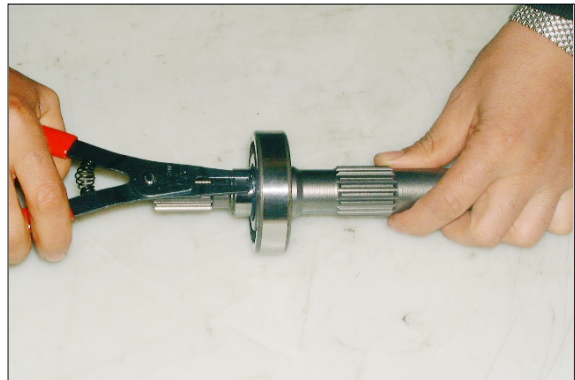
(5) Assembling the shaft

Fit the shaft into the bearing (With the bearing in the bottom) by using the press machine and jig. If the press is not available, use the jig in the similar manner and drive the shaft into the bearing by knocking with a plastic hammer.



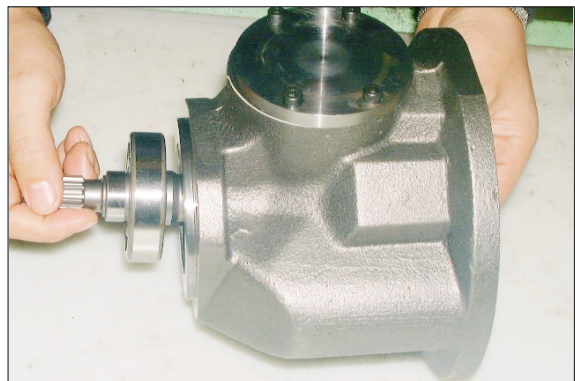
R55NM7HP53

Install the C-type stop ring to fix the bearing.



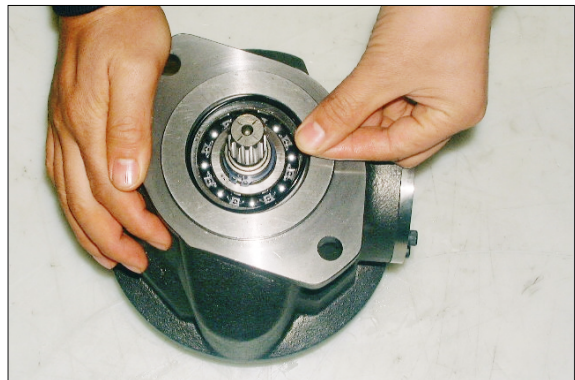
R55NM7HP54

Assembling the shaft.
Assemble the shaft into the housing.
Knock the spline end lightly with a plastic hammer and fix the bearing outer ring firmly into the housing hole.



R55NM7HP55

(6) Apply grease to the O-ring for assembling.



R55NM7HP56

- (7) Install the case with oil seal vertically without tilting.
Apply grease to the oil seal lip beforehand.



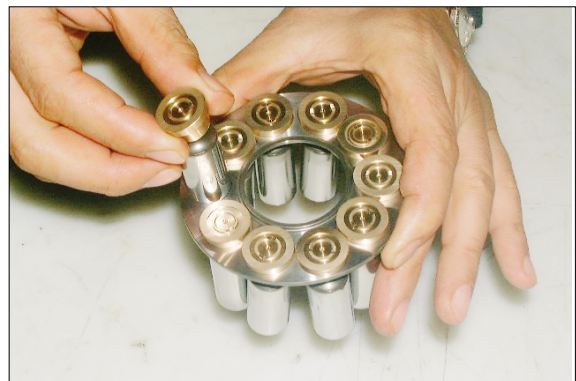
R55NM7HP57

- (8) Install the C-type stop ring to fix the shaft.



R55NM7HP58

- (9) Assembling the rotary group.
Install 10(ten) pistons into the retainer.



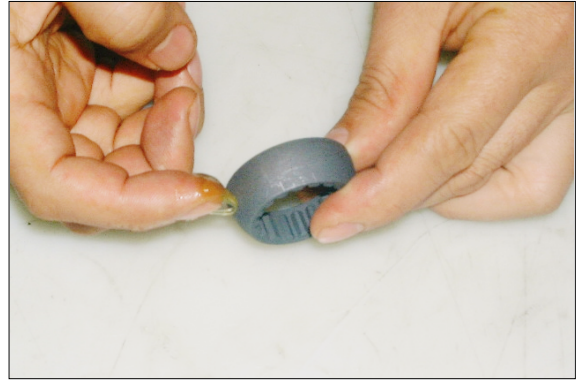
R55NM7HP59

- (10) Apply grease to 3 parallel pins and assemble them to the cylinder block.



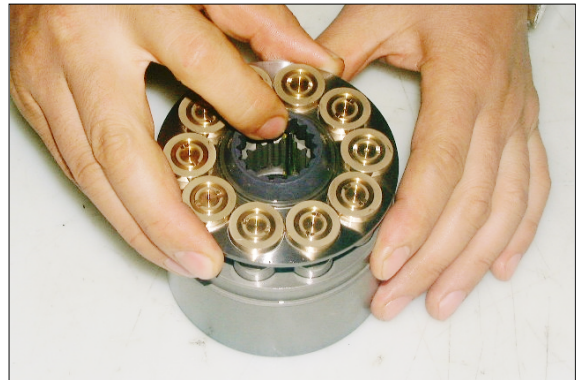
R55NM7HP60

- (11) Apply grease to the spherical portion of the guide.



R55NM7HP61

- (12) Insert the guide between the retainer and cylinder block and assemble the piston into the hole of cylinder block.



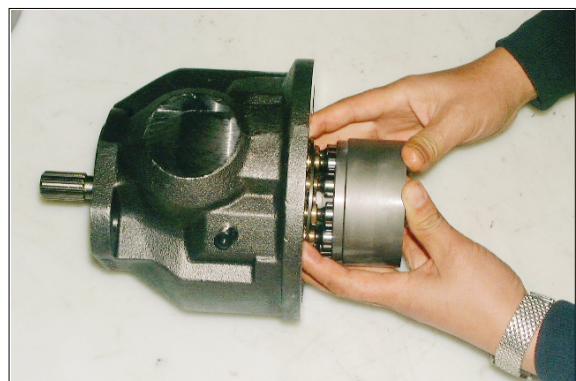
R55NM7HP62

- (13) Assembling the rotary group.
To prevent dislodgment, apply grease to the back side of the plate and assemble it to the hanger.



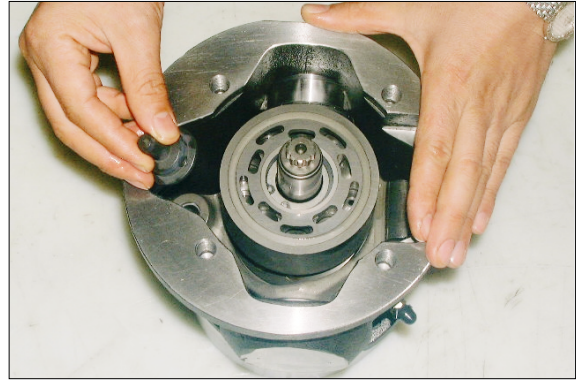
R55NM7HP63

- (14) Assemble the rotary group along the shaft spline.
During assembly, apply grease to the slide surface of piston shoe and to the slide surface of the cylinder block relative to the control plate.



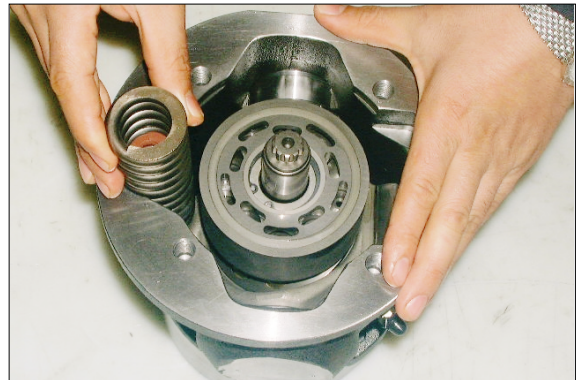
R55NM7HP64

- (15) Assembling the control spring.
Apply grease to the spherical portion of the spring seat before assembling.



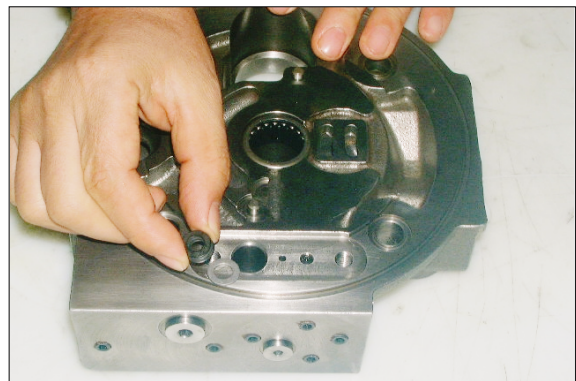
R55NM7HP65

- (16) Assemble 2 springs (Inner and outer).



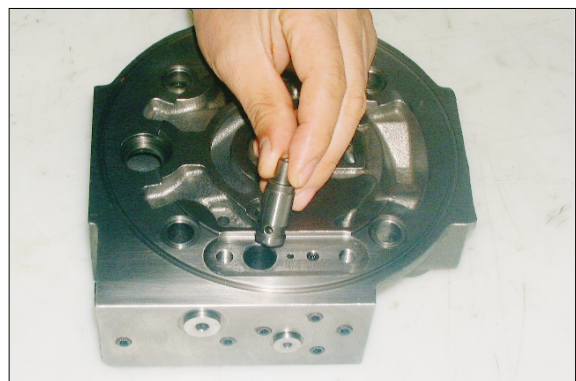
R55NM7HP66

- (17) Assembling the cover.
Assemble the spring seats and coned disk springs (3 pieces).



R55NM7HP67

- (18) Assembling the control piston.



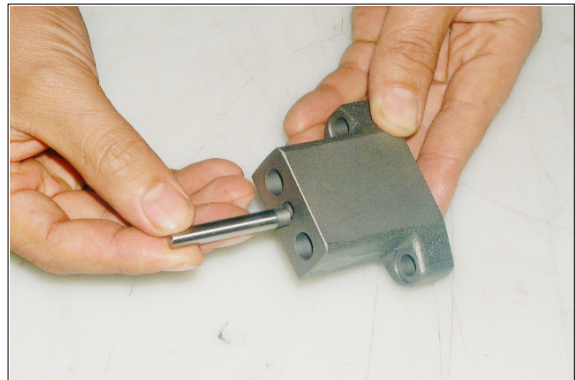
R55NM7HP68

- (19) Apply grease to the O-rings
(5.28 × 1.78, 1piece), (7.65 × 1.78, 1piece)
and (15.6 × 1.78, 1piece) and assemble
them to the cylinder.



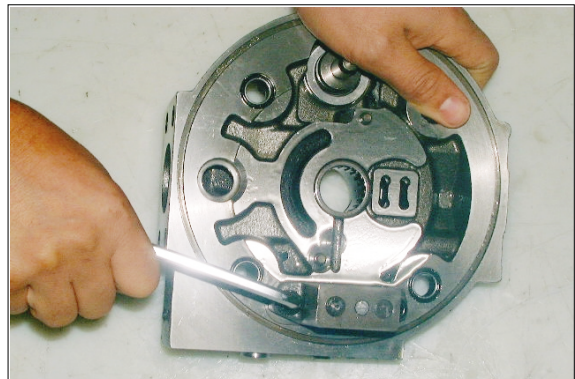
R55NM7HP69

- (20) Apply grease to 3 parallel pins and
assemble 3 pins into the cylinder.



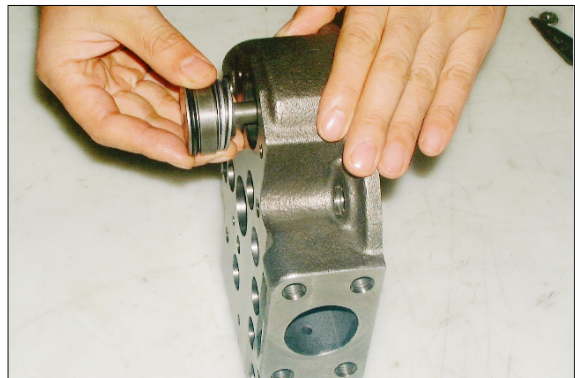
R55NM7HP70

- (21) Fix the cylinder with the hexagonal socket
headed bolts (M8 × 25, 2pieces).
Apply LOCTITE #270 to the threaded
portion of bolt.
Hexagonal bar spanner
(Hex. side distance : 6)
Tightening torque : 2.9 ~ 3.5kgf · m
(28 ~ 35N · m)



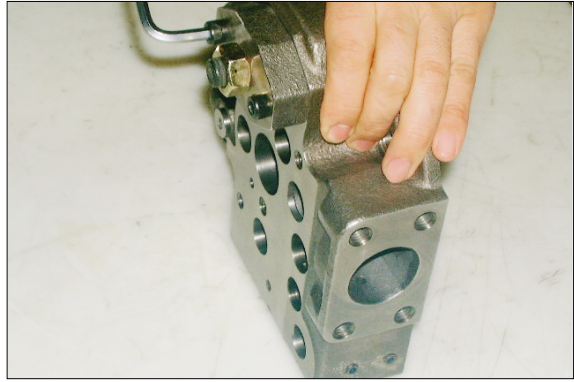
R55NM7HP71

- (22) Assembling the control spring.
Install the spring seat.



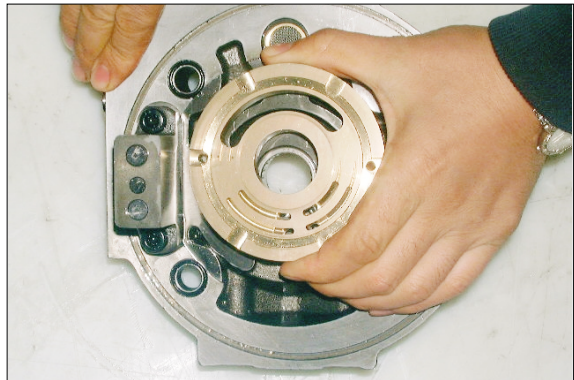
R55NM7HP72

- (23) Fix the cover with the hexagonal socket headed bolts (M8 × 30, 2pieces)
Hexagonal bar spanner
(Hex. side distance : 6)
Tightening torque : 2.9 ~ 3.5kgf · m
(28 ~35N · m)



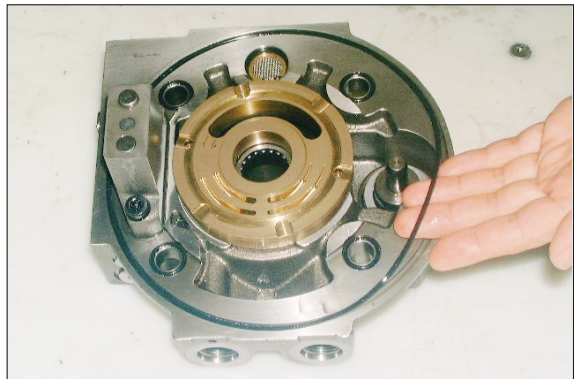
R55NM7HP73

- (24) Apply grease to the back side of the control plate and assemble it to the cover while matching knock holes.



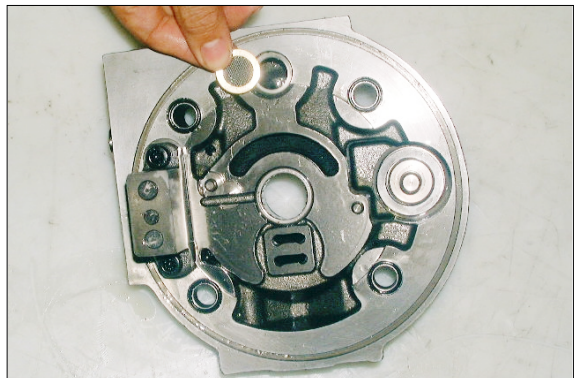
R55NM7HP74

- (25) Install the O-ring.
Assemble the spring seats and coned disk springs (3pieces).



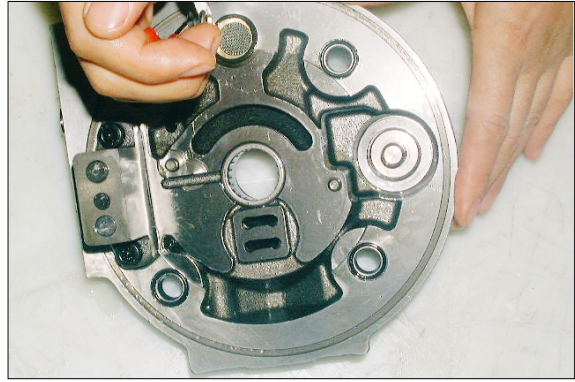
R55NM7HP75

- (26) Install the filter into the cover.



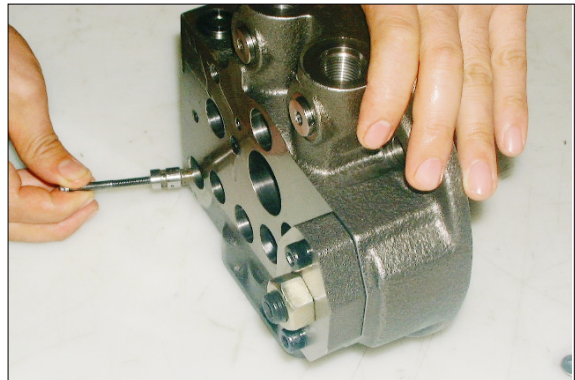
R55NM7HP76

(27) Fix the filter with the C-type stop ring.



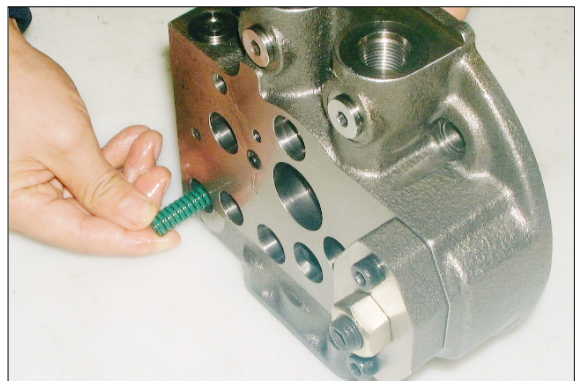
R55NM7HP77

(28) Assembling the relief valve.
Assemble the spool.



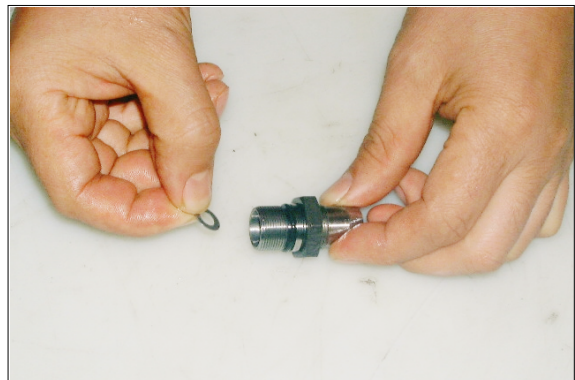
R55NM7HP78

(29) Assemble the spring.



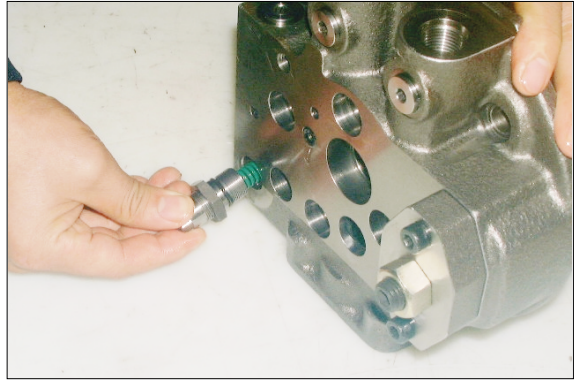
R55NM7HP79

(30) Insert the shim into the adjusting screw.



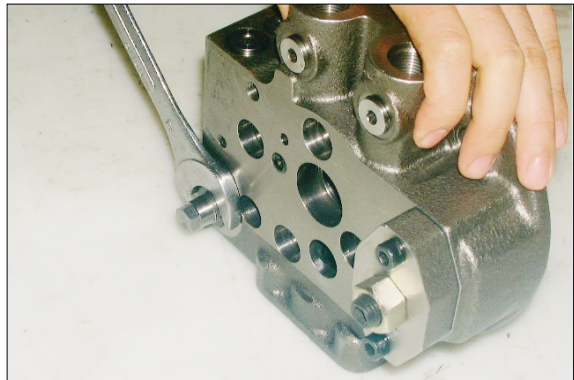
R55NM7HP80

(31) Assemble the adjusting screw.



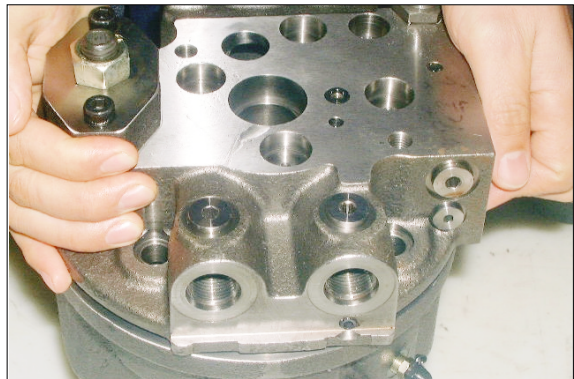
R55NM7HP81

(32) Tighten the hexagonal nuts.
After assembling, set the pressure and
tighten the nuts.
1kgf · m(9.8N · m)
Spanner (Hex. side distance : 24)



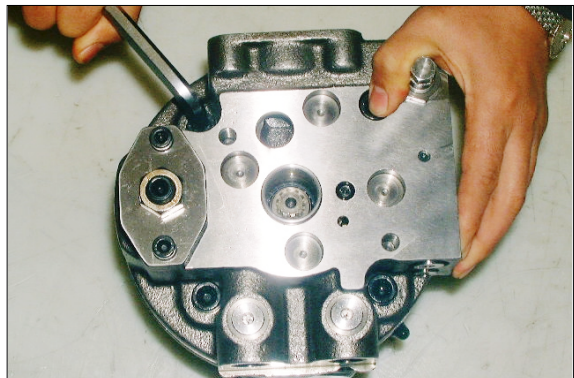
R55NM7HP82

(33) Install the cover in a parallel direction to
the housing mounting surface.



R55NM7HP83

(34) Fix the cover with the hexagonal socket
headed bolts (M12 x 30, 3pieces) and
(M12 x 55, 1piece)
Hexagonal bar spanner
(Hex. side distance :10)
Tightening torque : 10 ~ 12.5kgf · m
(98 ~ 123N · m)



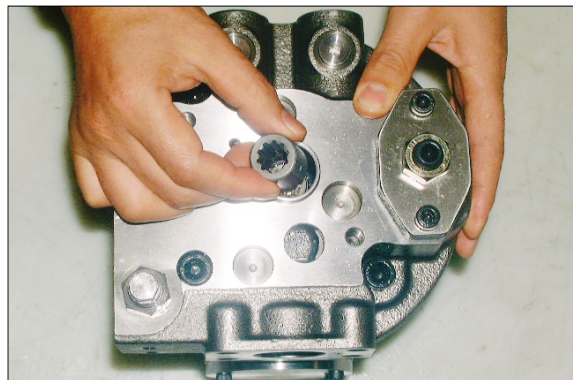
R55NM7HP84

(35) Install the O-ring into the cover.



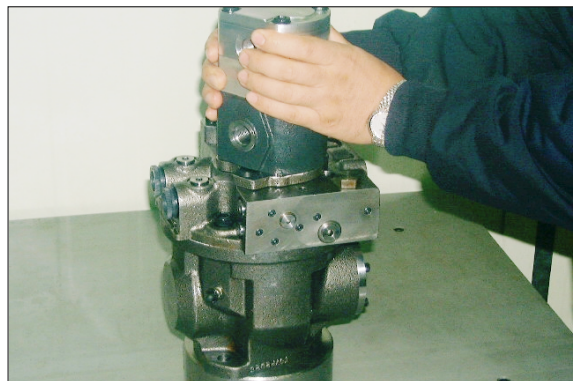
R55NM7HP85

(36) Install the coupling to the shaft end of the main pump.



R55NM7HP86

(37) Connect the main and geared pump.



R55NM7HP87

(38) Fix the geared pump with the hexagonal socket headed bolts (M10 x 25, 2pieces).
Hexagonal bar spanner
(Hex. side distance : 8)
Tightening torque : 5.6 ~ 7.0kgf · m
(55 ~ 69N · m)



R55NM7HP88

2) ASSEMBLING THE GEARED PUMP

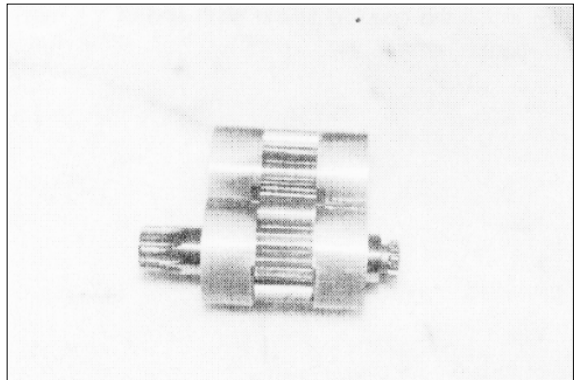
(up to #1416)

- (1) Assembling the geared pump(GSP2).
Assemble the square ring into the side plate.
Pay attention to the suction and discharge directions.



R55NMPH89

- (2) Assemble the drive gear and idle gear to the side plate.



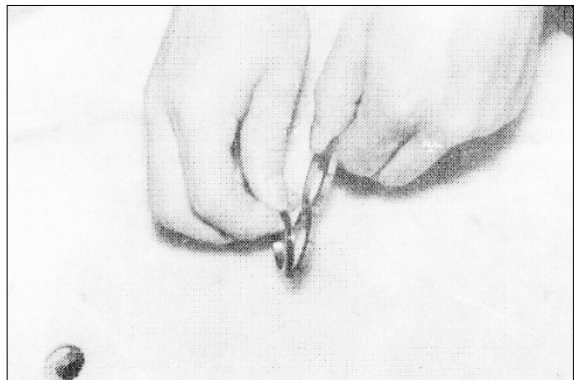
R55NMPH90

- (3) Assemble the drive gear, idle gear and side plate.



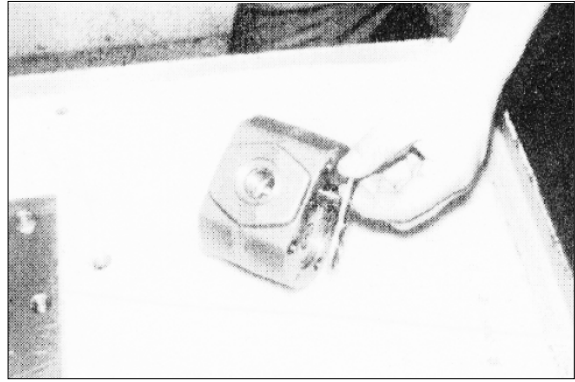
R55NMPH91

- (4) Insert the O-ring into the guide, then insert them into the plate.



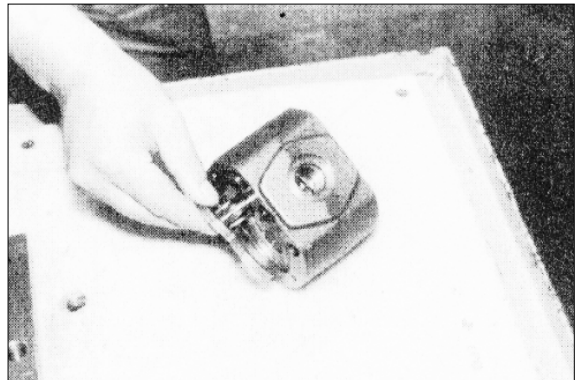
R55NMPH92

(5) Assemble the plate, guide and O-ring.



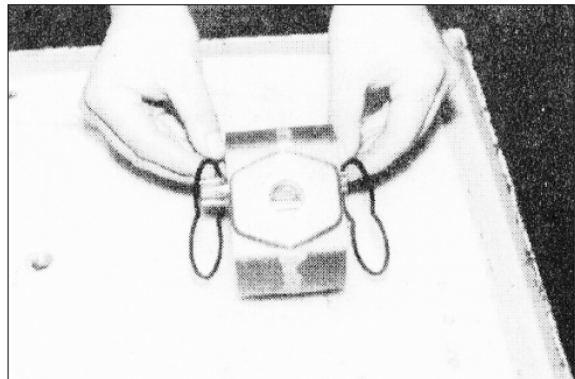
R55NMPH93

(6) Assemble 2 plates. In this case, pay attention to the suction and discharge directions.



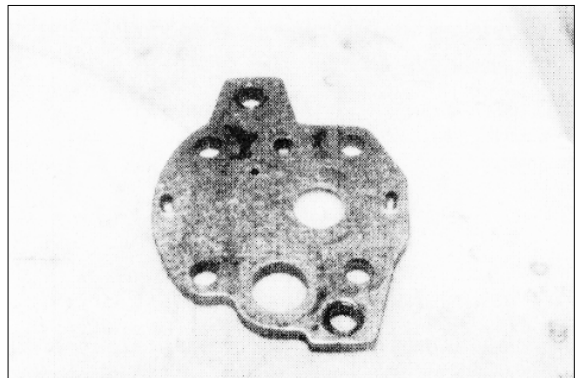
R55NMPH94

(7) Install the square ring.



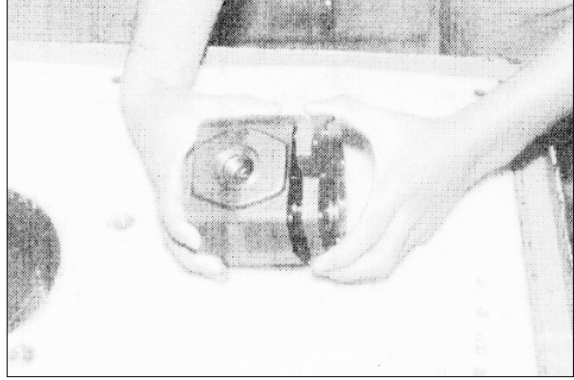
R55NMPH95

(8) Install 2 parallel pins into the front frame.



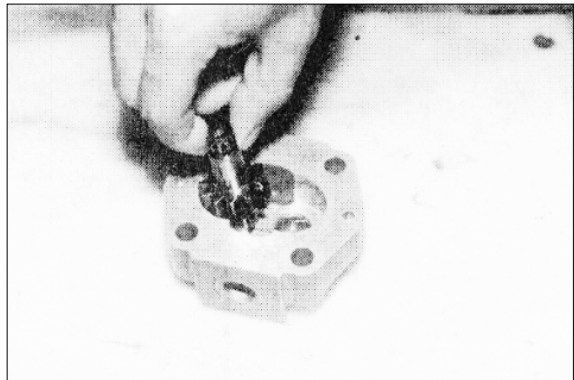
R55NMPH96

(9) Assemble the front frame.



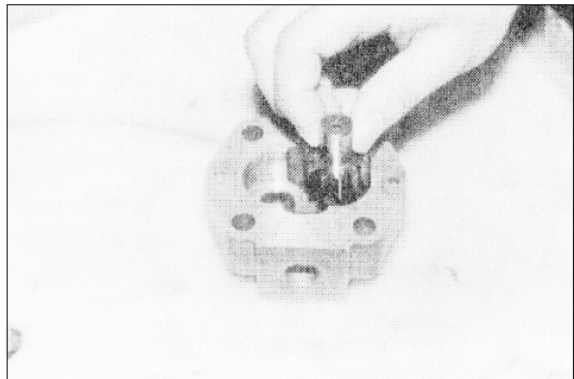
R55NMPH97

(10) Assemble the geared pump (G1)
Assemble the drive gear into the housing.



R55NMPH98

(11) Assemble the idle gear.



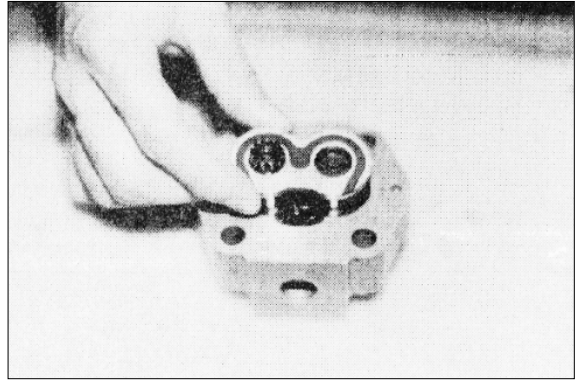
R55NMPH99

(12) Apply grease to the square ring and
backup ring to prevent dislodgment and
assemble them in this order.



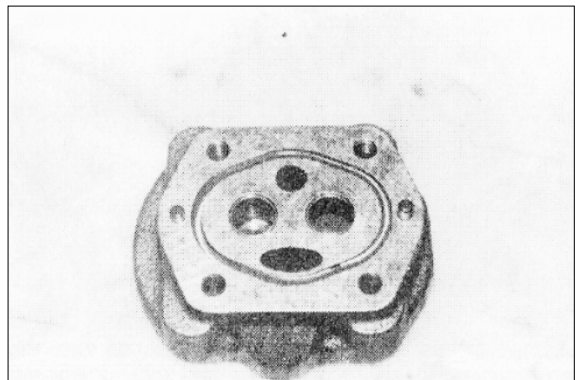
R55NMPH100

(13) Assemble the side plate assembled in item(12) into the housing.



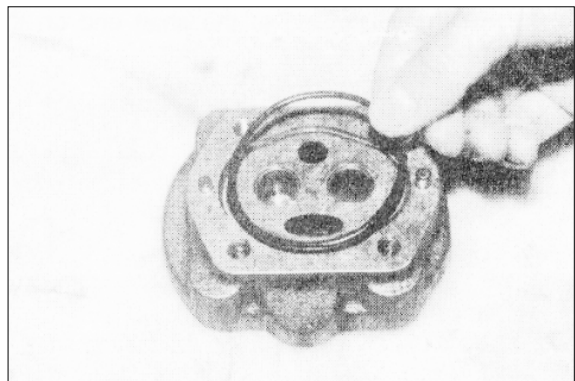
R55NMPH101

(14) Install 2 parallel pins into the intermediate frame.



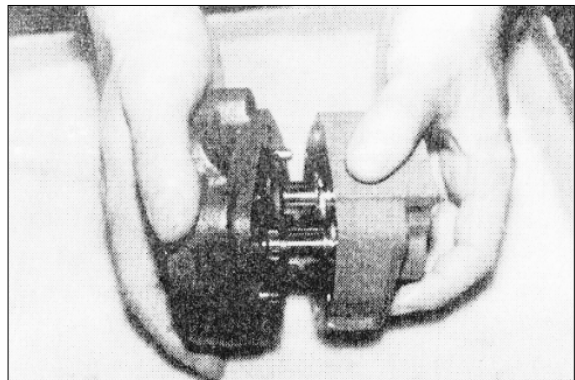
R55NMPH102

(15) Install O-ring into the intermediate frame.



R55NMPH103

(16) Assemble the intermediate frame.



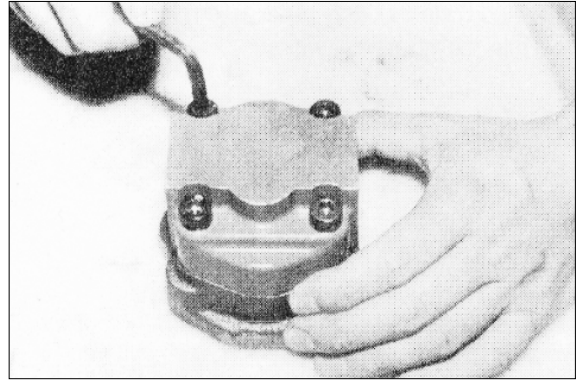
R55NMPH104

(17) Fix the intermediate frame with the hexagonal socket headed bolts(M8 × 40, 4pieces).

Hexagonal bar spanner

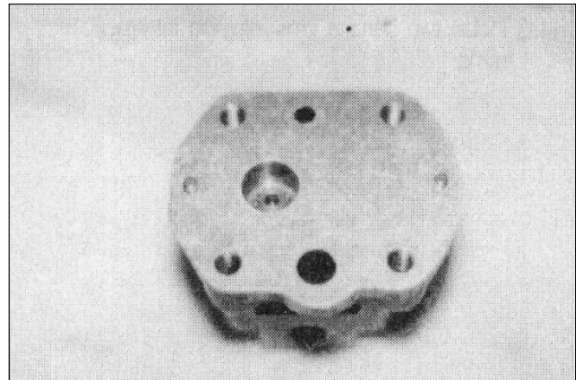
(Hex. side distance : 6)

Tightening torque : 29N · m(3kgf · m)



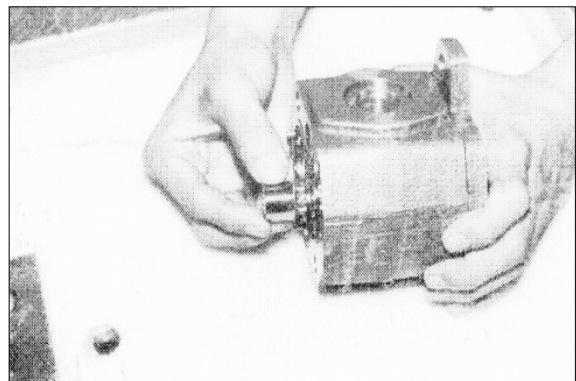
R55NMPH105

(18) Install 2 parallel pins into the intermediate frame.



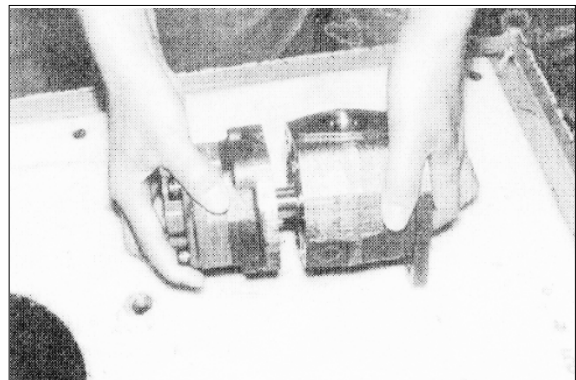
R55NMPH106

(19) Install the coupling to the shaft end on the GSP2 side.



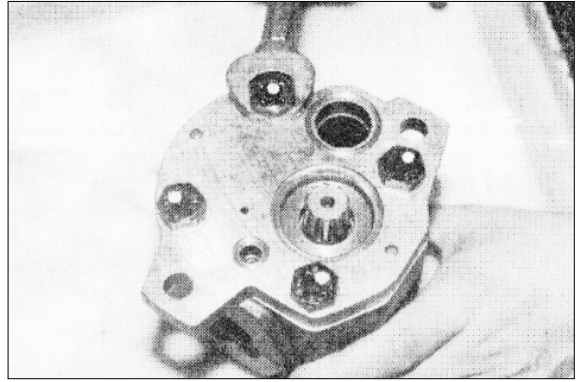
R55NMPH107

(20) Connect the GSP2 and G1.



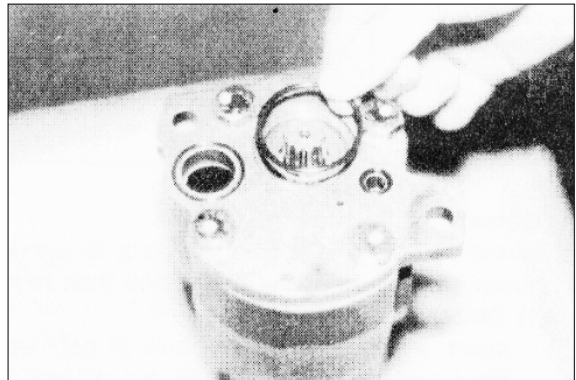
R55NMPH108

- (21) Fix the GSP2 and G1 with the hexagonal bolts (M10 × 95, 4pieces).
Spanner (Nominal : 17)
Tightening torque : 59N · m(6kgf · m)



R55NMPH109

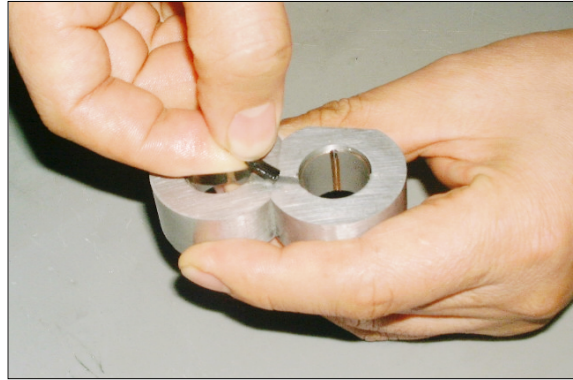
- (22) Install the O-ring and filter into the front frame.



R55NMPH110

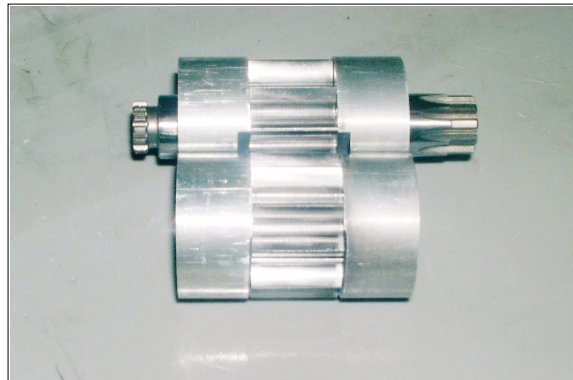
**4) REASSEMBLING THE GEARED PUMP
(#1417 and up)**

- (1) Reassembling the geared pump (P3)**
Insert the square ring into the side plate.
Be careful to suction and discharge side.



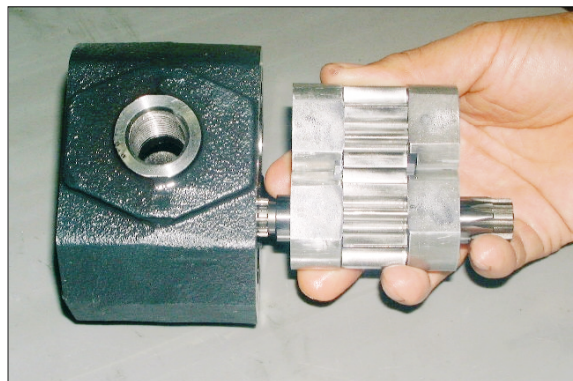
R55NM7HP210

Assemble the side plate to the drive and
idle gear.



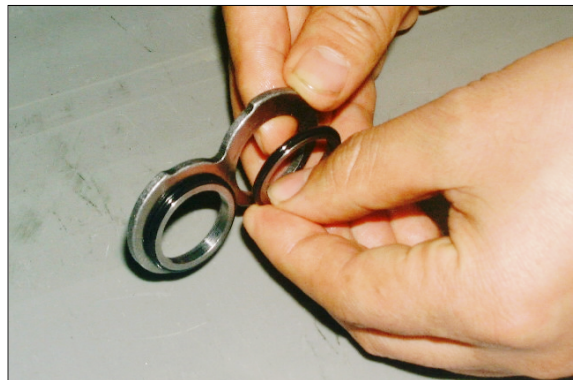
R55NM7HP211

Assemble the gear assembly into the
gear casing.



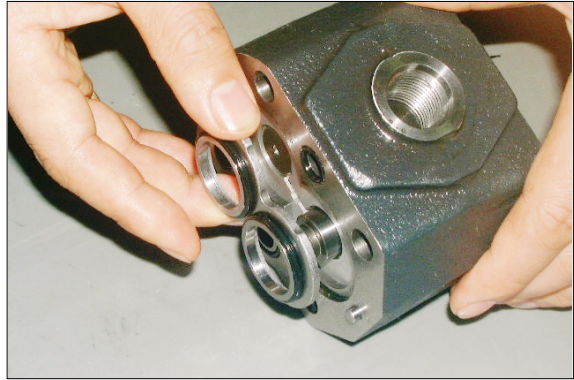
R55NM7HP212

Assemble the O-ring to the guide ring
and assemble them to the plate.



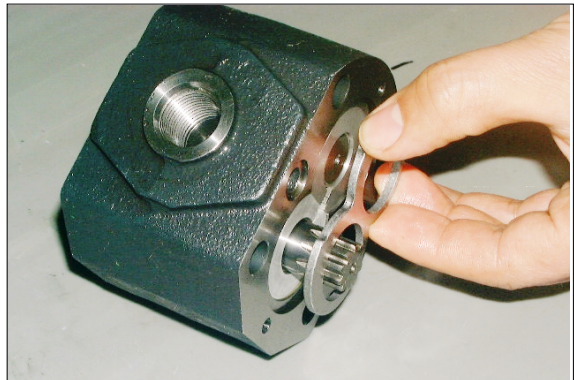
R55NM7HP213

Assemble the guide ring assembly to the gear casing.



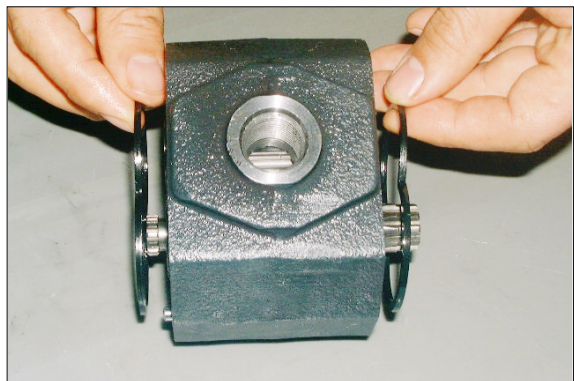
R55NM7HP214

Assemble the plate to the gear casing.
Be careful to suction and discharge side.



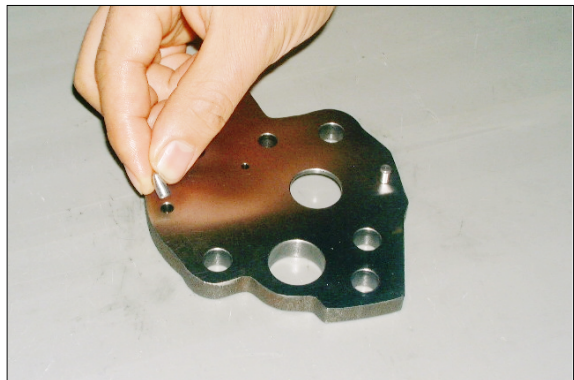
R55NM7HP215

Assemble the square ring(2 piece) to the gear casing.



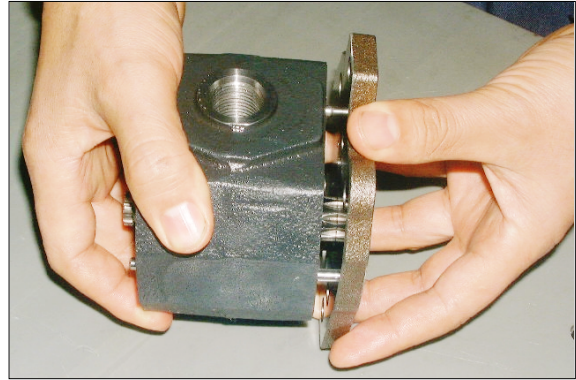
R55NM7HP216

Insert pin to the front cover.



R55NM7HP217

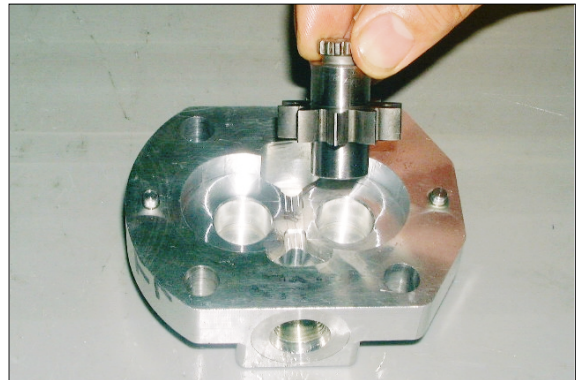
Assemble the front cover to the gear casing.



R55NM7HP218

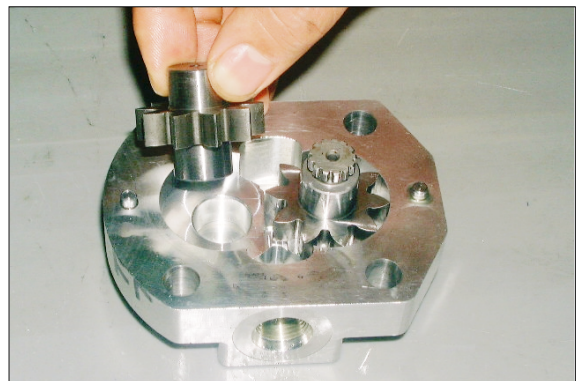
(2) Reassembling the geared pump (P4)

Insert the drive gear into the gear casing.



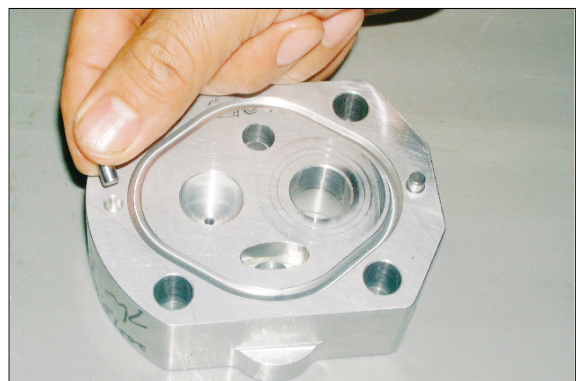
R55NM7HP219

Insert the idle gear to into the gear casing.



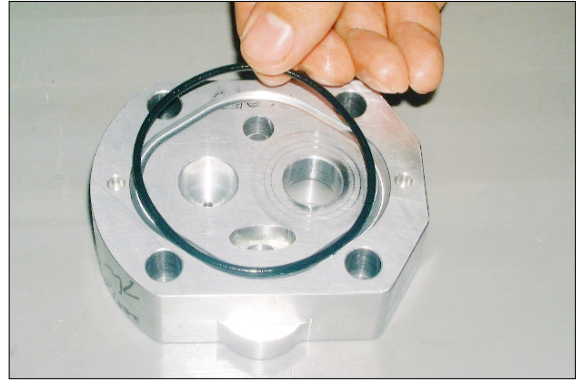
R55NM7HP220

Insert the pins (2-pieces) to the center frame.



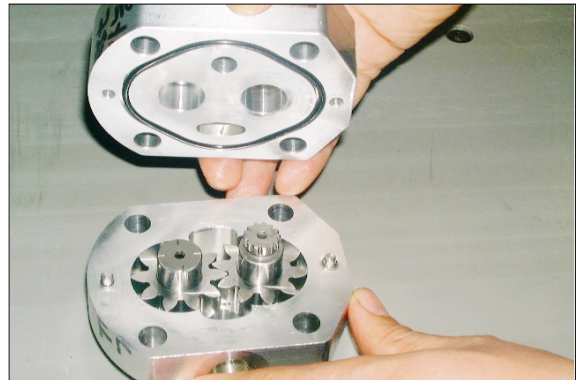
R55NM7HP221

Assemble the O-ring to the center frame.



R55NM7HP222

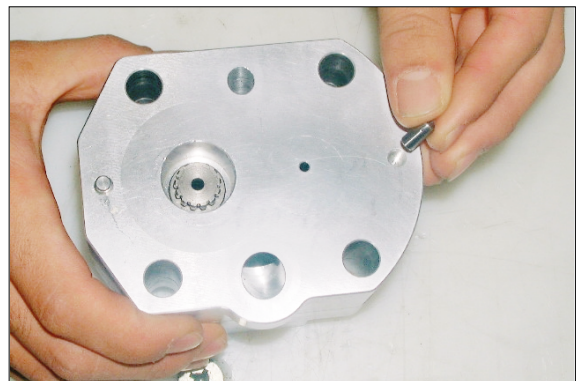
Assemble the center frame sub-assembly to the gear casing sub-assembly.



R55NM7HP223

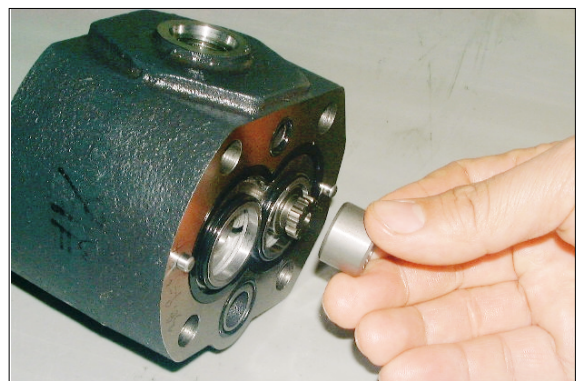
(3) Reassembling the P3 and P4 pumps

Insert the pins (2-pieces) into the center frame.



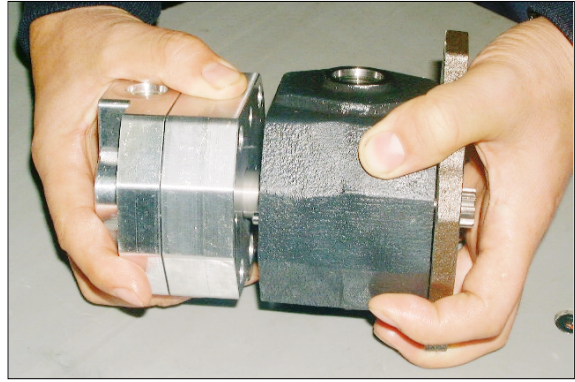
R55NM7HP224

Insert coupling to the P3 geared pump.



R55NM7HP225

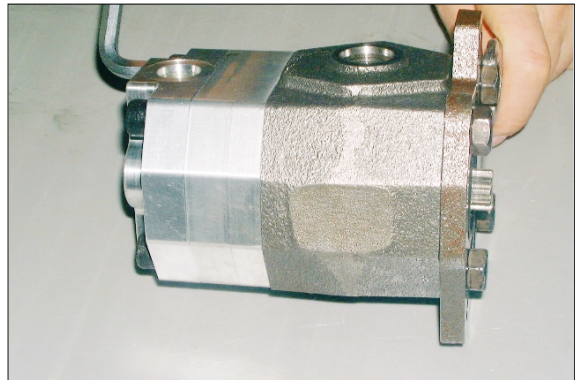
Assemble the P3 and P4 geared pumps.



R55NM7HP226

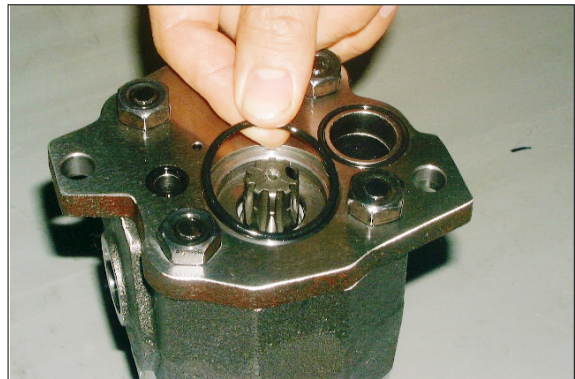
Assemble the hexagonal socket bolts and nuts.

- Size : M10 x 135L, 4pieces
- Allen wrench : 8mm
- Spanner : 17mm
- Tightening torque : 580kgf · cm(56.9N · m)



R55NM7HP227

Assemble the O-ring to the front cover.



R55NM7HP228