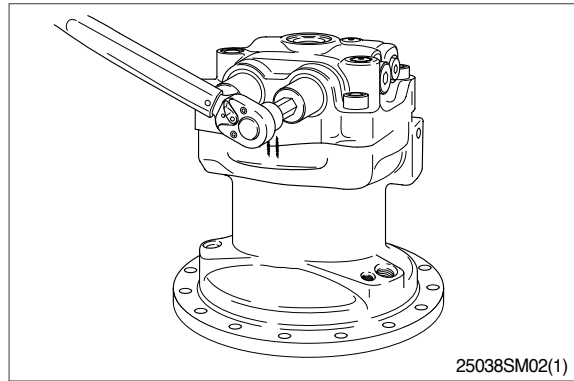


## GROUP 3 SWING MOTOR

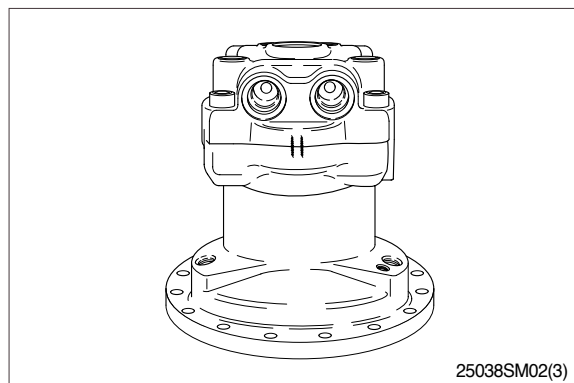
### 1. SWING MOTOR

#### 1) DISASSEMBLY

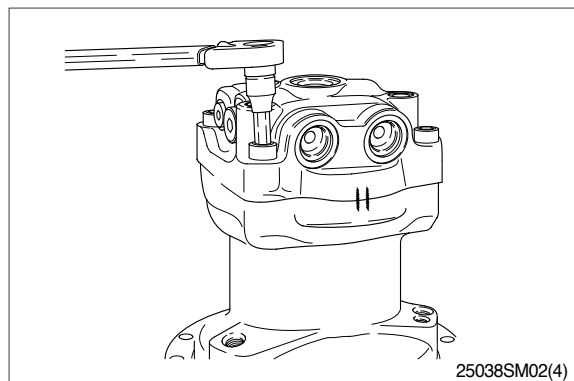
- (1) Remove the relief valve and hydraulic timer. The relief valve and bypass valve disassembled to be reassembled to the original position.



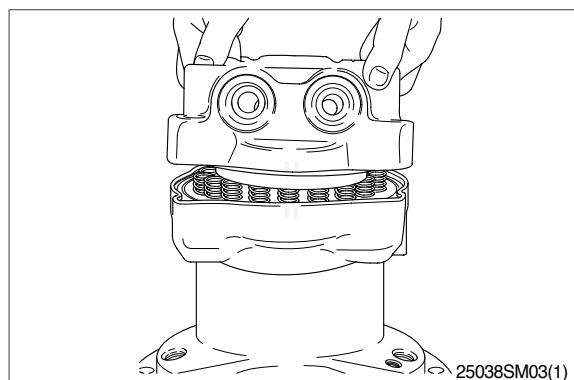
- (2) Mark "I" on the assembly position of motor. To mark "I" on the assembly position of cover & housing is convenient for reassembly



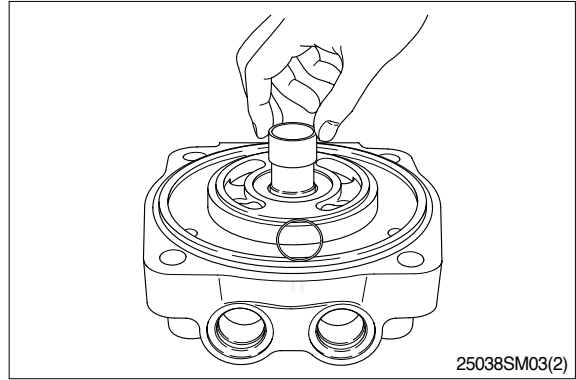
- (3) Removal of bolt.  
Remove cover & housing and then remove bypass valve assembly.



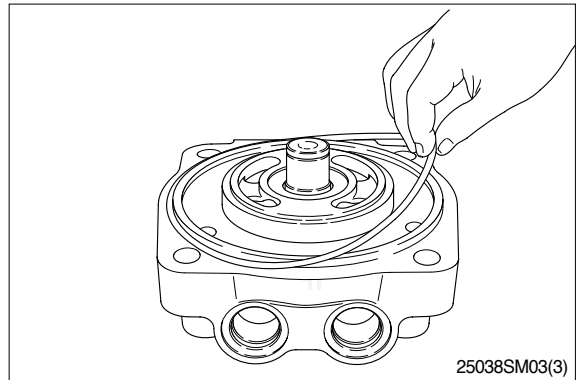
- (4) Lift cover and then remove it.



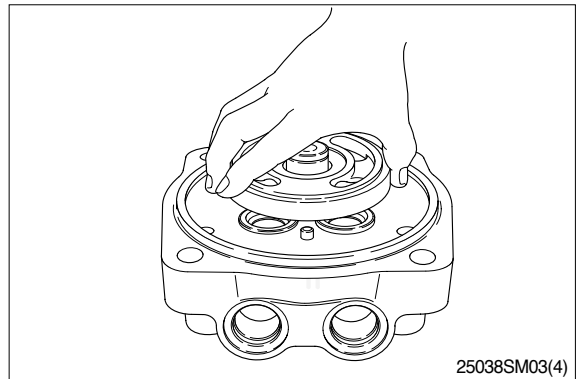
- (5) Remove the snap ring and then remove the inlet parts of needle bearing.



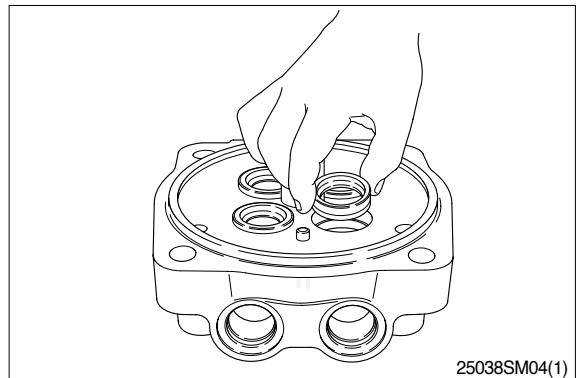
- (6) Remove O-ring.



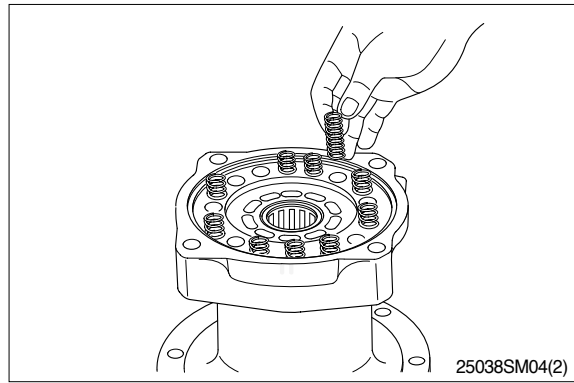
- (7) Remove balance plate.



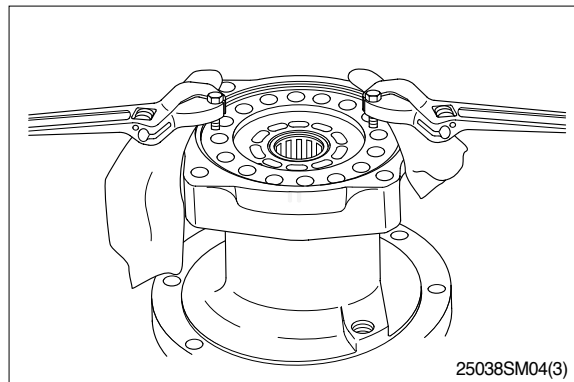
- (8) Remove bushing and dish spring attached to tefron ring.



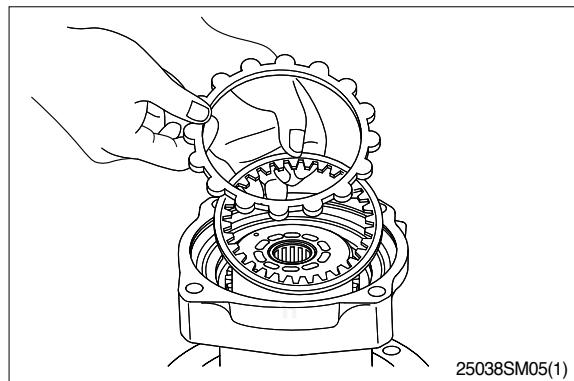
- (9) Remove the spring from the piston for brake the inlet parts of needle bearing. Mark to recognize assembly position of spring.



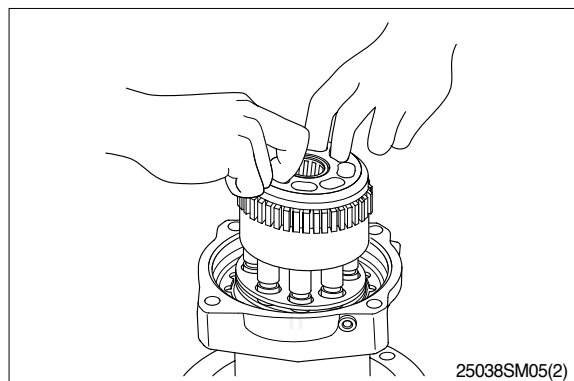
- (10) Removal of the piston for brake.  
It is difficult for piston to be removed from housing due to resistance, so it is necessary to use tap hole on the piston as shown on the picture.



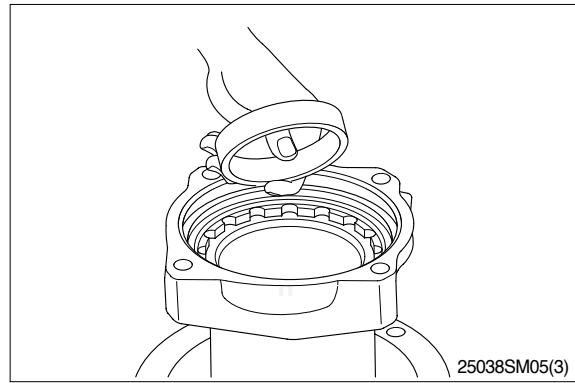
- (11) Remove friction plate and opposite plate.



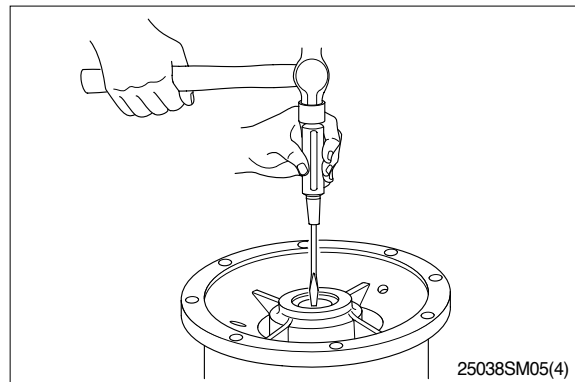
- (12) Removal of cylinder assembly.  
Remove cylinder assembly from housing.  
Wrap the edge of cylinder in a smooth texture to prevent a damage.



(13) Remove the outlet parts of taper roller bearing from housing.

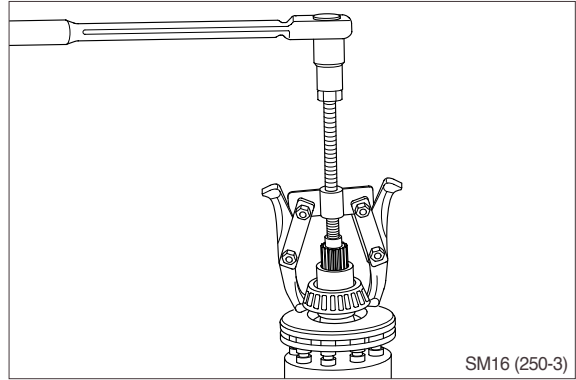


(14) Removal of oil seal.  
Tap screw driver or hammer on the seal  
of housing.  
Don't use oil seal again.

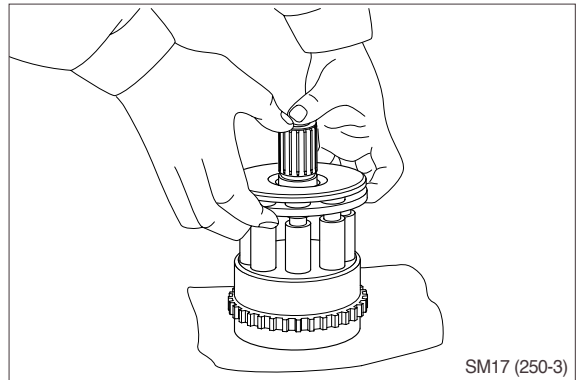


(15) Disassembly of cylinder assembly

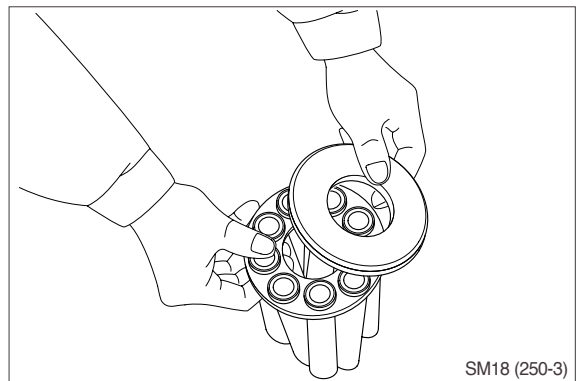
Remove inlet parts of taper roller bearing.



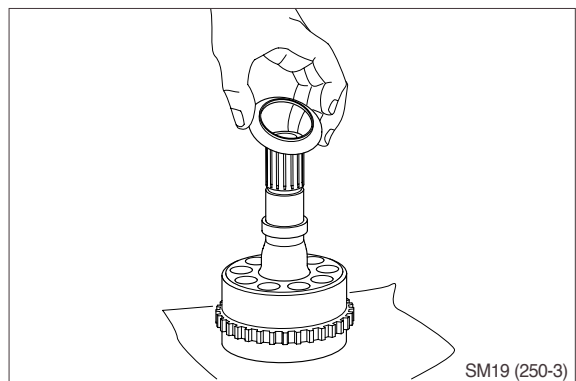
Remove cam plate, piston plate and return plate from cylinder all together.



Make cam plate slide to edge of piston assembly and then remove cam plate.



Remove cam spring from cylinder.



## 2) ASSEMBLY

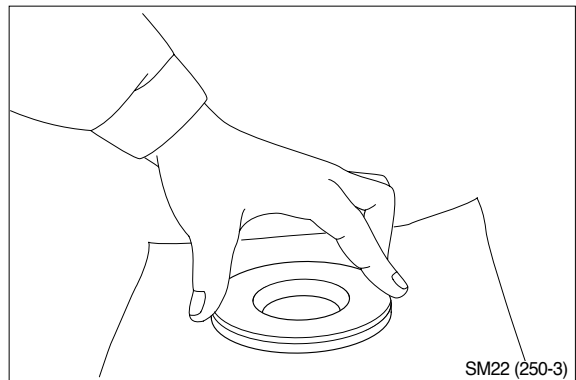
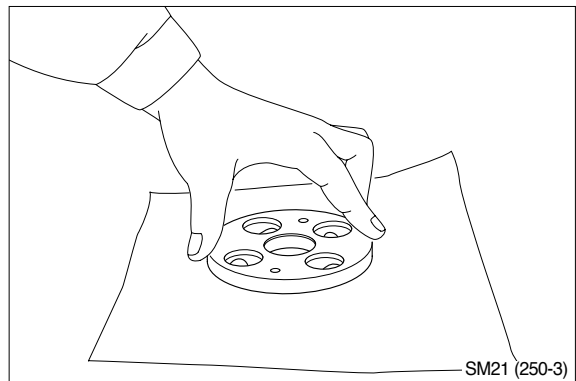
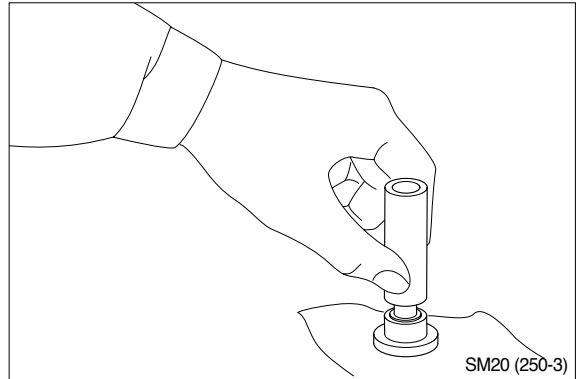
### (1) Preparation for assembly

Carry out followings before assembly.

Check if there is a damage to each of the disassembled parts due to disassembly, remove a damage by use of a light sandpaper, clean each of the disassembled parts and apply clean hydraulic oil to them.

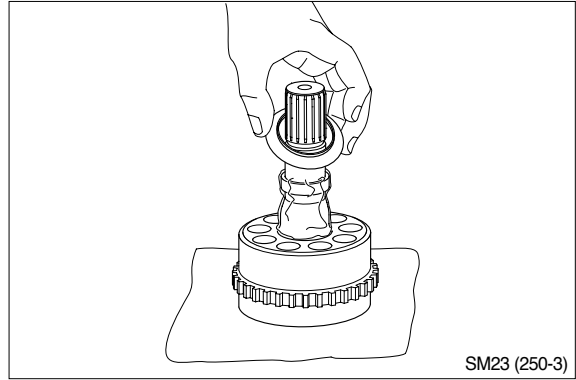
Replace with a new seal.

When use sandpaper, sand paper (#2000) to be used for piston assembly, balance plate and cam plate.

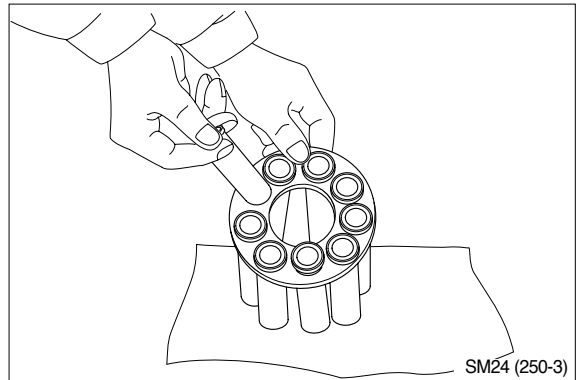


## (2) Cylinder assembly

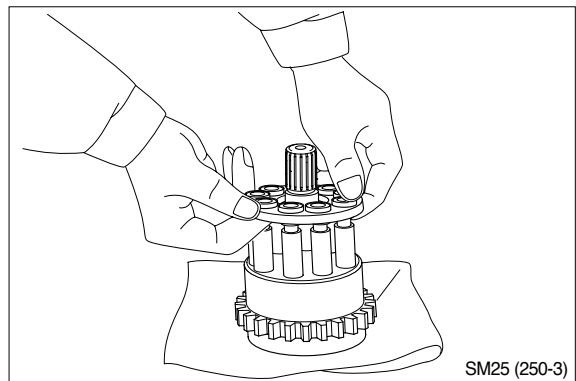
Install cap spring after applying grease oil to edge of cylinder contacted to cap spring.



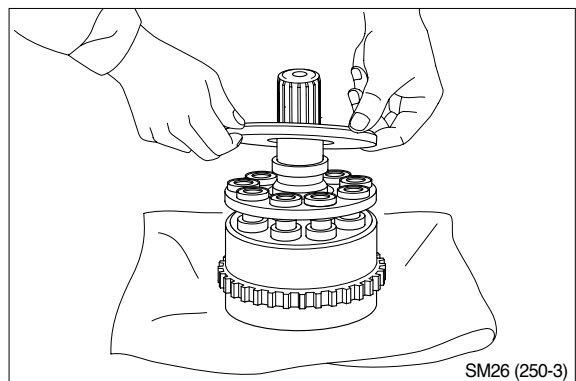
Insert piston assembly into the hole of return plate.



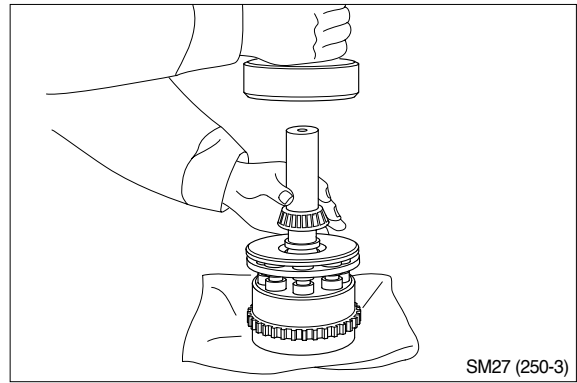
Install piston assembly and return plate in cylinder. At this time, after applying grease oil to hole of cylinder piston, insert piston assembly into the same hole located in before disassembly.



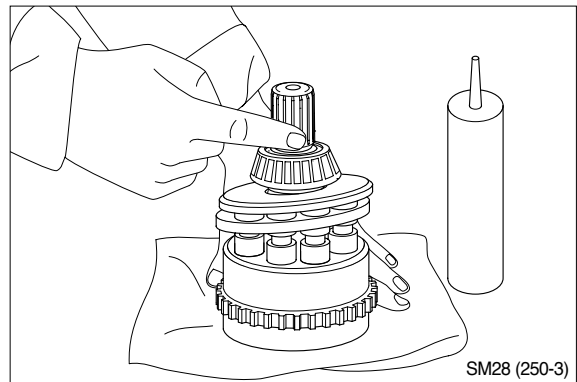
After applying oil to shoe edge of piston assembly, install cam plate.



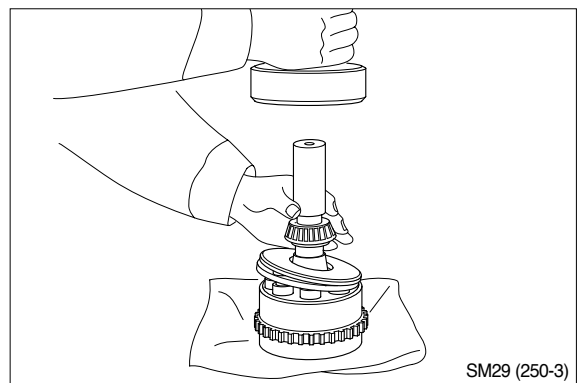
Install inlet parts of tape roller bearing.



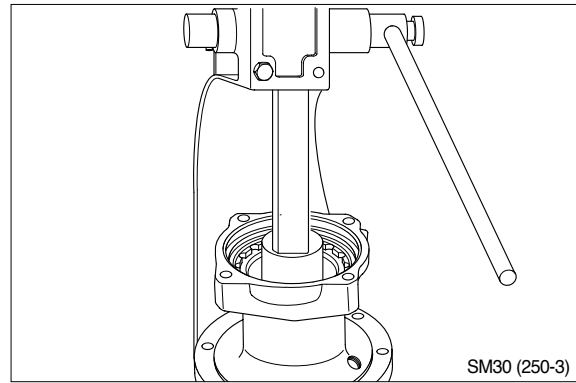
Spray loctote 515 to inlet parts of cylinder.



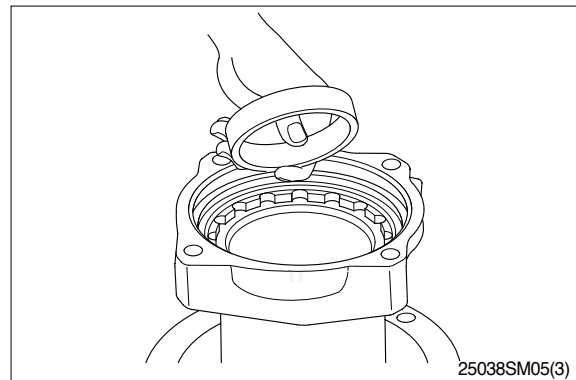
Install inlet parts of cylinder.



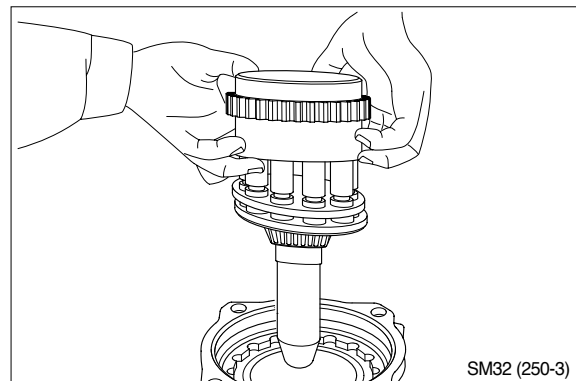
- (3) Assembly of oil seal.  
Install oil seal after spraying 3-bond “KK 1211” to seal.  
At this time, apply grease oil to seal lip.



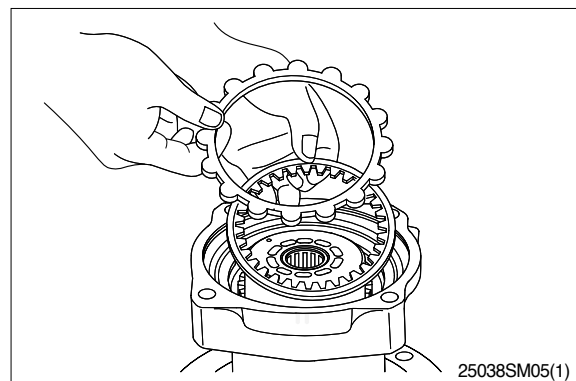
- (4) Install outlets of taper roller bearing.



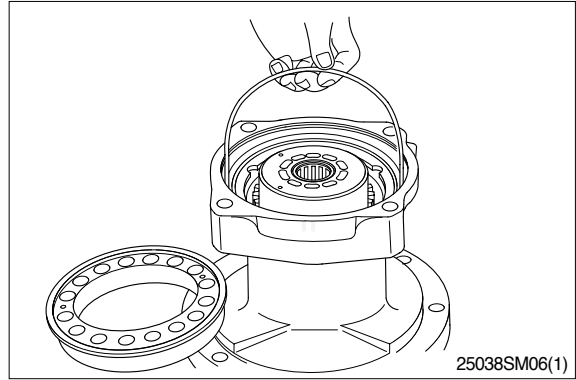
- (5) Assembly of cylinder assembly  
Install cylinder assembly in housing.  
At this time, use seal shelter for cylinder spring part.



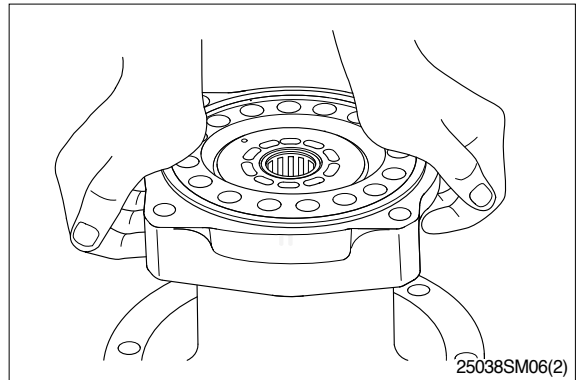
- (6) Install friction plate, opposite plate.  
Apply oil to each of both side.



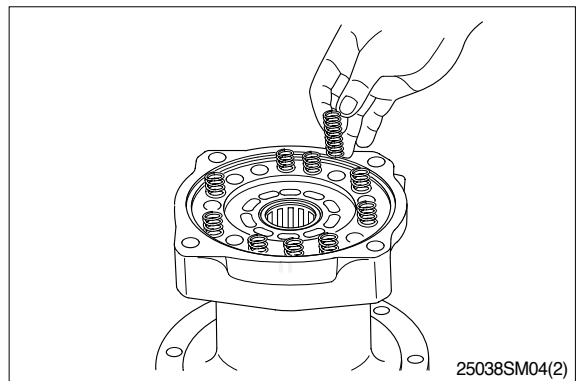
- (7) Install O-ring in housing and piston.  
Apply grease oil to O-ring.



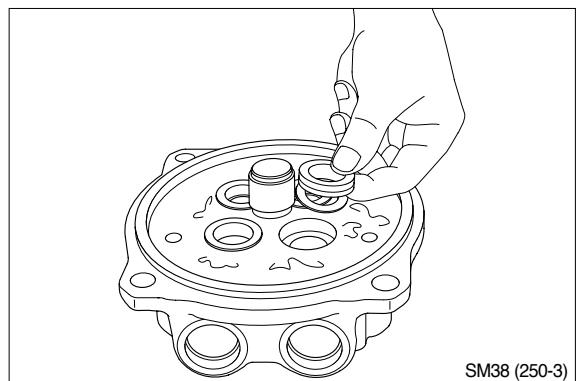
- (8) Assembly of brake piston.  
After applying oil to outside of cylinder,  
install it in housing.



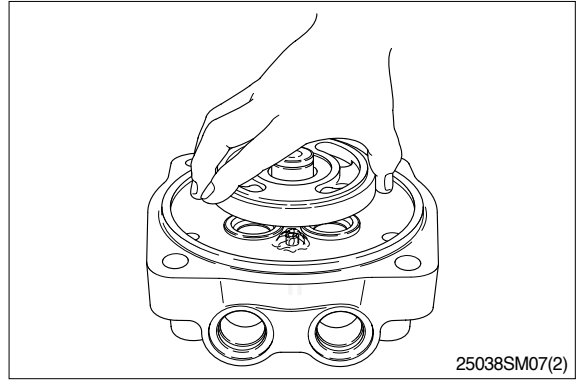
- (9) Assembly of spring (for brake)  
Install spring in piston for brake.



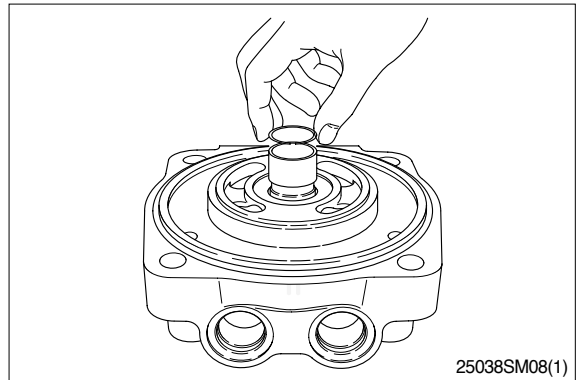
- (10) Install dish spring and bushing which  
teffron ring is attached in bushing hole of  
cover.



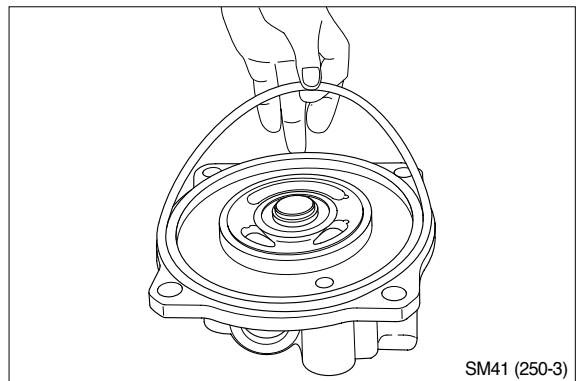
- (11) Assembly of balance plate  
Install balance plate in cover.  
Be careful to be installed in correct  
position.



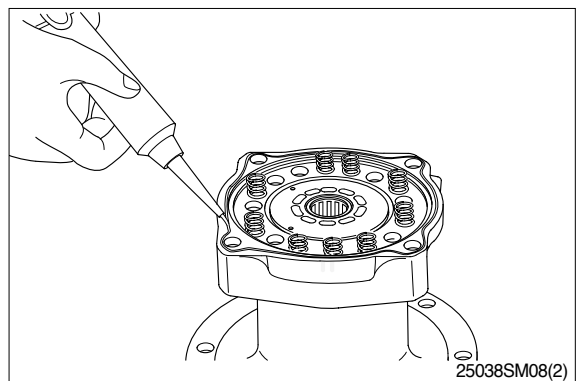
- (12) Install inlet parts of needle bearing, snap  
ring.



- (13) Install O-ring in cover after applying  
grease oil to O-ring.

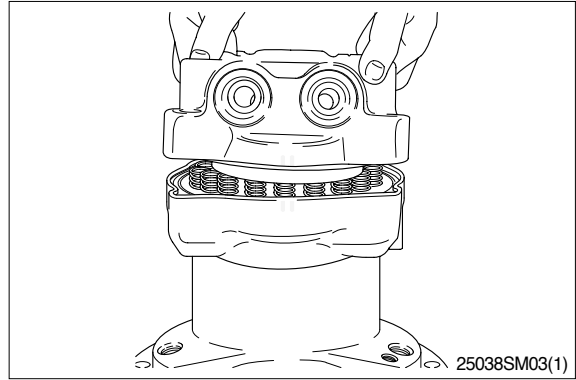


- (14) To prevent oil in cover bolt hole from  
flowing outside, apply 3-bond "KK 1211".



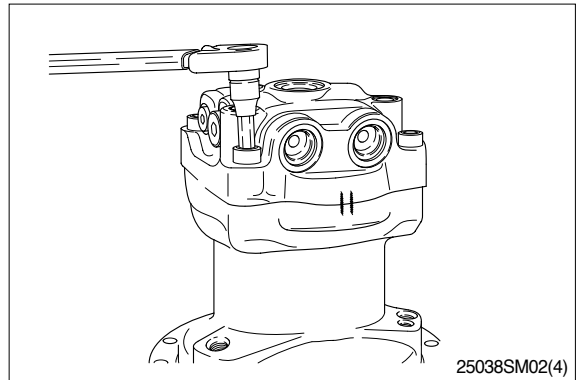
(15) Install cover in housing.

Assemble housing and cover according to marking "I" before disassembly.



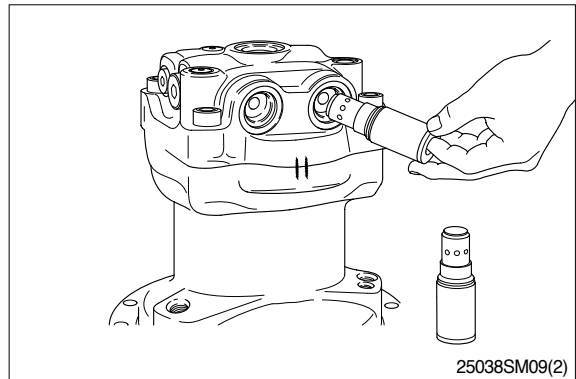
(16) Bolt tightening torque

- Connecting cover and housing :  
10.5kgf · m(103N · m)
- Bypass valve : 4kgf · m(39.2N · m)



(17) Install relief valve assembly in cover, then install hydraulic timer.

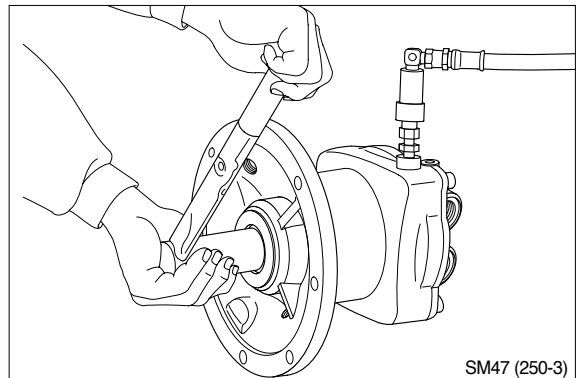
- Tightening torque for relief valve assembly : 4kgf · m(39.2N · m)
- Tightening torque for hydraulic timer :  
1.2kgf · m(11.8N · m)



(18) Make sure that shaft is turned more than one revolution.

If it is not turned, disassemble again and adjust. At this time, the drain port to be opened.

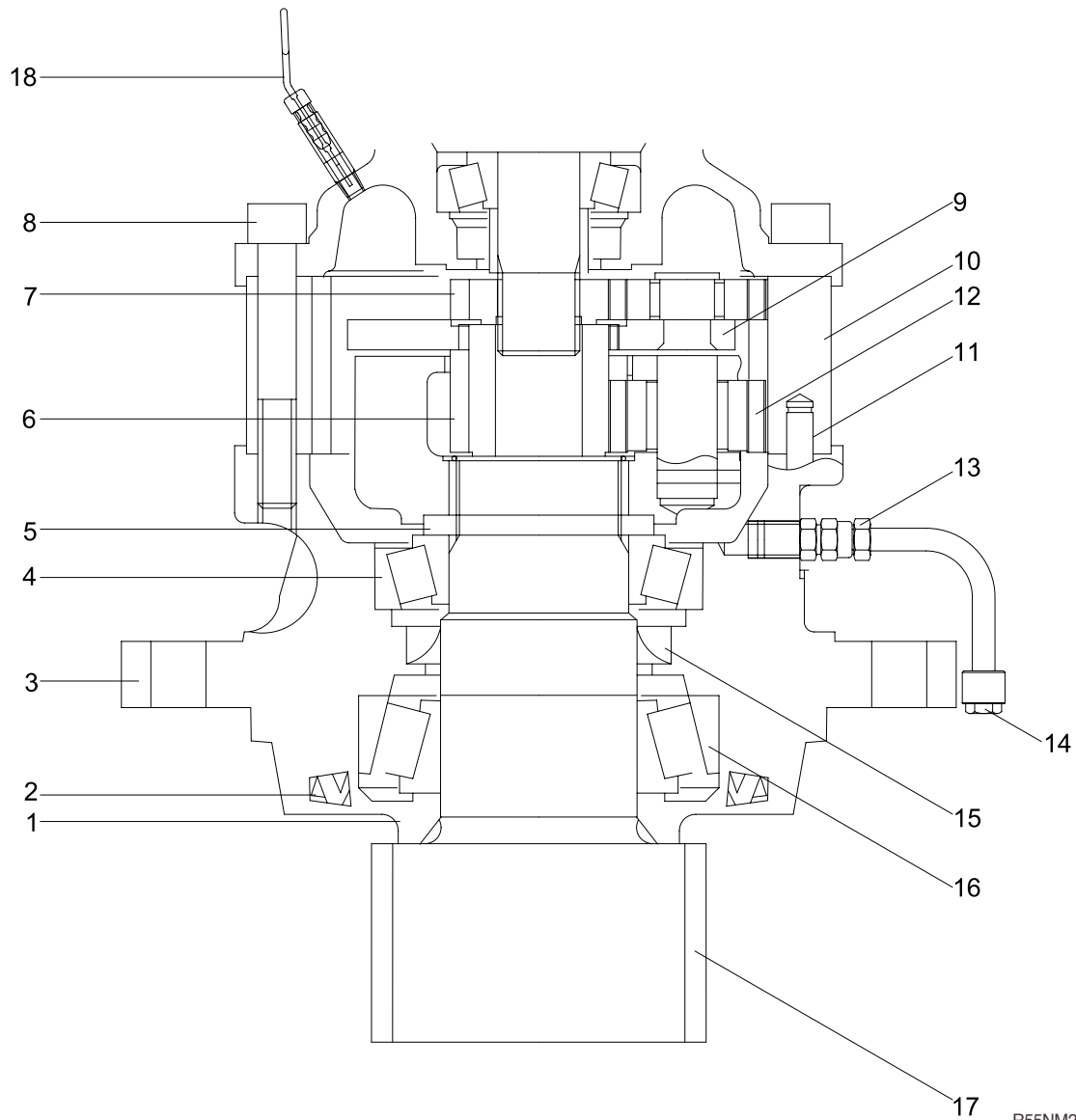
- Torque : 2 ~ 3kgf · m(19.6 ~ 29.4N · m)



## 2. SWING MOTOR REDUCER

### A. REDUCTION GEAR (SG015E, UP TO #0915)

#### 1) STRUCTURE

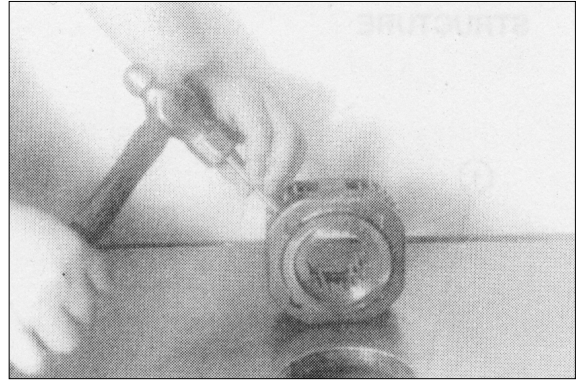


R55NM2SF03

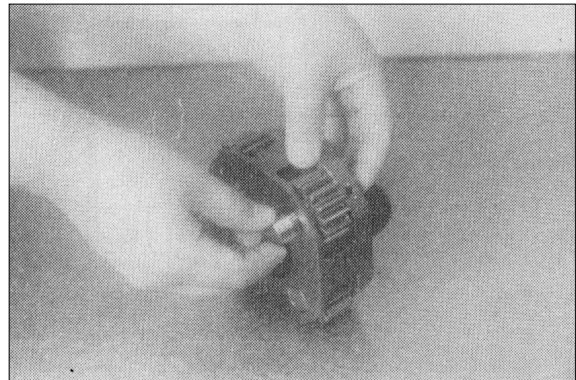
- |    |                      |    |                       |
|----|----------------------|----|-----------------------|
| 1  | Pinion shaft         | 16 | Collar                |
| 2  | Collar               | 17 | Plug                  |
| 3  | Taper roller bearing | 18 | Shaft assembly        |
| 4  | Friction plate       | 19 | Bypass valve assembly |
| 5  | Gear case            | 20 | Shaft                 |
| 7  | Oil seal             | 21 | O-ring                |
| 8  | Taper roller bearing | 22 | Gear                  |
| 9  | Parallel pin         | 23 | Holder                |
| 10 | Ring gear            | 24 | Needle bearing        |
| 11 | Gear                 | 25 | Thrust plate          |
| 12 | Piston assembly      | 26 | Gear                  |
| 13 | Sun gear             | 27 | Oil seal              |
| 14 | Socket bolt          |    |                       |

## 2) DISASSEMBLY

- (1) Remove sun gear and 1st step holder assembly.
- (2) Remove sun gear and 2nd step holder assembly.
- (3) Removal of 2nd step holder assembly.  
Install spring pin into the shaft inside by using hammer.  
Spring pin not to be used again.  
Fixing gear by hands, remove shaft from holder.

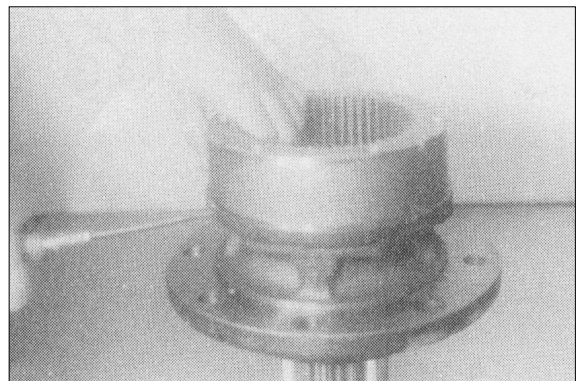


R55NM7SM01



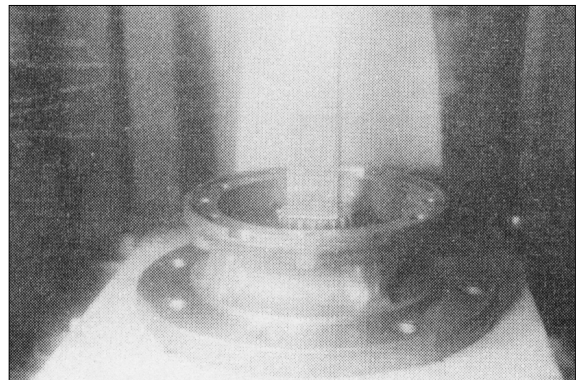
R55NM7SM02

- (4) Removal of ring gear.  
Remove ring gear from gear case.  
Because liquid packing (3-bond "KK 1215", black) is applied to the edge of contact between ring gear and gear case to prevent the leakage of gear oil, remove ring gear by using the contact part of gear case.



R55NM7SM03

- (5) Removal of collar.  
Remove the collar from shaft by using hammer and driver.
- (6) Removal of shaft assembly.  
Put the support (300mm height) to the flange part of gear case in order to get the position of removal, press flange part by hydraulic machine, then remove shaft, collar, taper roller bearing.  
Oil seal not to be used again.



R55NM7SM04

Don't disassemble more than the above if there is not any abnormality in bearing, etc.

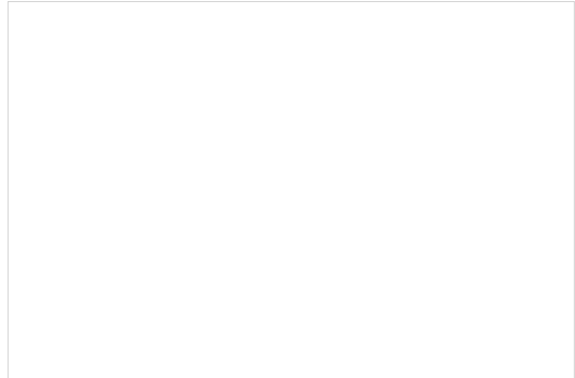
### 3) ASSEMBLY

#### (1) Preparation for assembly.

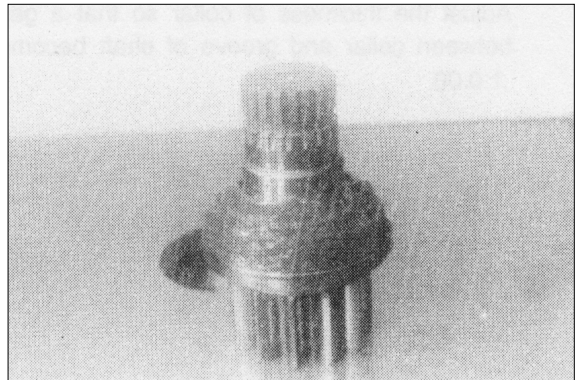
Carry out followings before assembly.

Check if there is a damage to each of the disassembled parts due to disassembly, remove a damage by use of a light sandpaper, clean each of the disassembled parts and apply clean hydraulic oil to them.

Replace with a new seal.

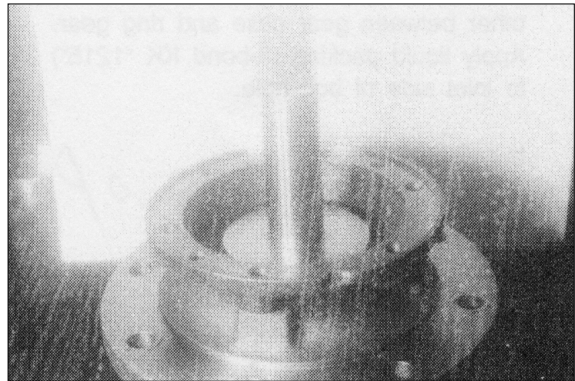


#### (2) Apply grease oil to the roller part of taper roller bearing.



R55NM7SM05

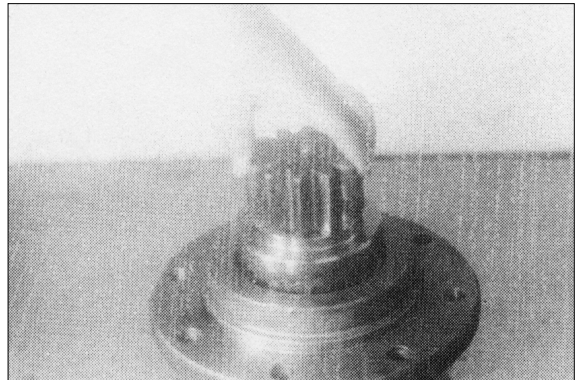
#### (3) Install oil seal after spraying 3-bond "KK 1211" to seal. At this time, apply grease oil to seal lip.



R55NM7SM06

#### (4) Assembly of pinion shaft assembly Use seal protector for spline part to prevent damage of seal lip.

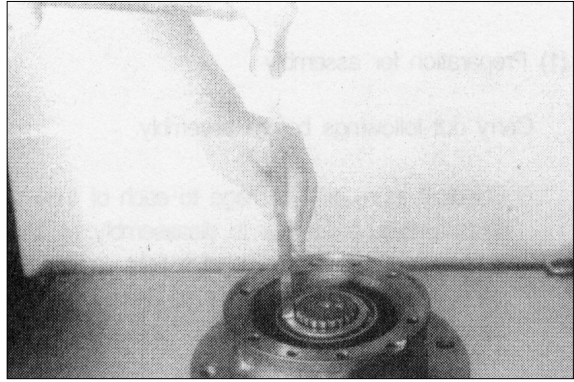
Put the output shaft of gear case to the upper direction, then install pinion shaft in gear case.



R55NM7SM07

(5) Installation of taper roller bearing

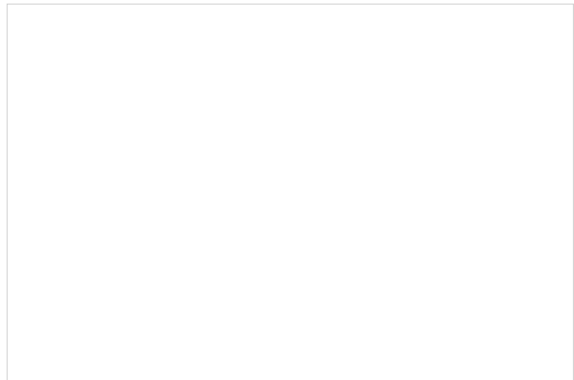
Put output shaft of gear case to the lower direction, install roller bearing in shaft on condition of environmental temperature 50 C



R55NM7SM08

(6) Assembly of collar

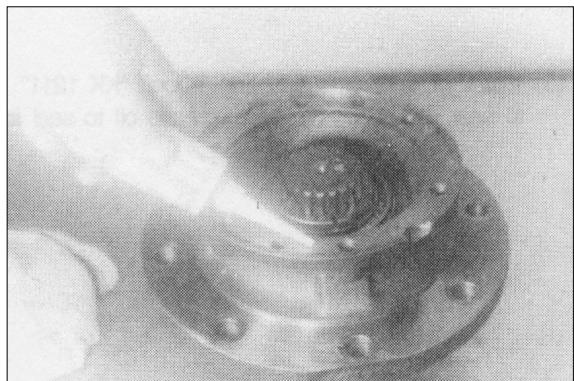
Adjust the thickness of collar so that a gap between collar and groove of shaft become  $\pm 0.06$ .



(7) Installation of ring gear

Remove the pin and edge touched each other between gear case and ring gear. Apply liquid packing (3-bond "KK 1215") to inlet side of bolt hole.

Install ring gear.



R55NM7SM09

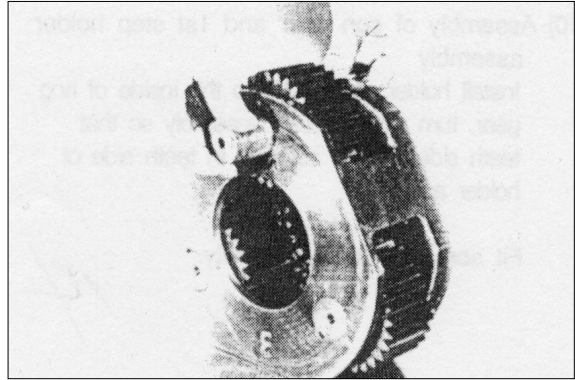


R55NM7SM10

(8) Assembly of holder assembly

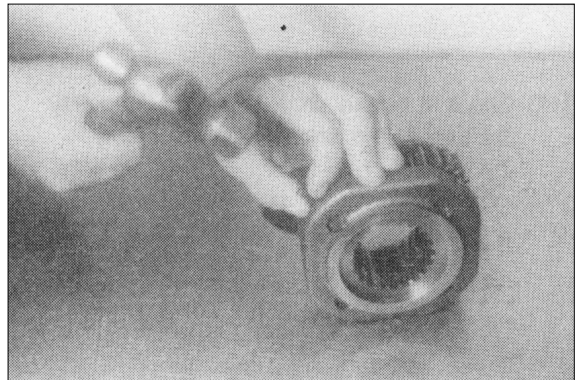
Install thrust plate and gear in which needle bearing is inserted in holder, then install it in shaft.

At this time, apply gear oil to inside of gear, inside & outside of bushing and outside of shaft.



R55NM7SM11

Install spring pin by using a hammer.  
Hit a hammer on the pin to the gear direction.

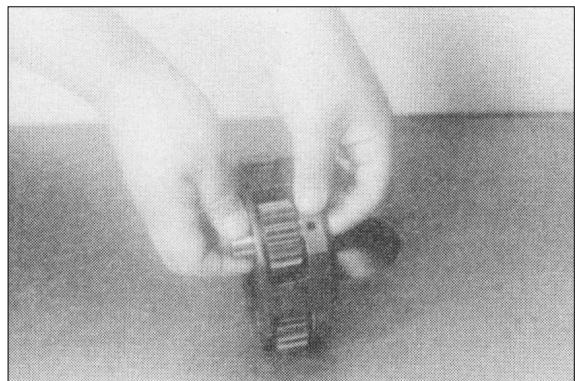


R55NM7SM12

(9) Assembly of gear and holder assembly

Install holder assembly into the inside of ring gear, turn holder assembly slowly so that spline of pinion shaft can be installed on it.

Install gear slowly.

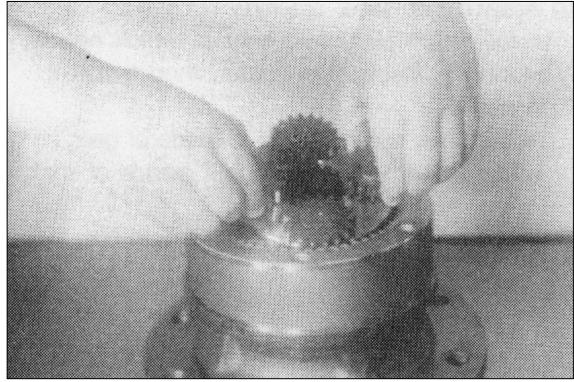


R55NM7SM13

(10) Assembly of sun gear and 1st step holder assembly

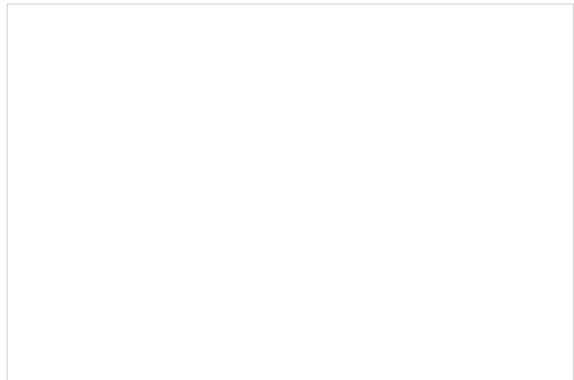
Install holder assembly into the inside of ring gear, turn slowly holder assembly so that teeth side of gear installed in teeth side of holder assembly.

Fit sun gear in gear slowly.



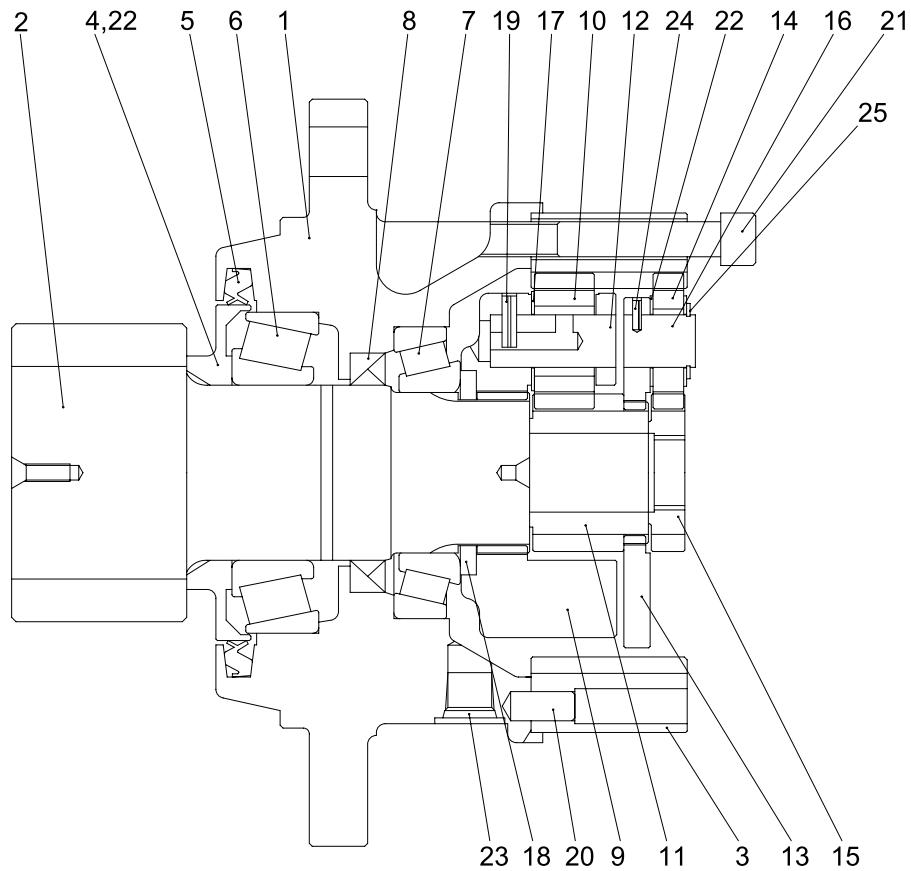
R55NM7SM14

(11) Check if output shaft is turned smoothly by turning 1st step holder assembly by hand.



## B. REDUCTION GEAR (SB50, #0916 AND UP)

### 1) STRUCTURE

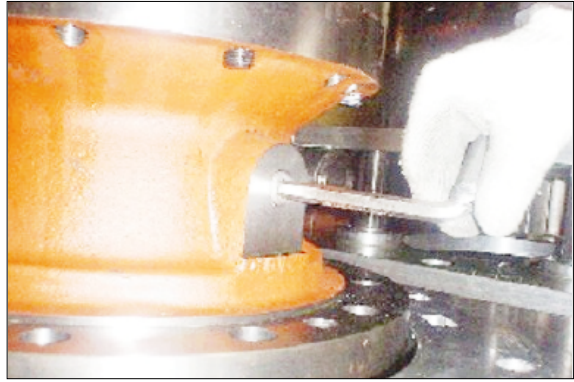


R55NM2SF06

- |   |             |    |                |    |                  |
|---|-------------|----|----------------|----|------------------|
| 1 | Case        | 10 | #2 Planet gear | 18 | Collar           |
| 2 | Drive shaft | 11 | #2 Sun gear    | 19 | Spring pin       |
| 3 | Ring gear   | 12 | #2 Pin assy    | 20 | Knock pin        |
| 4 | Spacer      | 13 | #1 Carrier     | 21 | Socket head bolt |
| 5 | Grease seal | 14 | #1 Planet gear | 22 | Thrust washer1   |
| 6 | Bearing     | 15 | #1 Sun gear    | 23 | Plug             |
| 7 | Bearing     | 16 | #1 Pin assy    | 24 | Spring pin       |
| 8 | Oil seal    | 17 | Thrust washer2 | 25 | Stop ring        |
| 9 | #2 Carrier  |    |                |    |                  |

## 2) DISASSEMBLY

- (1) Remove the plug as shown on picture and drain out gear oil.



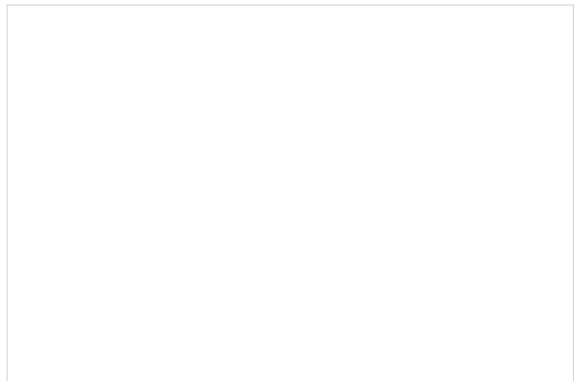
R55NM7RG01

- (2) Remove the socket bolt.

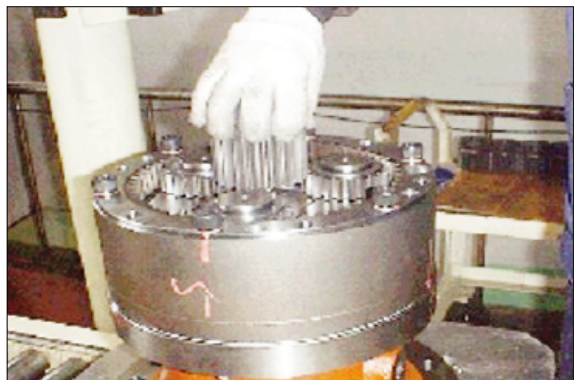


R55NM7RG02

- (3) Lift out the hydraulic motor.

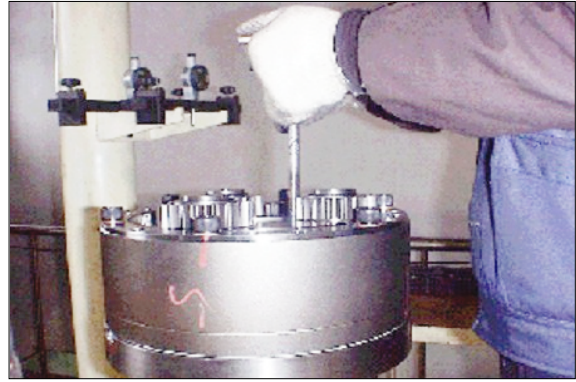


- (4) Remove the No.1 sun gear.



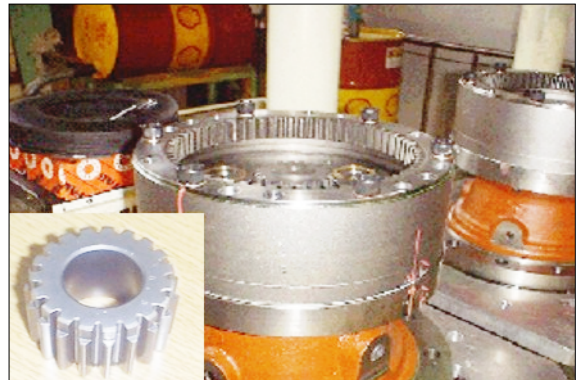
R55NM7RG03

- (5) Remove the No.1 carrier sub-assembly using the jig.



R55NM7RG04

- (6) Remove the No.2 sun gear.  
Pay attention to ensure the gear is not damaged during disassembling.



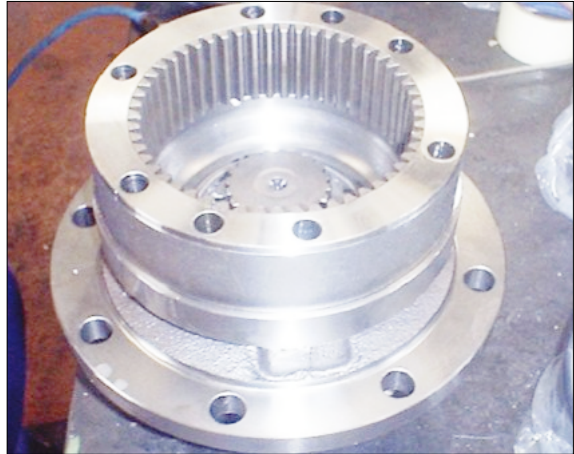
R55NM7RG05

- (7) Remove the No.2 carrier sub assembly.



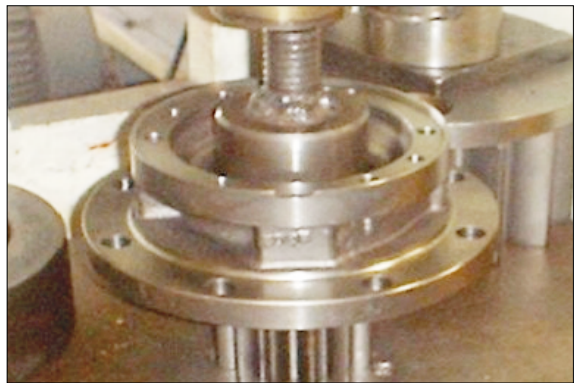
R55NM7RG09

- (8) Remove the ring gear by the removal groove between the ring gear and casing by using jig.  
Full out the knock pin.  
Do not need to remove the knock pin if it is not worn or damaged.



R55NM7RG06

- (9) Put it on the working table with the drive shaft up.



R55NM7RG07

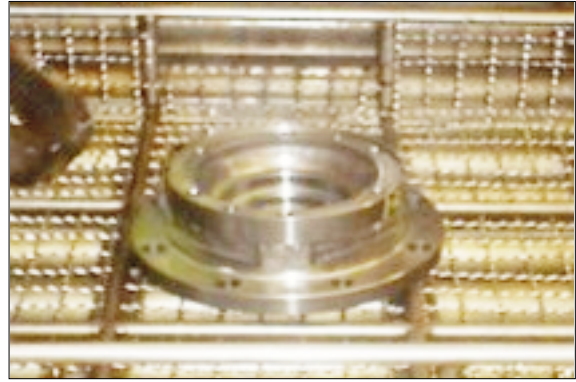
- (10) Disassemble the drive shaft by using jig.



R55NM7RG08

### 3) ASSEMBLING SWING REDUCTION GEAR

- (1) Place the case on the reversing machine having the flange side of the case up.



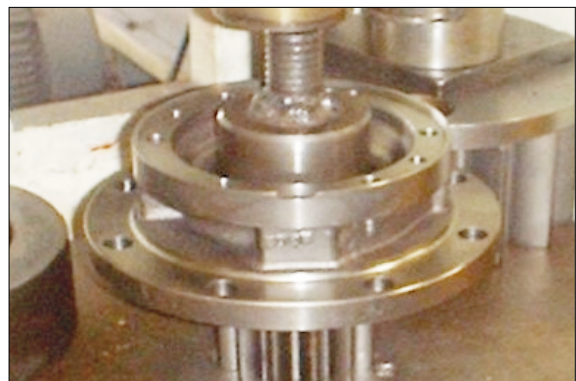
R55NM7RG12

- (2) Install shaft assembly into case.  
Be sure to clean the case before install, using washing machine with the temperature of 80. C  
Do not install shaft assembly by force.



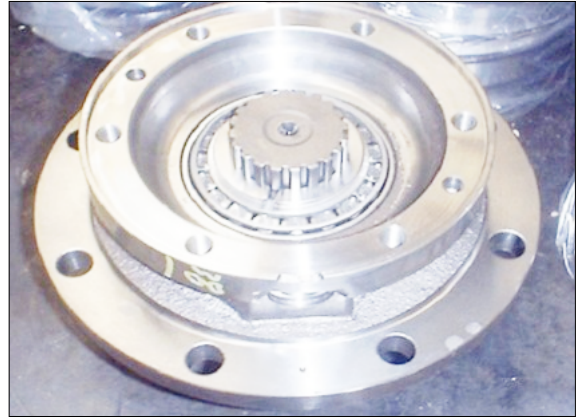
R55NM7RG08

- (3) Reverse case and press to insert oil seal by using pressing jig after spreading grease oil around the outside ring of the seal and bearing.  
Coat grease oil slightly on the lip surface to prevent any scratch when installing.  
Be sure to check by eye that the oil seal is seated completely after being installed.



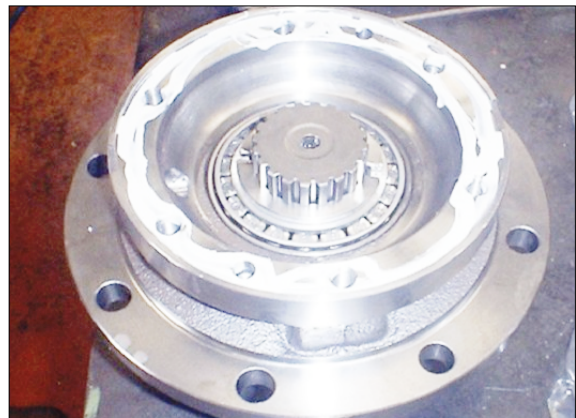
R55NM7RG07

- (4) Assemble collar and check that the collar is correctly inserted by pushing drive shaft.



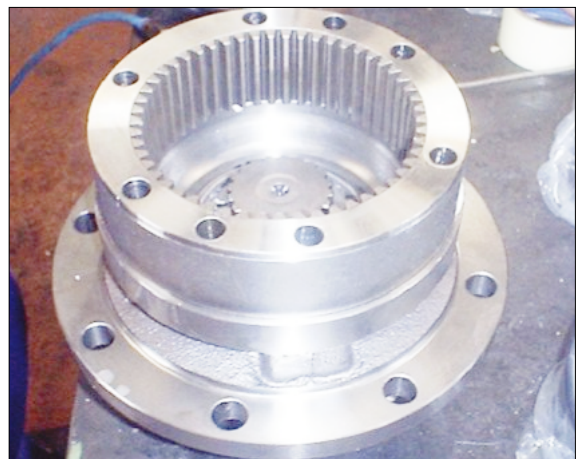
R55NM7RG10

- (5) Clean the assembling surface of case and spread packing liquid(TH1105) as shown in figure.



R55NM7RG11

- (6) Place ring gear on the case by matching it with knock pin hole.
- (7) Insert 2 knock pins by using jig.  
Be sure to check the hole location of oil gage before inserting.



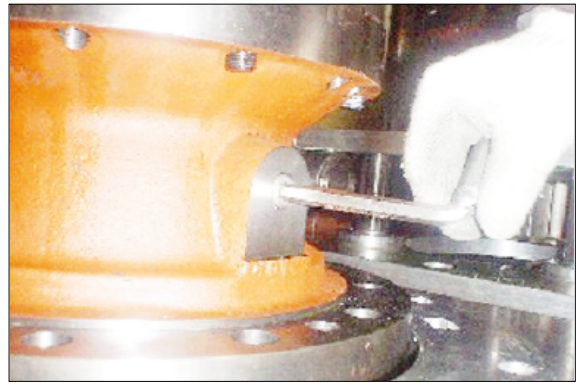
R55NM7RG06

- (8) Assemble ring gear with case by screwing socket bolt(M12).  
Spread loctite 262 on socket bolt when installing.



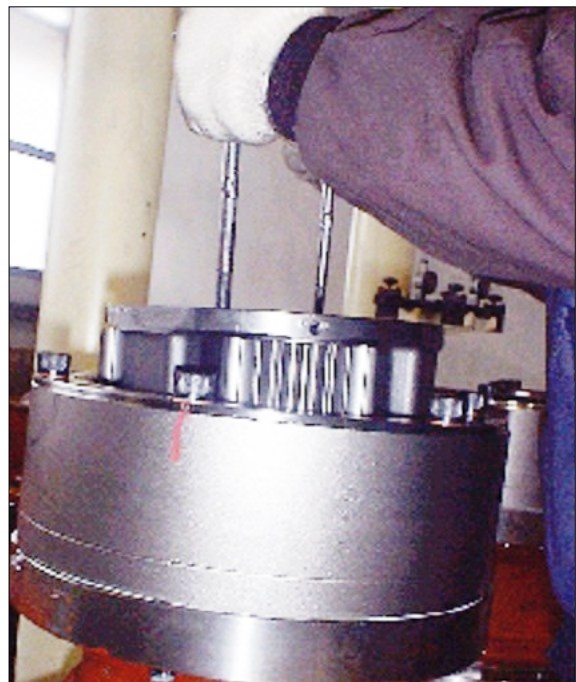
R55NM7RG02

- (9) Screw drain plug into drain port after winding sealing tape.



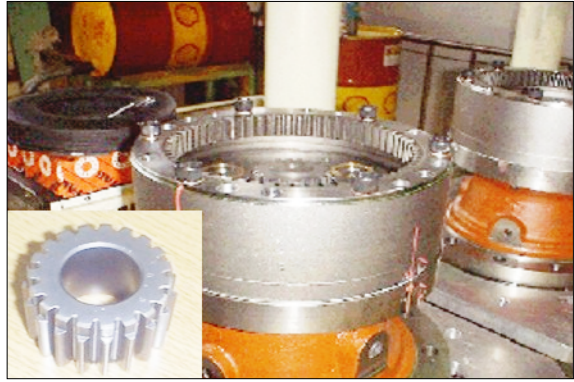
R55NM7RG01

- (10) Mount No.2 carrier assembly in the case sub assembly and install bolts into 2 TAP holes(M6) as shown in figure.  
Turn the carrier slowly by hand to adjust the matching holes when assembling.



R55NM7RG09

- (11) Install No.2 sun gear.  
Be sure to check the direction of sun gear  
when assembling.



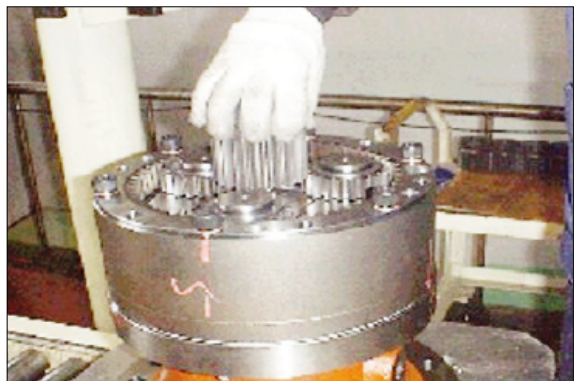
R55NM7RG05

- (12) Mount No.1 carrier assembly in the case  
sub assembly and install bolts into 2 TAP  
holes(M6) as shown in figure.  
Turn the carrier slowly by hand to adjust  
the matching holes when assembling.



R55NM7RG04

- (13) Assemble No.1 sun gear.



R55NM7RG03