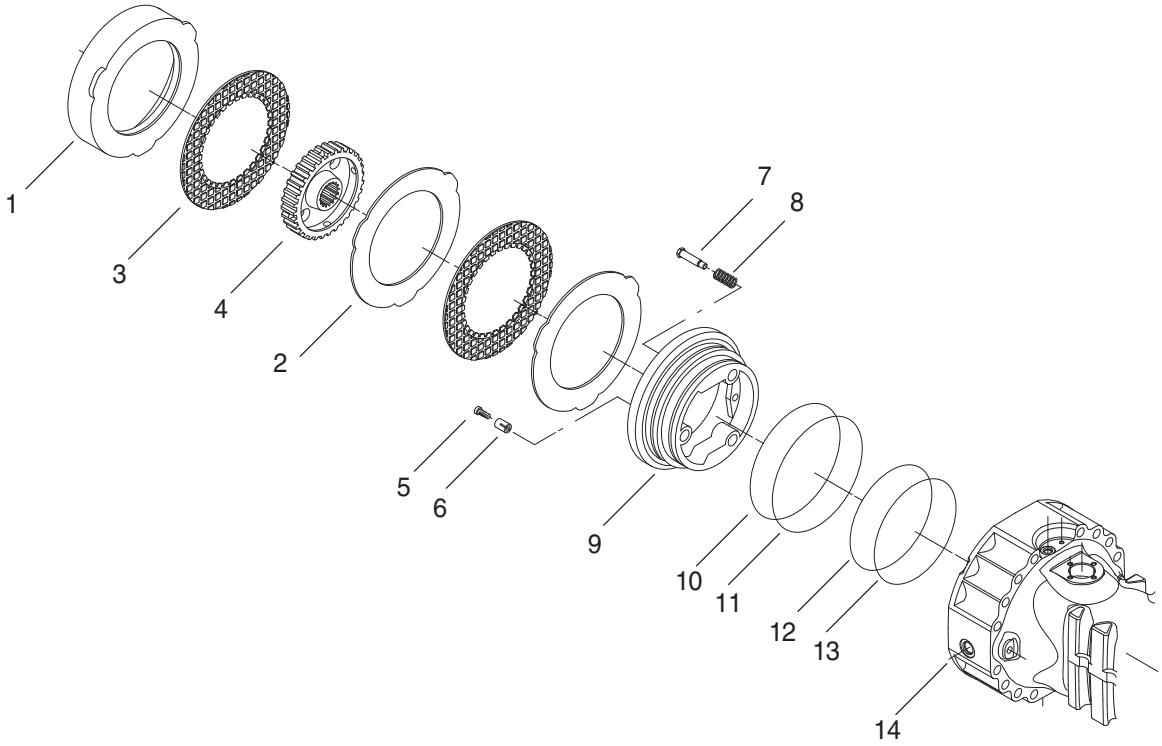
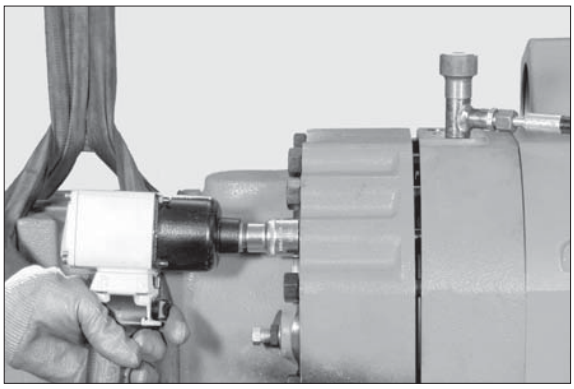
3. AXLE (machine serial No.: -#0088, DANA)

1) SERVICE BRAKE DISASSEMBLY



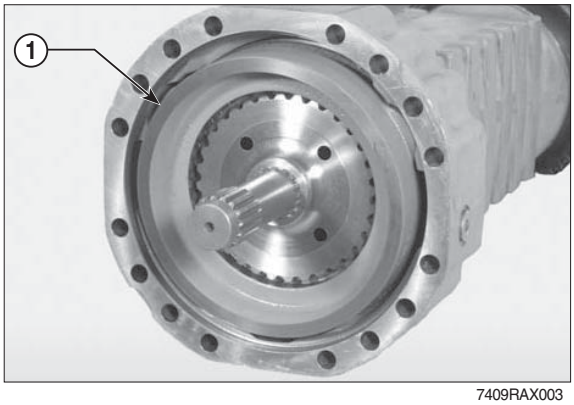
7409RAX001

(1) Sling the arm to be removed and connect it to a hoist.
Loosen and remove screws.

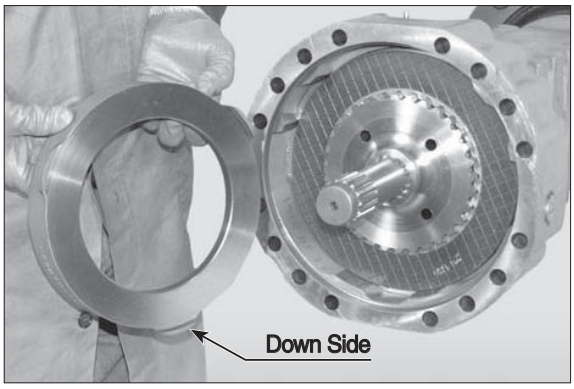


7409RAX002

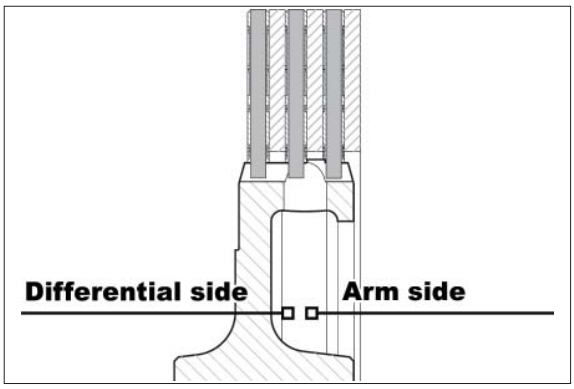
(2) Note down their order of assembly and remove the counterwasher (1).



7409RAX003



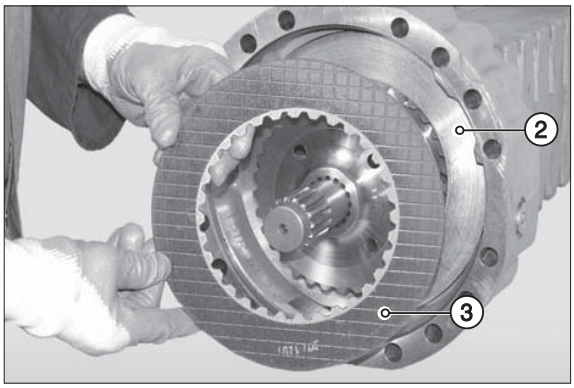
7409RAX004



7409RAX005

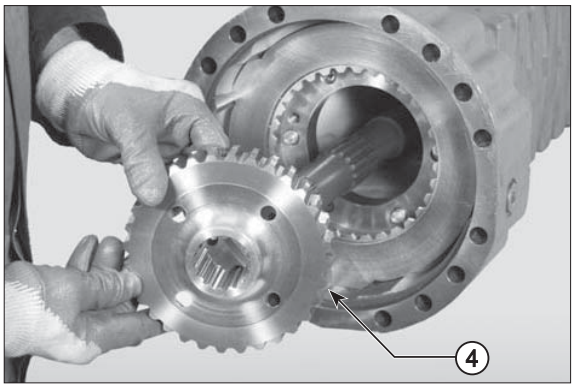
(3) Remove braking discs (2)(3), noting down direction of assembly.

※ If disks are not to be replaced, avoid changing their position.



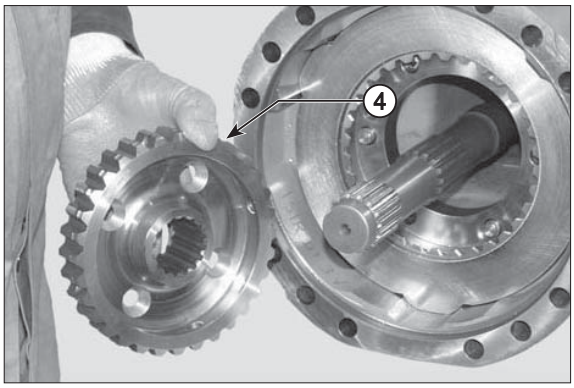
7409RAX006

(4) Remove the flange (4) complete with the discs.



7409RAX007

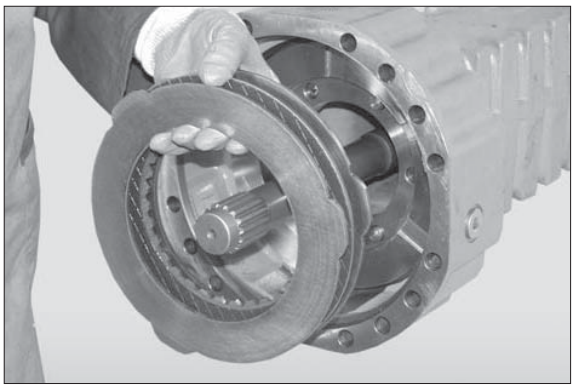
(5) Noting down direction of assembly.



7409RAX008

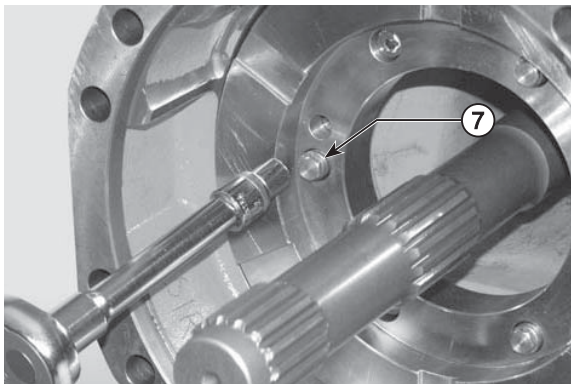
(6) Remove braking discs, noting down direction of assembly.

※ If disks are not to be replaced, avoid changing their position.

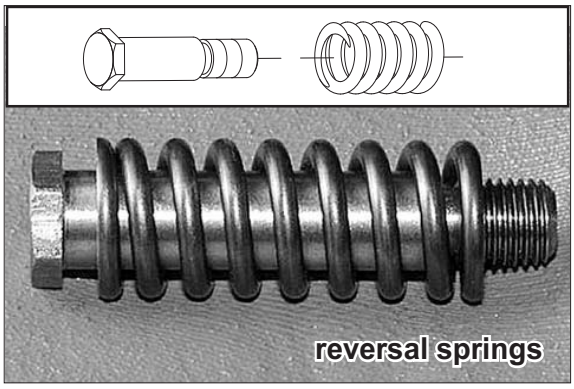


7409RAX009

(7) Remove the reversal springs (7)

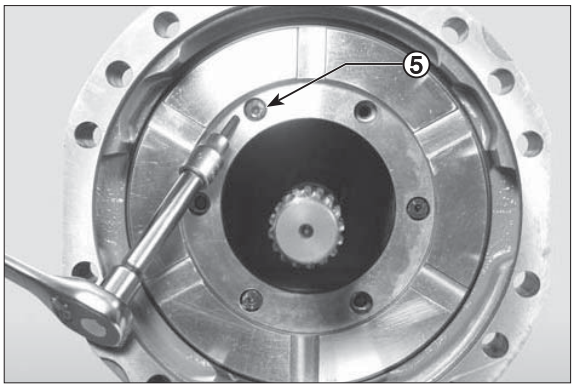


7409RAX010

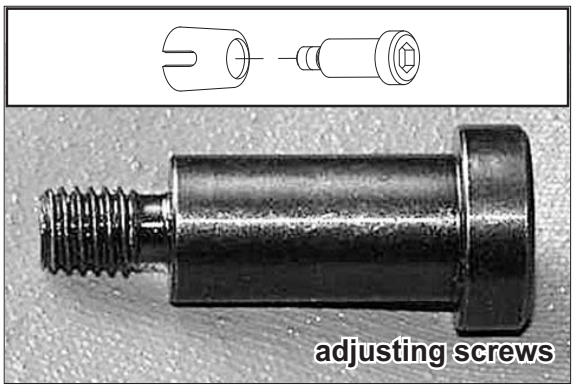


7409RAX011

(8) Remove the adjusting screws (5)



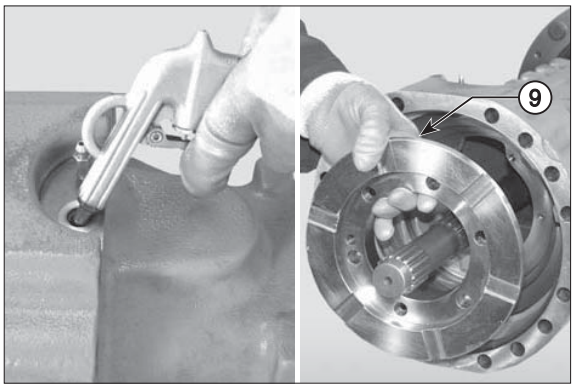
7409RAX012



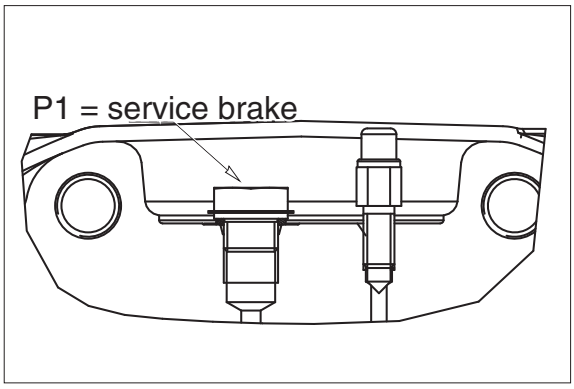
7409RAX013

(9) Slowly introduce low-pressure compressed air through the connection member for the service brake (P1), in order to extract the piston (9).

※ Hold the piston (9) back, as it may be suddenly ejected and damaged.

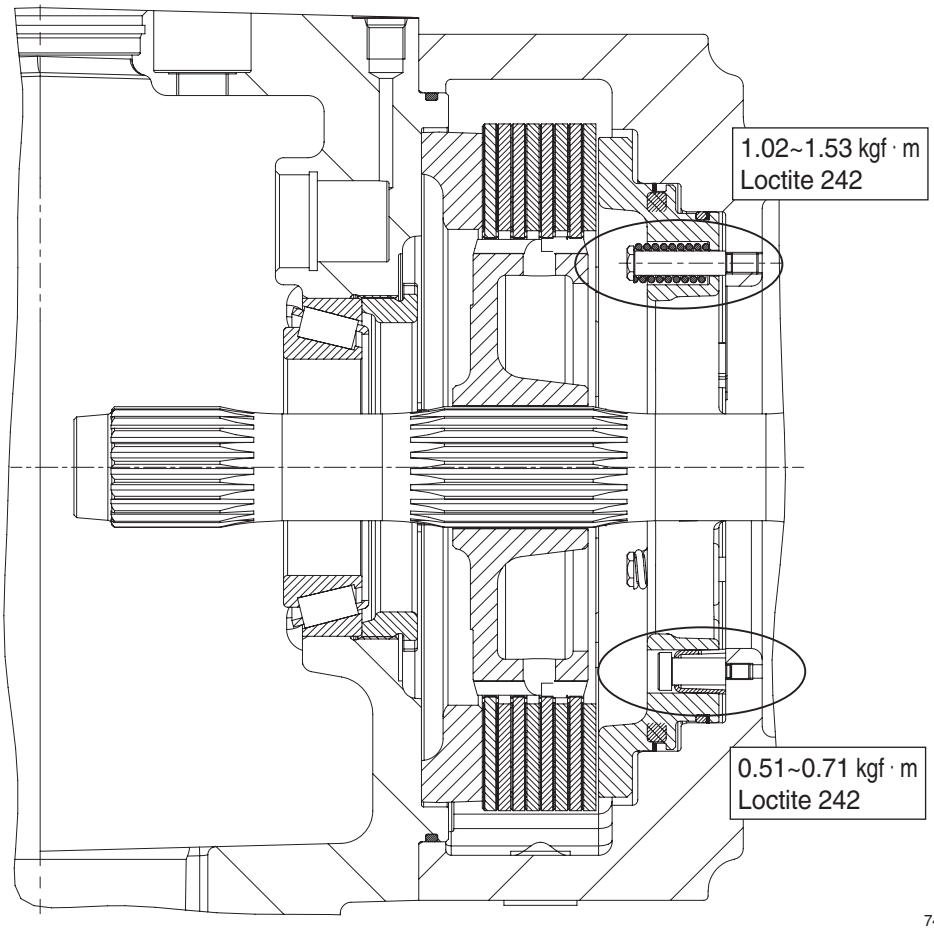


7409RAX014



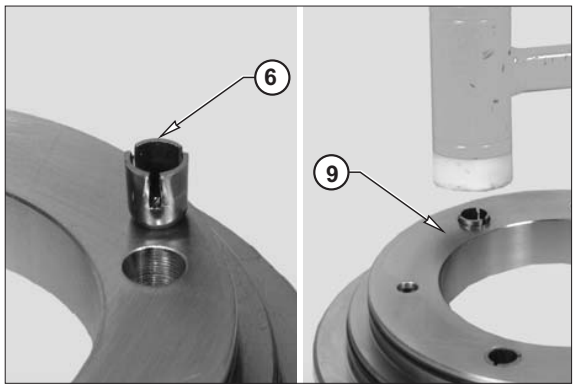
7409RAX015

2) SERVICE BRAKE ASSEMBLING



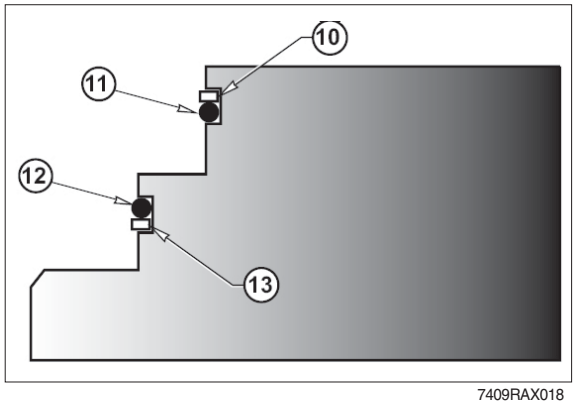
7409RAX016

(1) Insert the stroke automatic regulation springs (6); place them in line with the piston (9).



7409RAX017

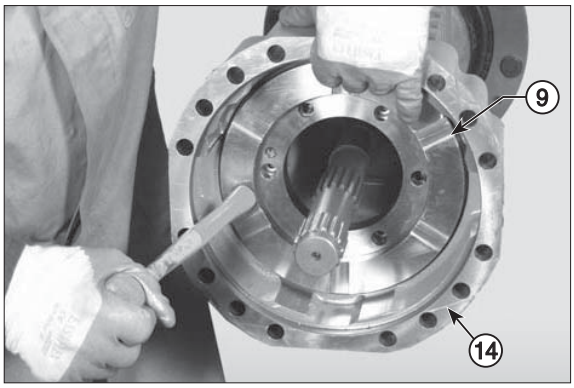
(2) Fit O-ring (11)(12) and back-up ring (10) (13) onto the piston (11).
Lubricate the piston and the O-rings and install the unit into the arm (14).



7409RAX018

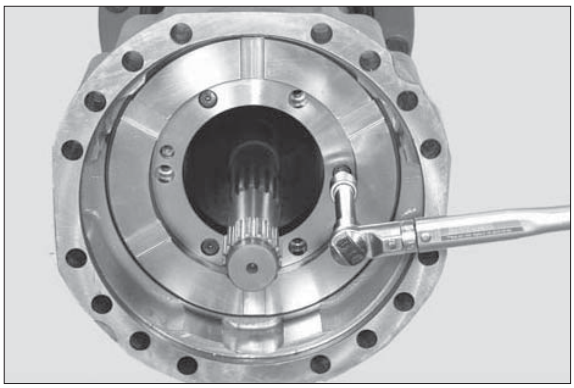
(3) Using a plastic hammer, ram the piston (9) into the arm (14).

※ Lightly hammer all around the edge in an alternate sequence.



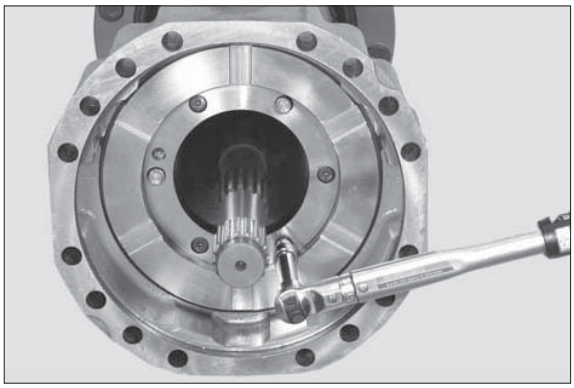
7409RAX019

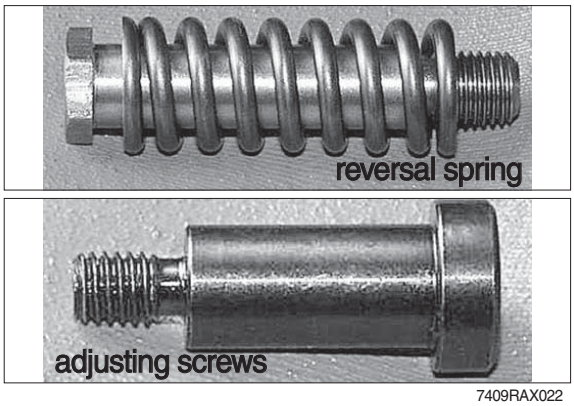
(4) Fit the reversal springs (7) on the piston (9).
Apply loctite 242 to the thread of the adjustment screw.
Tighten with torque wrench setting of 0.51~0.71 kgf · m (3.69~5.14 lbf · ft).


7409RAX020

(5) Fit the adjusting screws (5).
Apply loctite 270 to the thread.

· Torque wrench setting :
0.51~0.71 kgf · m (3.69~5.14 lbf · ft)

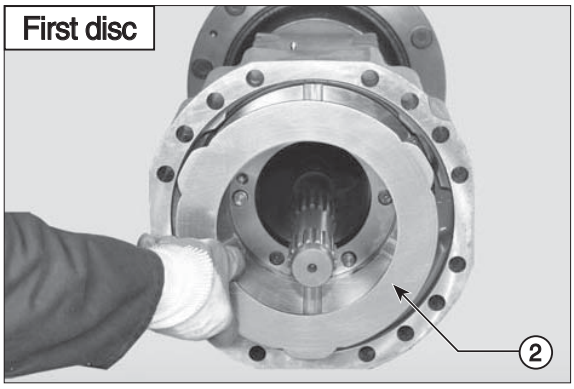

7409RAX021



7409RAX022

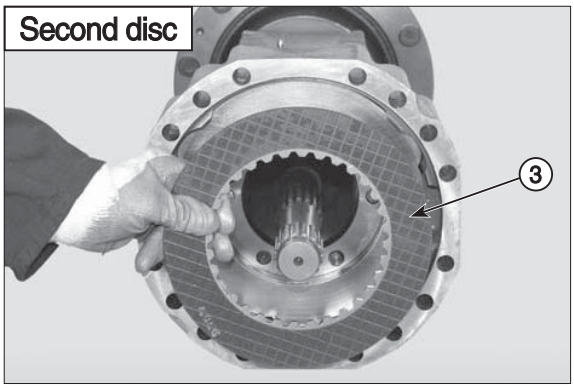
(6) Insert the brake discs in the right sequence.

※ The first brake disc (2) to be inserted must be of metal material.

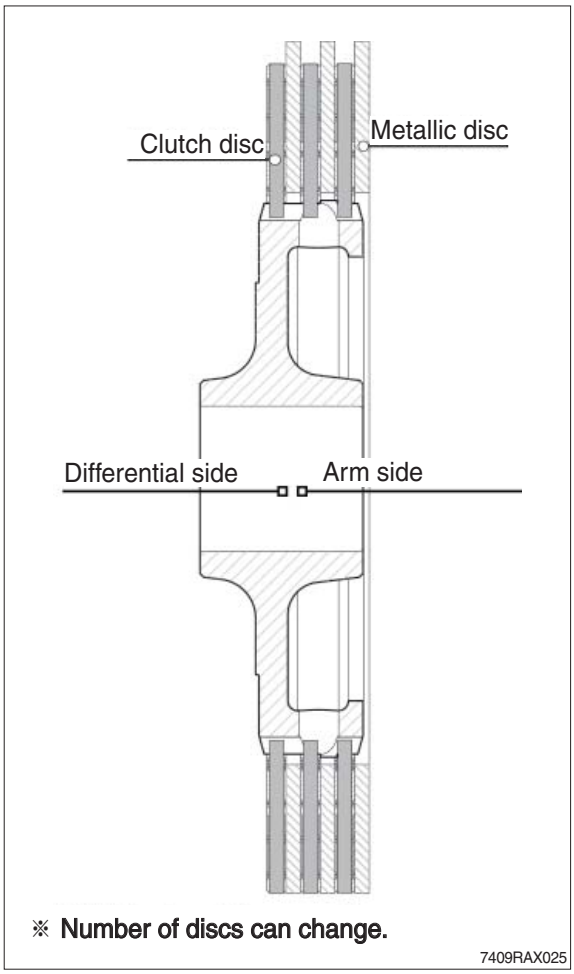


7409RAX023

※ The second brake disc (3) to be inserted must be of friction material.

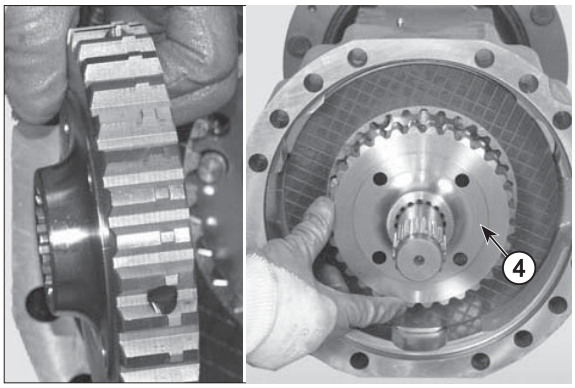


7409RAX024



7409RAX025

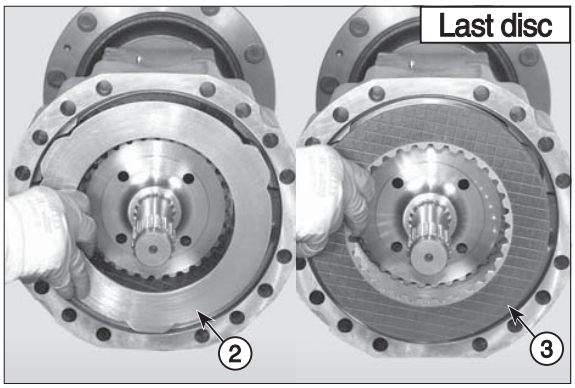
(7) Install the flange (4) on the arm.



7409RAX026

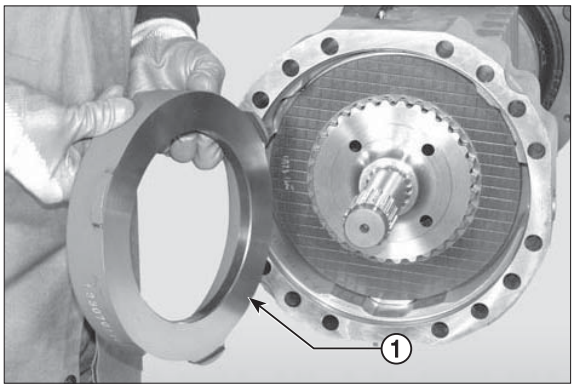
(8) Insert the brake discs (2)(3) in the right sequence.

※ The last brake disc to be inserted must be of friction material.

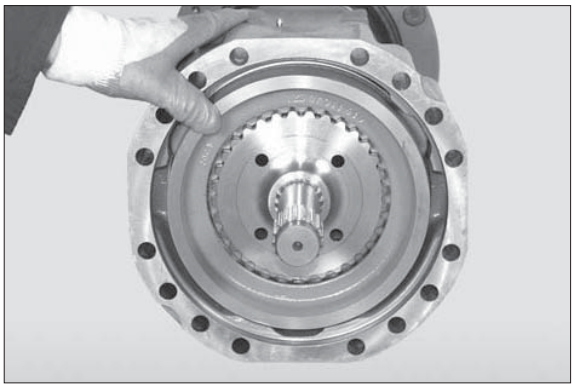


7409RAX027

(9) Insert the intermediate disk (1).

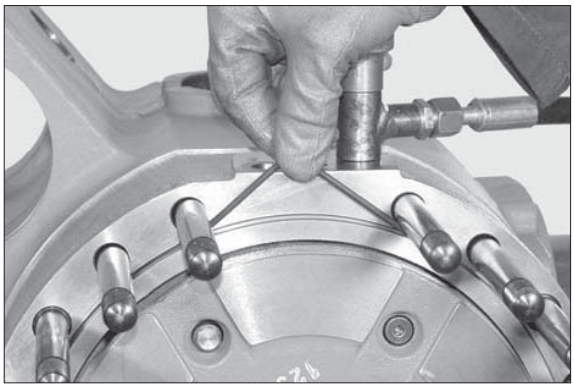


7409RAX028



7409RAX029

(10) Check integrity and position of the cylinder's O-ring.

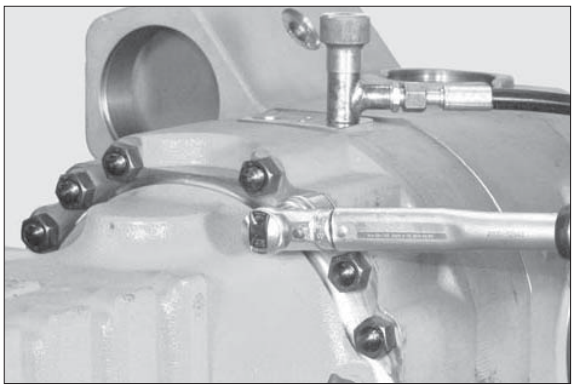


7409RAX030

(11) Cross tighten the nuts in two stages.

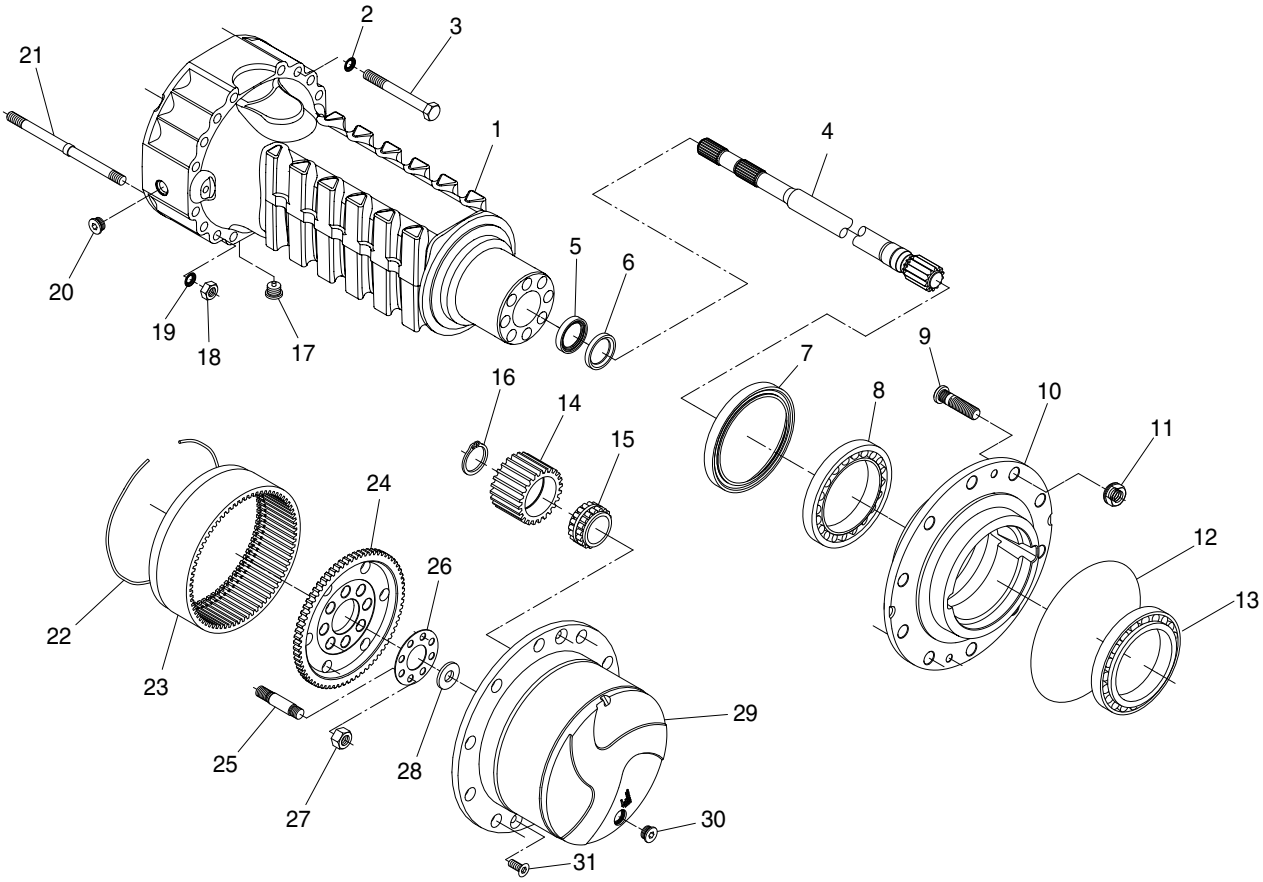
· Torque wrench setting :

20.4~22.5 kgf · m (148~163 lbf · ft)



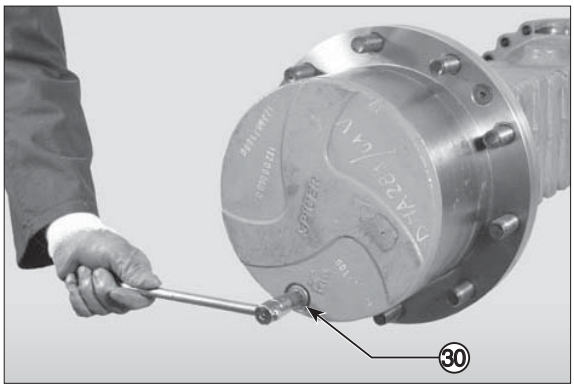
7409RAX031

3) HOW TO DISASSEMBLE THE PLANETARY REDUCTION



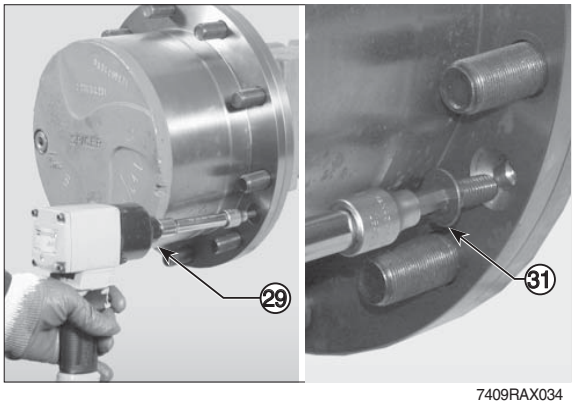
7409RAX032

(1) Remove oil-level plug (30) and the oil.



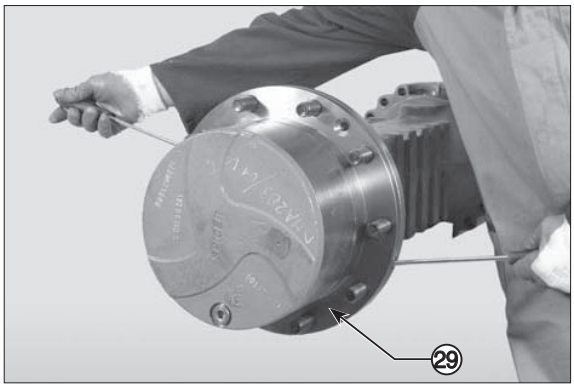
7409RAX033

(2) Remove the locking screws (31) of planetary cover (29).



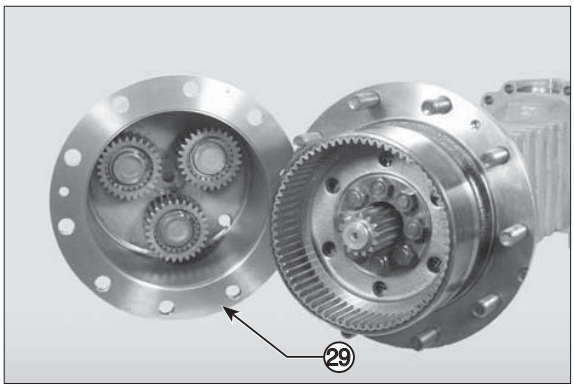
7409RAX034

(3) Using two screwdrivers or two levers inserted in the slots provided, pry the planetary cover (29) away from the wheel hub (10).



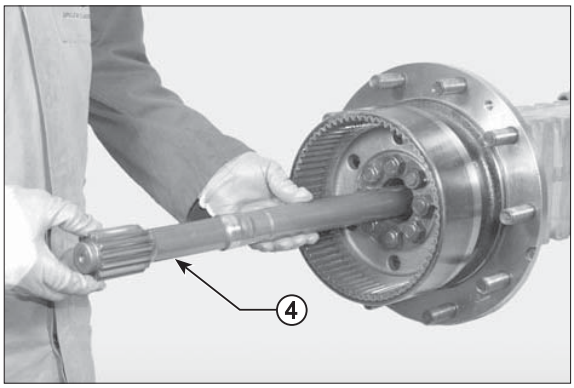
7409RAX035

(4) Remove the cover (29).



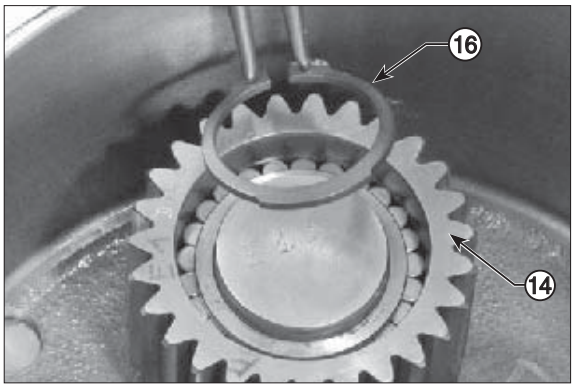
7409RAX036

(5) Remove the axle half shaft (4).



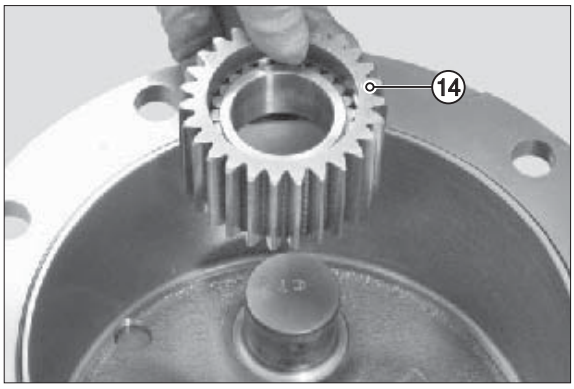
7409RAX037

(6) Remove the safety spring rings (16) of the planetary gears (14).



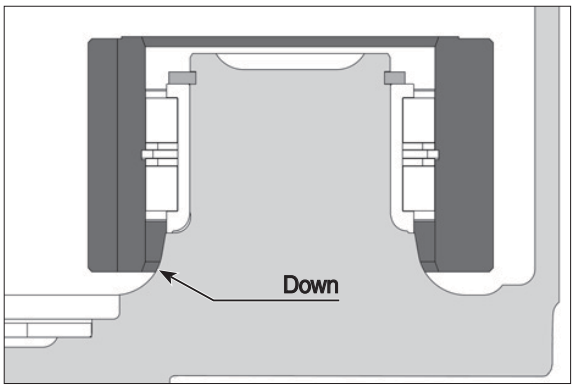
7409RAX038

(7) Remove the planetary gears (14).



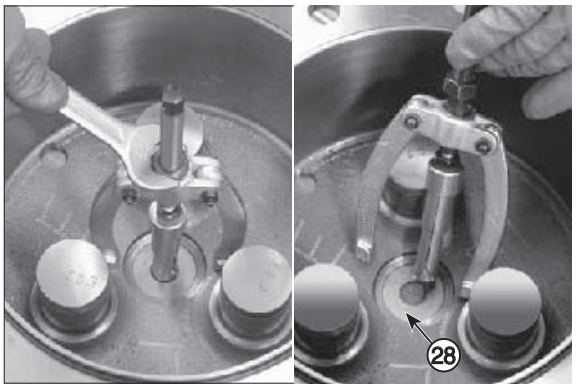
7409RAX039

※ Note down direction of assembly of planetary gears.



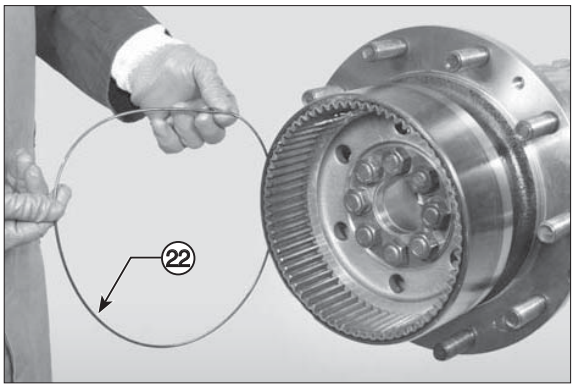
7409RAX040

(8) Check the wear of the shim washer (28) .



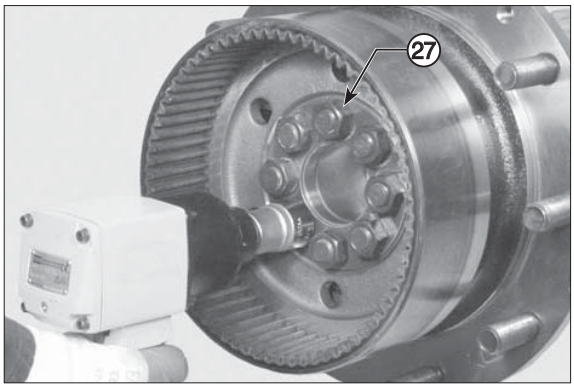
7409RAX041

(9) Accurately check the O-ring (22).



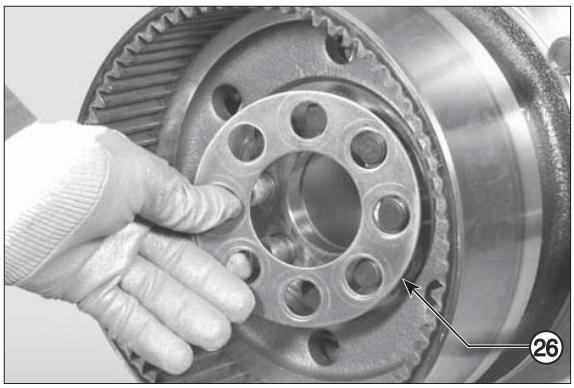
7409RAX042

(10) Loosen the nuts (27) and remove them.



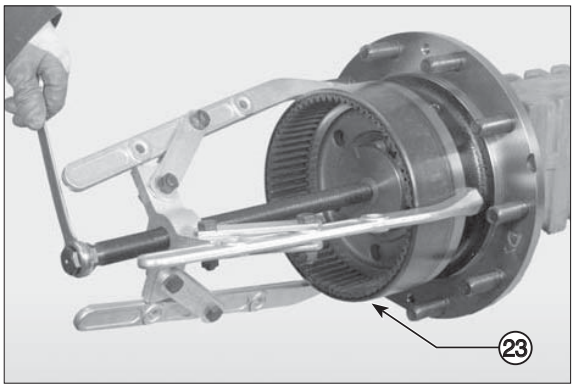
7409RAX043

(11) Remove the safety flange (26).



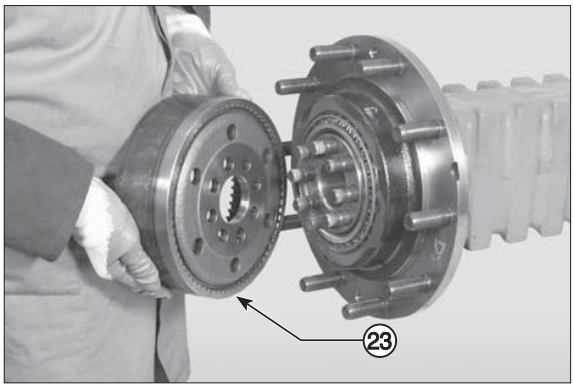
7409RAX044

(12) Using an extractor and applying a counter pressure to the screws (25), disengage the crown wheel (23) from the hub (10).



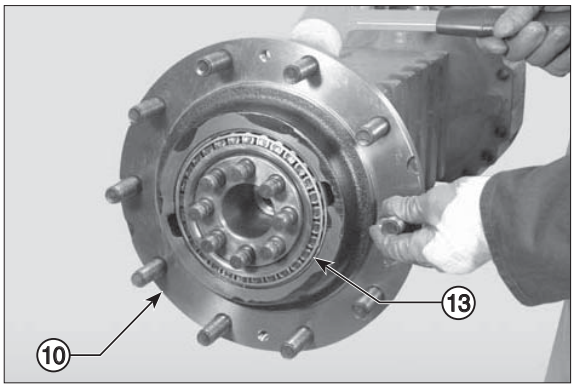
7409RAX045

(13) Remove the crown (23).



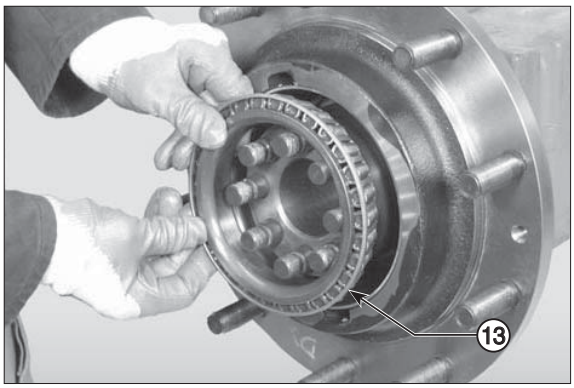
7409RAX046

(14) With the help of a hammer, shift the hub (10) and the external bearing (13).



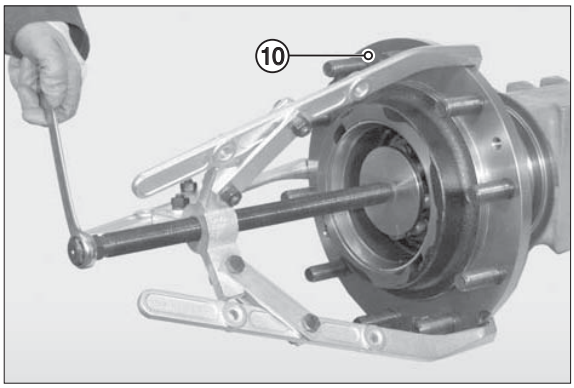
7409RAX047

(15) Extract the external bearing (13).



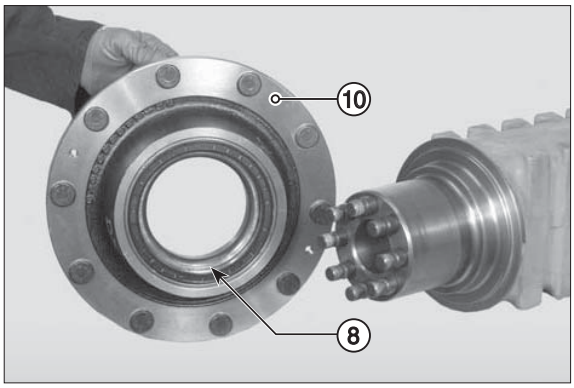
7409RAX048

(16) Using an extractor and applying a counter pressure to the screws disengage the hub (10).



7409RAX049

(17) Remove the internal bearing (8) and the hub (10).

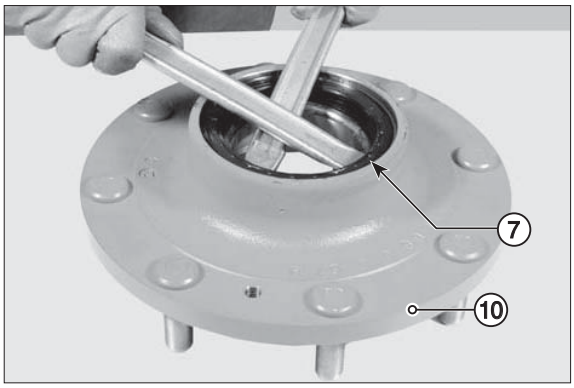


7409RAX050

(18) Remove the seal ring (7) from the hub (10).

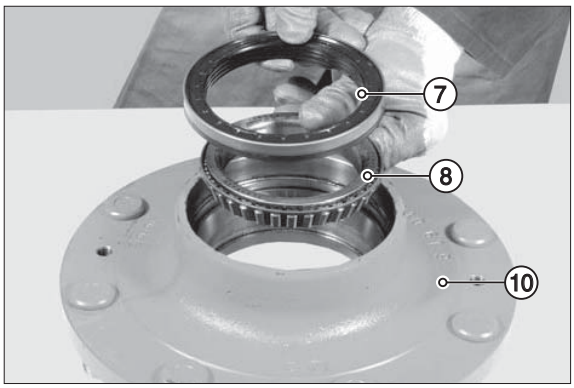
※ Note down direction of assembly.

※ The seal ring may not be reused.



7409RAX051

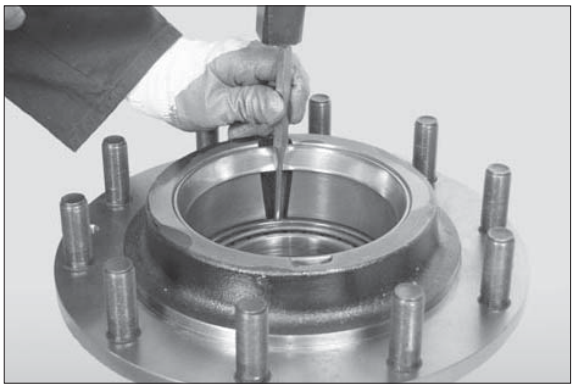
(19) Remove the internal bearing (8) and sealing ring (7).



7409RAX052

(20) Remove the external thrust blocks of bearings, using a pindriver.

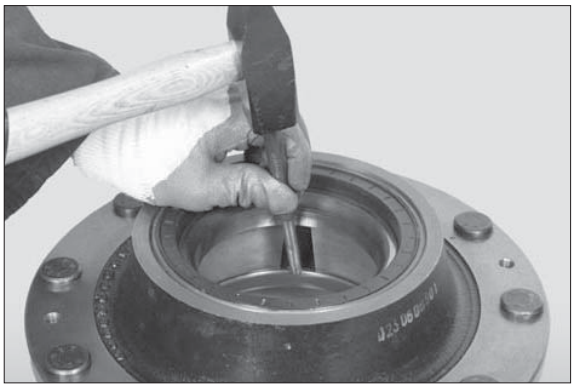
※ Hammer in an alternate sequence to prevent crawling and deformation of the thrust blocks.



7409RAX053

(21) Remove the external thrust blocks of bearings, using a pindriver.

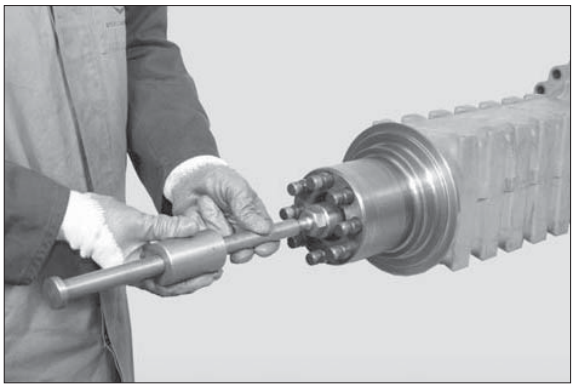
※ Hammer in an alternate sequence to prevent crawling and deformation of the thrust blocks.



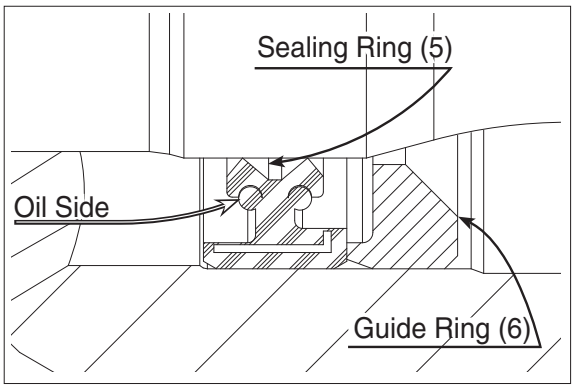
7409RAX054

(22) Using an extractor, remove seal ring (5) and guide ring(6).

※ Note down the direction of assembly of snap ring.

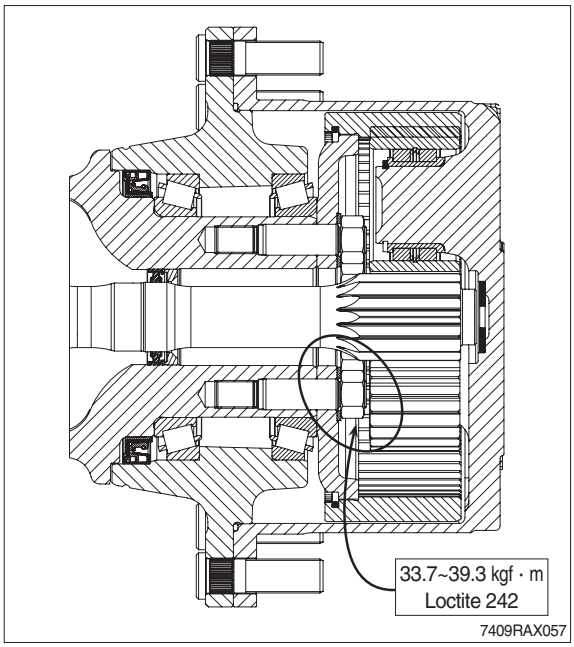


7409RAX055

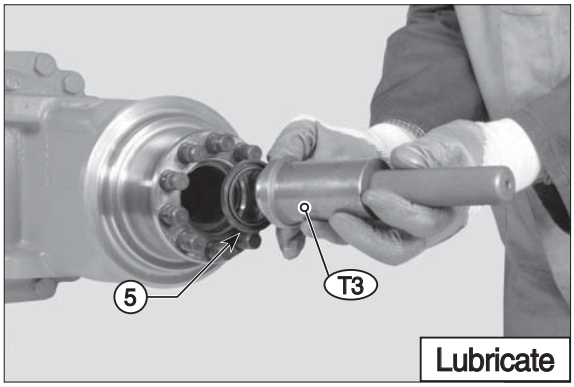


7409RAX056

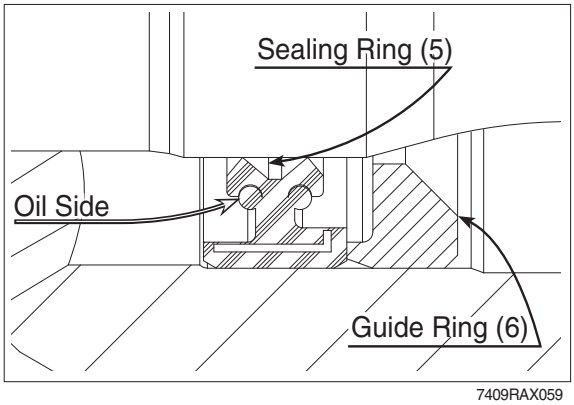
4) ASSEMBLING THE PLANETARY REDUCTION



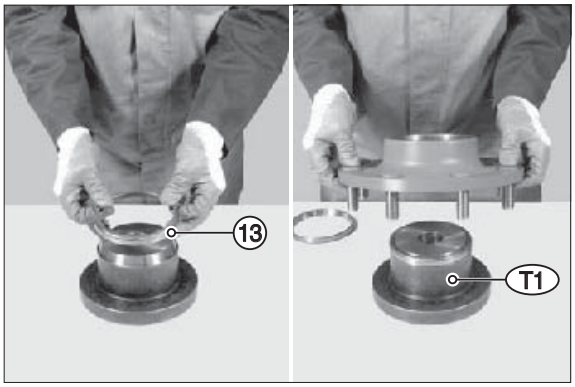
(1) Lubricate and fit the seal ring (5) and guide ring(6) onto tool T3; install the rings into the arm.



※ Pay particular attention to the direction of assembly of the rings.



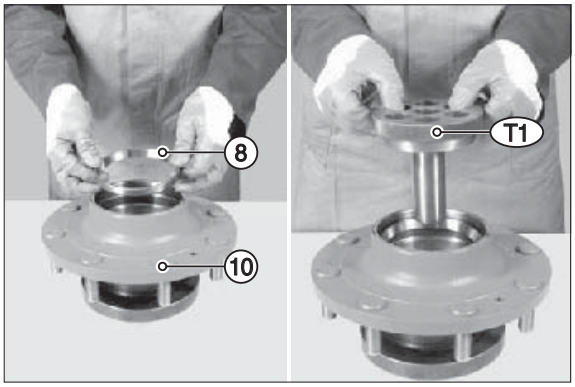
(2) Position the lower part of tool T1 and the thrust block of the external bearing (13).



7409RAX060

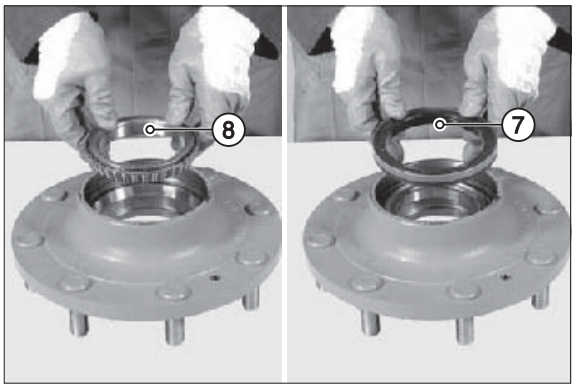
(3) Lubricate the seats of the bearings and position the hub (10) on tool T1; position the thrust block of the internal bearing (8).

※ Check that the thrust block is correctly oriented.



7409RAX061

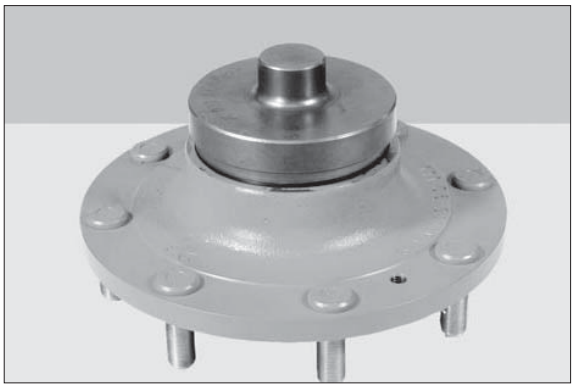
(4) Fit the bearing (8) and seal ring (7) into the internal thrust block.



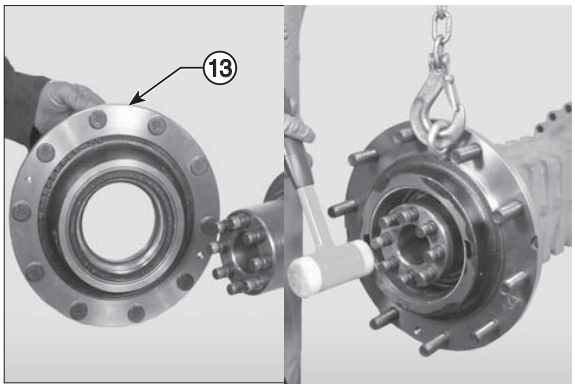
7409RAX062

(5) Using special tool apply a repositionable jointing compound for seals to the outer surface of the sealing ring (7). Position the sealing ring (7) in the hub (10).

※ Check that the ring (7) is correctly oriented.


7409RAX063

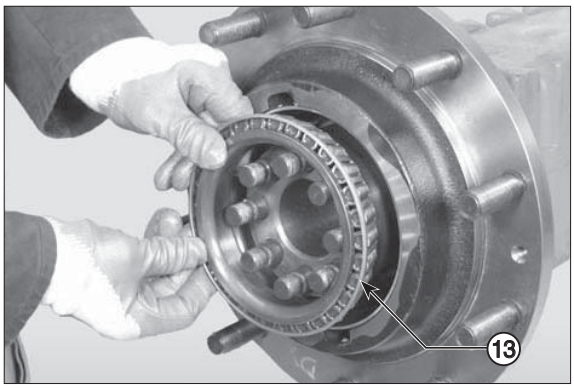
(6) Install the wheel hub.



7409RAX064

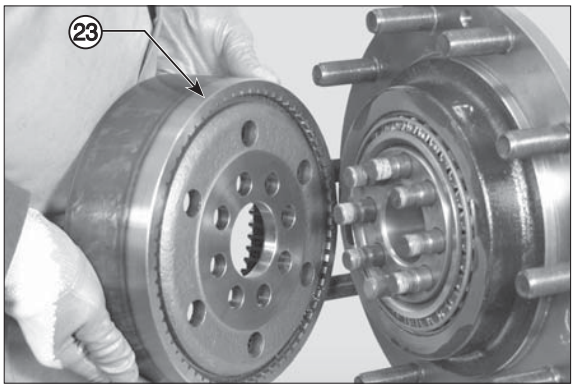
(7) Install the external bearing (13).

※ Move the bearing to the limit stop by hammering lightly all around the edge.



7409RAX065

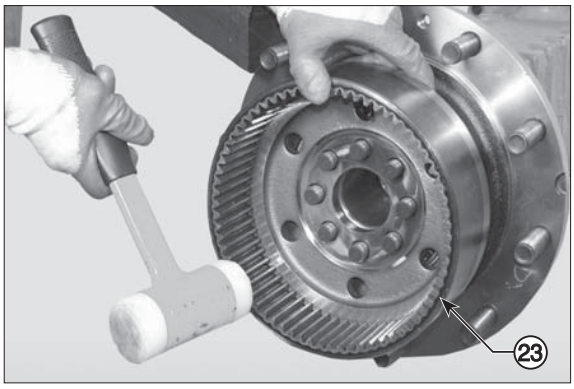
(8) Install the crown wheel (23).



7409RAX066

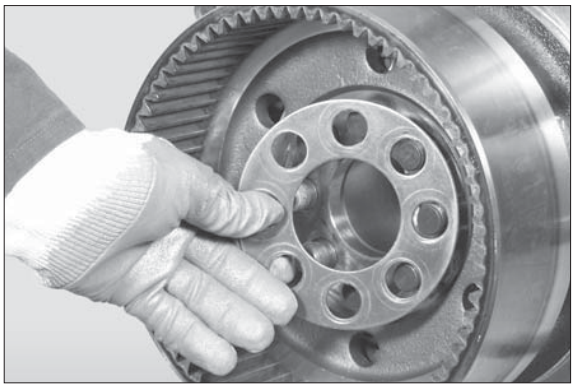
(9) Fit the complete crown flange (23).

※ In order to fasten the flange (23), use a plastic hammer and alternately hammer on several equidistant points.



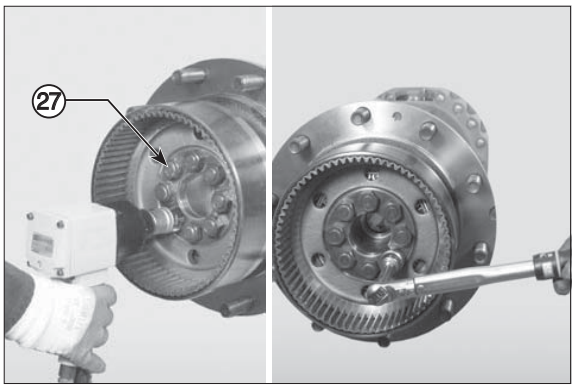
7409RAX067

(10) Install the security flange (26).
Using grease the surface of the safety flange (26) that touches the crown wheel.


7409RAX068

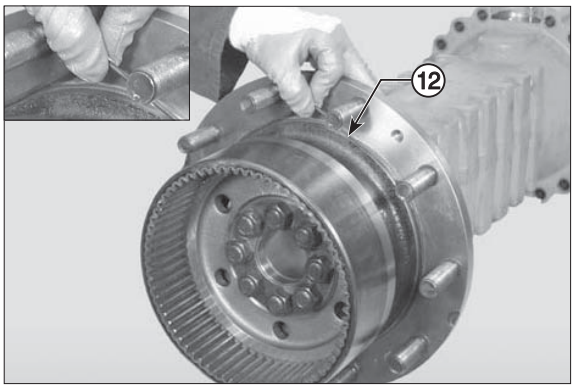
(11) Coat the nuts (27) with loctite 242 and screw them.
Tighten nuts (27) in two stages, using the criss-cross method.

· Initial torque wrench setting :
33.7 kgf · m (244 lbf · ft)
· Final torque wrench setting :
39.3 kgf · m (284 lbf · ft)



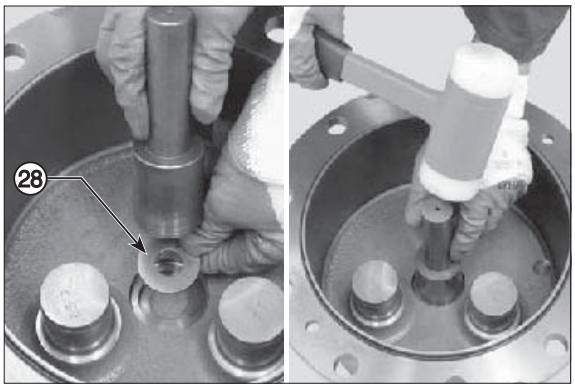
7409RAX069

※ Check the condition and position of the O-ring (12).



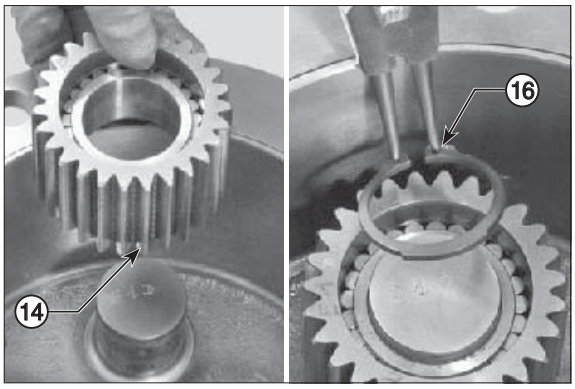
7409RAX070

(12) Fit shim washer (28) into spider cover (29).



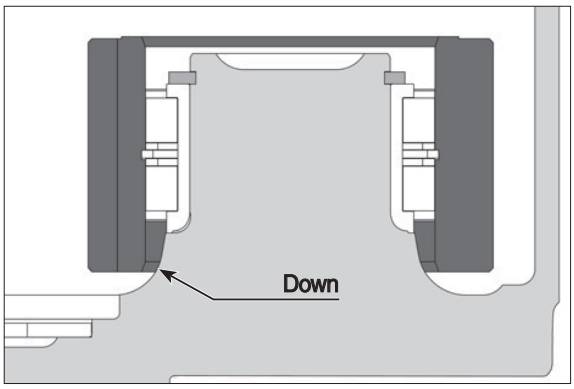
7409RAX071

(13) Insert the planet wheel gears (14) into the cover (29).
Lock gears (14) into position by installing the snap rings.



7409RAX072

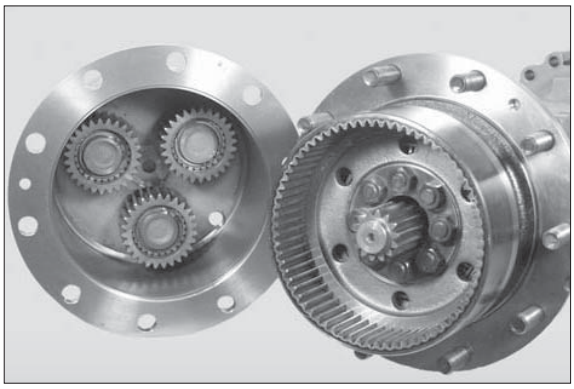
(14) Accurately check the orientation.



7409RAX073

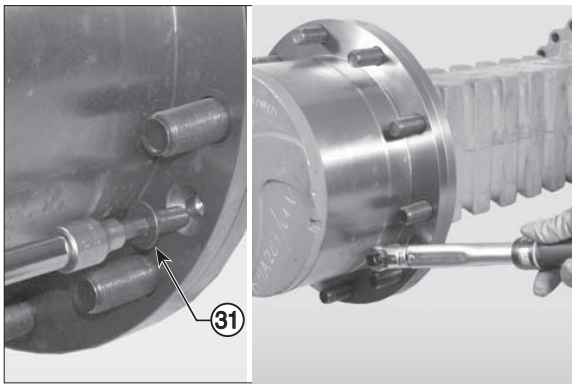
(15) Fit the planetary carrier cover onto the hub.

※ Check that the O-ring is in good condition and in position.


7409RAX074

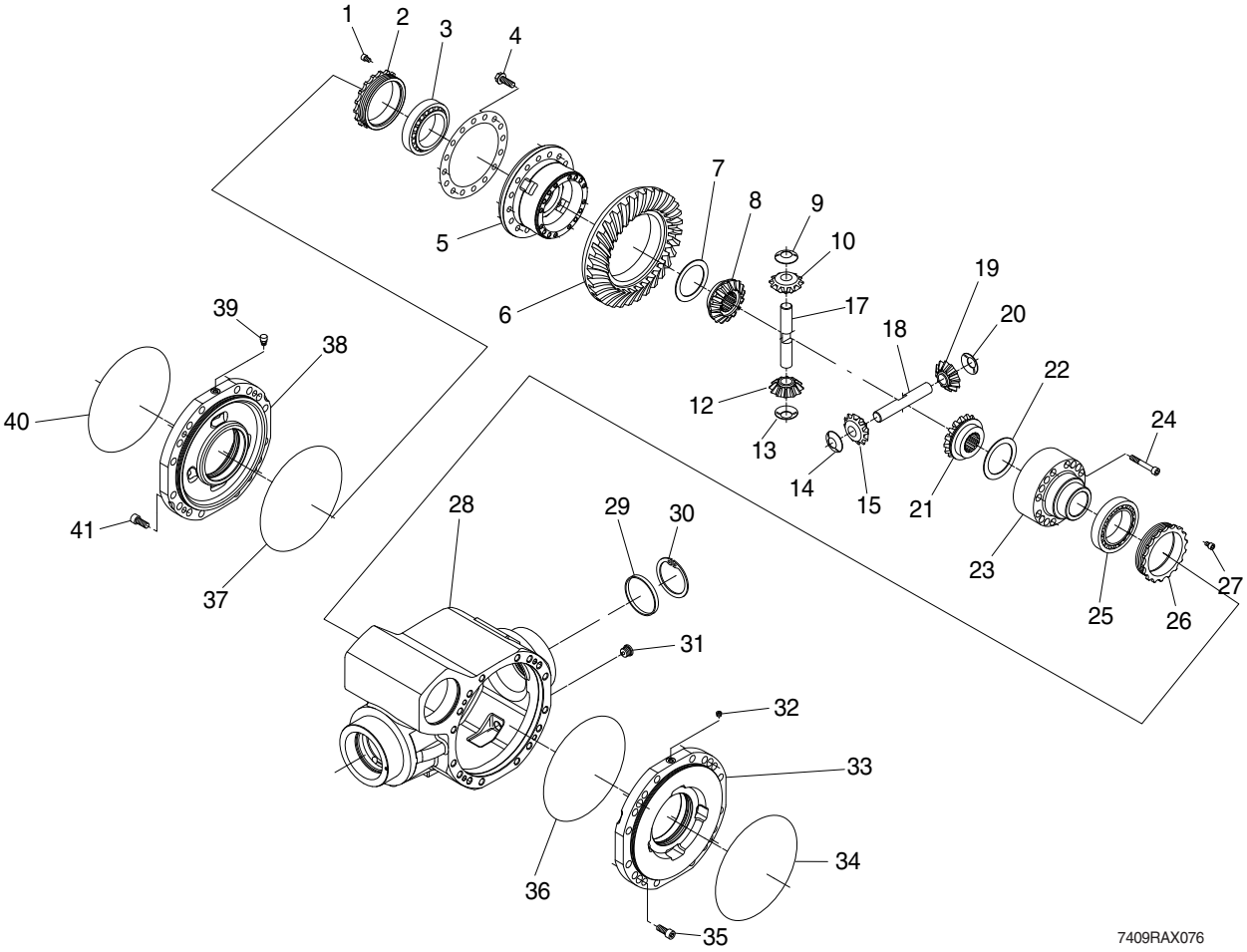
(16) Lock the planetary carrier cover by tightening the screws.

· Torque wrench setting for screws :
3.57~5.1 kgf · m (25.8~36.9 lbf · ft)



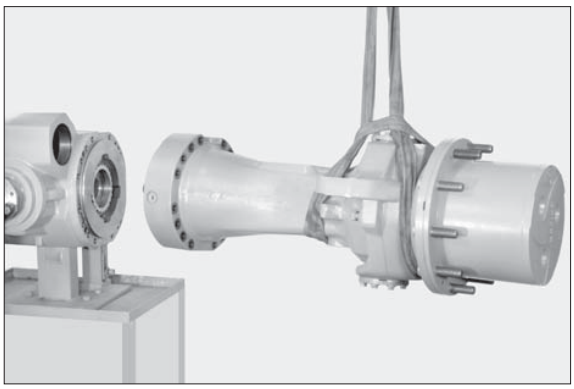
7409RAX075

5) HOW TO REMOVE AND DISASSEMBLE THE DIFFERENTIAL UNIT

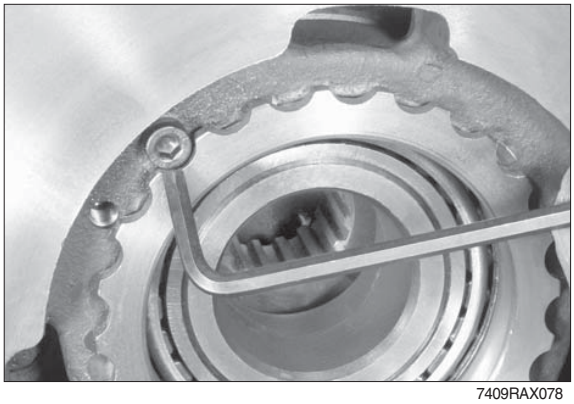


7409RAX076

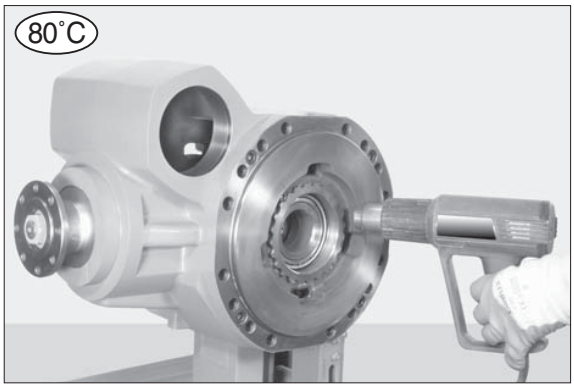
(1) Sling the arm to be removed and connect it to a hoist.
Loosen and remove screws and nuts.


7409RAX077

(2) Only if need removing or adjusting.
Remove the screw (27).

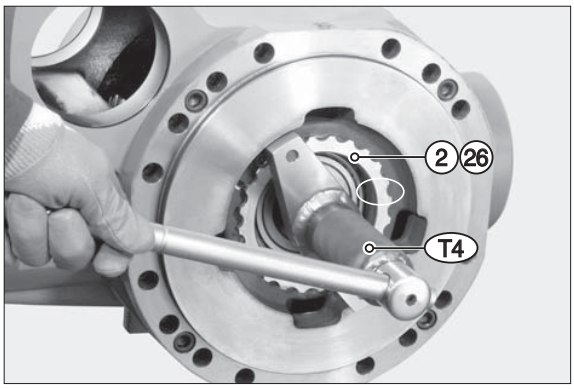

7409RAX078

(3) Only if need removing or adjusting.
Uniformly heat the ring nuts up to a temperature of 80˚C.



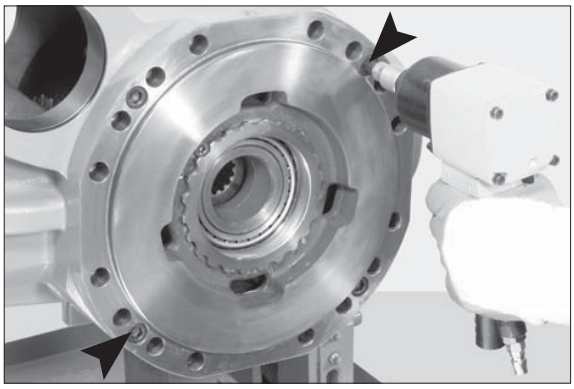
7409RAX079

(4) Only if need removing or adjusting.
Using special tool T4 mark the position of the ring nuts (2) (26).

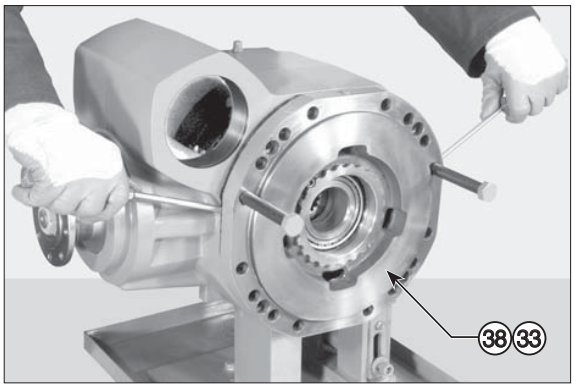


7409RAX080

(5) Loose he stud bolts (35)(41) and remove two of them.

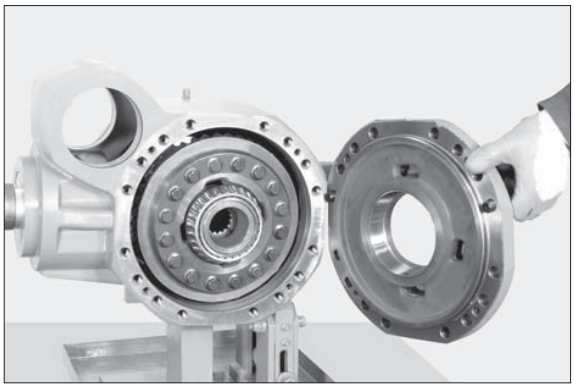

7409RAX081

(6) Disjoin the cover (38)(33) crown side.



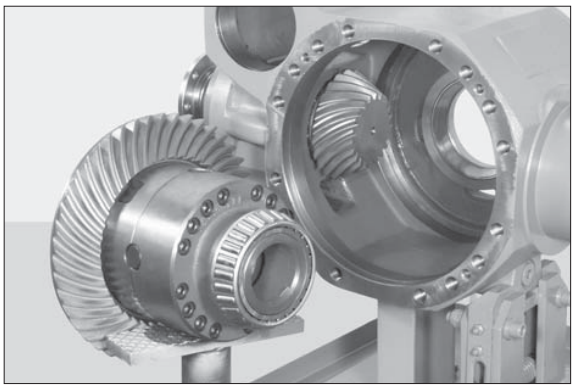
7409RAX082

(7) Remove the cover and studs.



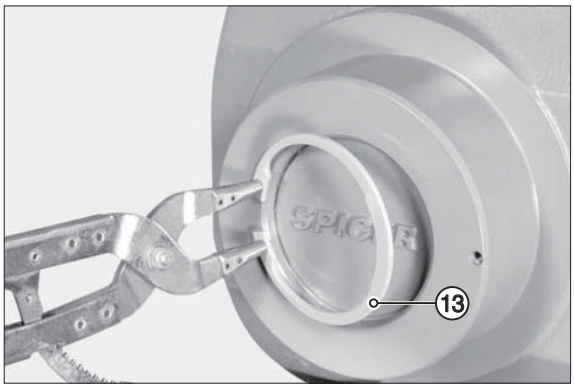
7409RAX083

(8) Extract the whole differential unit.



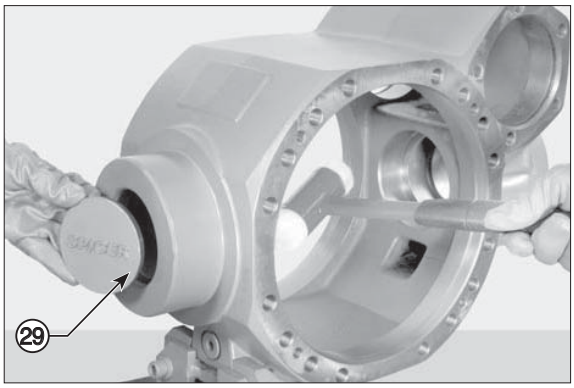
7409RAX084

(9) Remove the snap ring (30).



7409RAX085

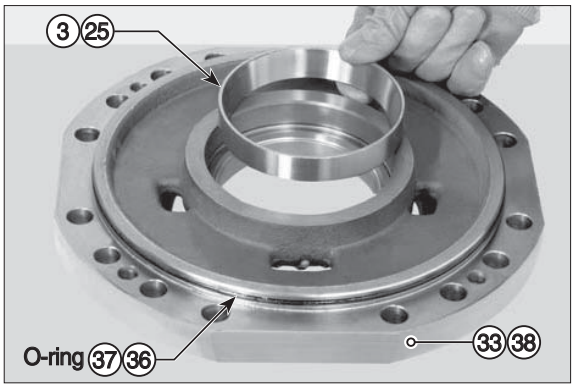
(10) Remove the cap (29).



7409RAX086

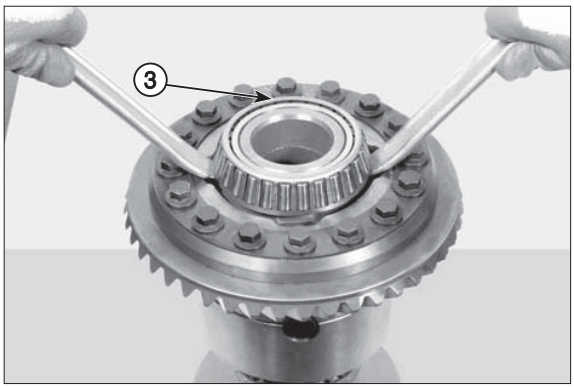
(11) If the bearings need replacing, extract the external thrust blocks of the bearings (3) and (25) from middle cover (33)(38).

※ Accurately check the O-ring (37)(36).



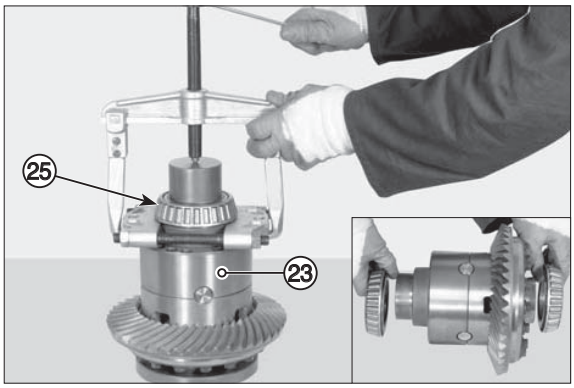
7409RAX087

(12) If the bearing need replacing, extract the bearing (3).



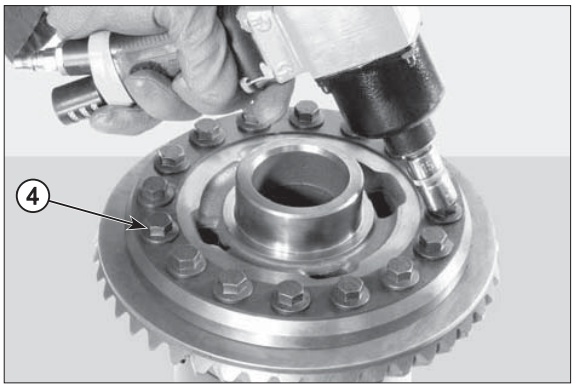
7409RAX088

(13) If the bearing need replacing, extract the bearing (25) from the differential carrier (23).



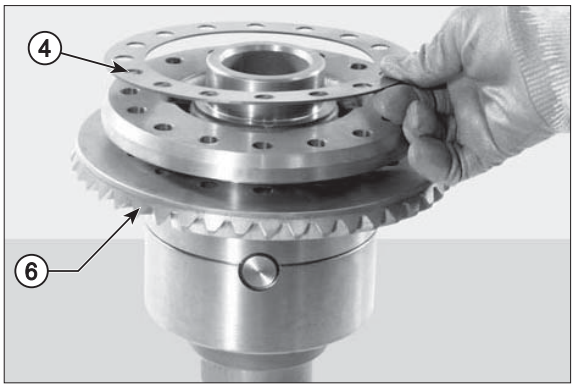
7409RAX089

(14) Remove the fitting screws (4) of the crown (6).



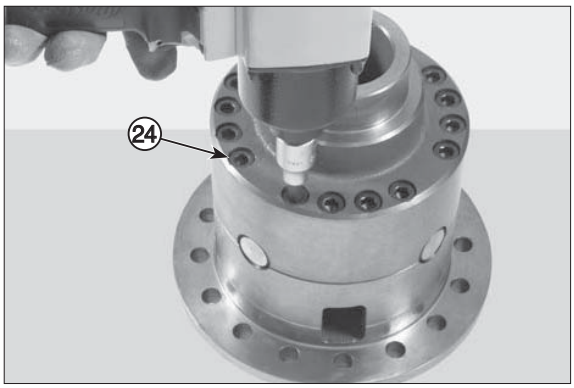
7409RAX090

(15) Remove the spacer (42) and the crown (6).



7409RAX091

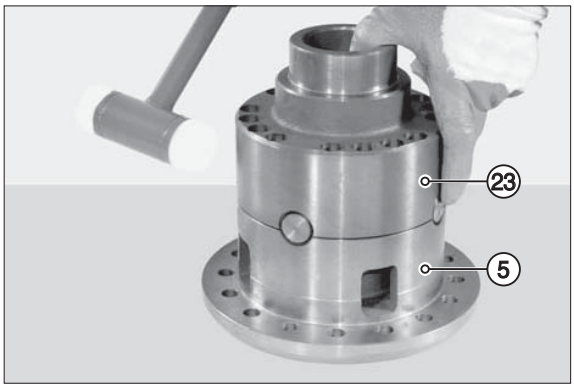
(16) Remove the screws (24) jointing the differential unit half box .



7409RAX092

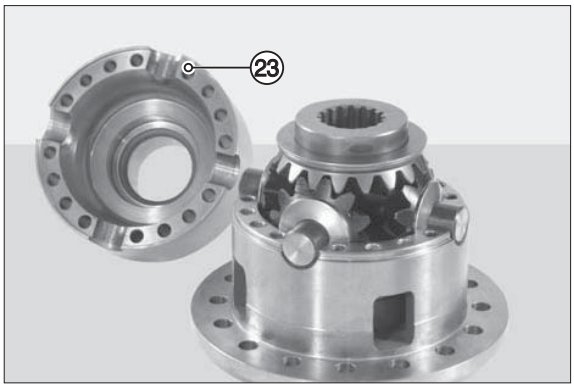
(17) Using a plastic hammer, take the half box (23)(5) to pieces.

※ Note down the coupling marks.



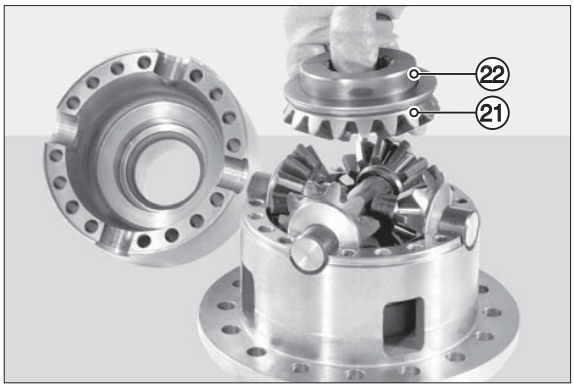
7409RAX093

(18) Remove the upper half box (23).



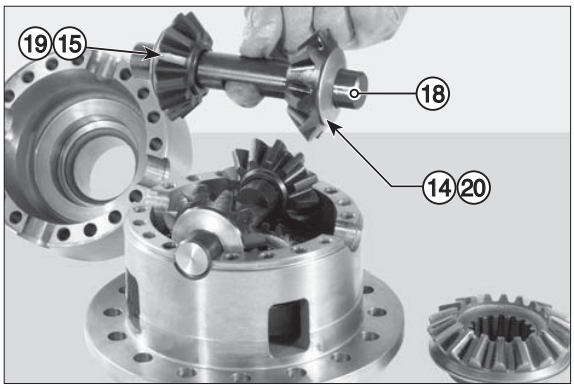
7409RAX094

(19) Remove shoulder (22) and first planetary gear (21).



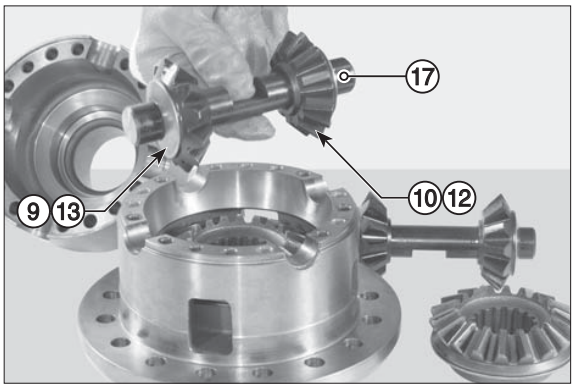
7409RAX095

(20) Remove shafts (18), complete with planet wheels (15)(19) and spherical shoulder washers (14)(20).



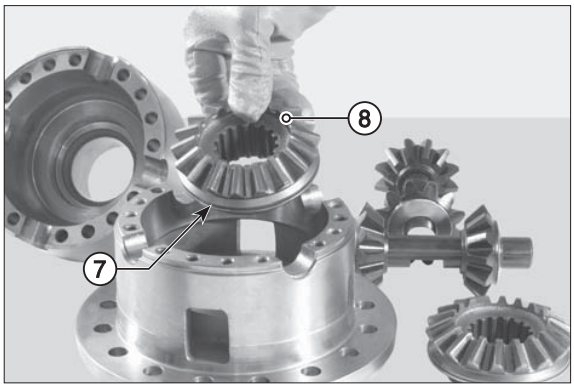
7409RAX096

(21) Remove shafts (17), complete with planet wheels (10)(12) and spherical shoulder washers (9)(13).



7409RAX097

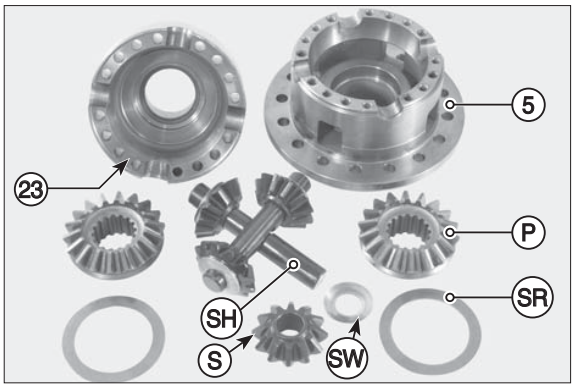
(22) Remove the 2nd planetary gear (8) and shoulder ring (7).



7409RAX098

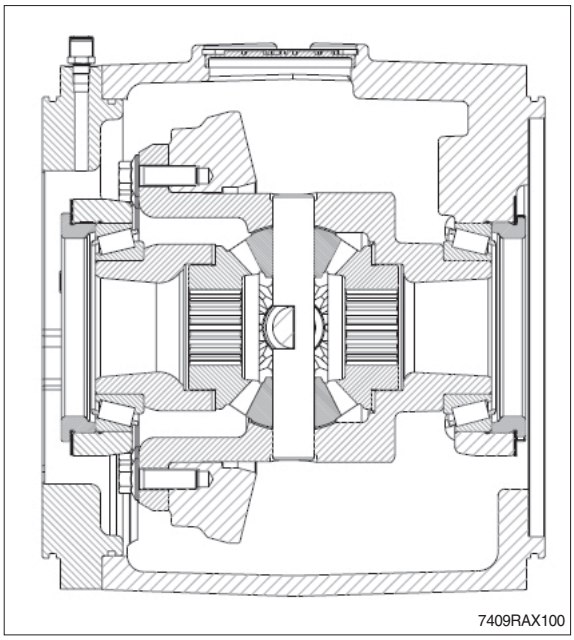
(23) The differential unit.

Sh = shafts (18)(17)
SW = spherical shoulder washers (9)(13) (14)(20)
P = planetary gears (8)(21)
SR = shoulder ring (22)(7)
23 = upper half box
5 = half box crown side
S = planet wheels (10)(12)(15)(19)

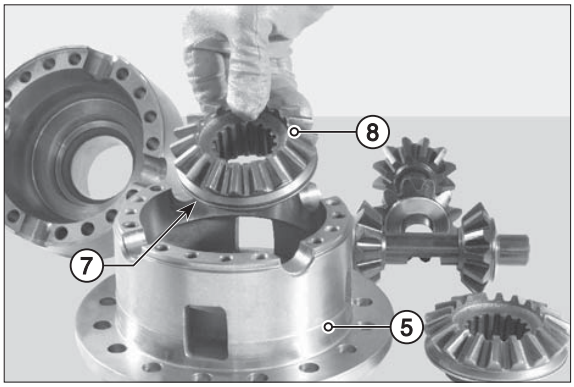


7409RAX099

6) HOW TO ASSEMBLE AND INSTALL THE DIFFERENTIAL UNIT

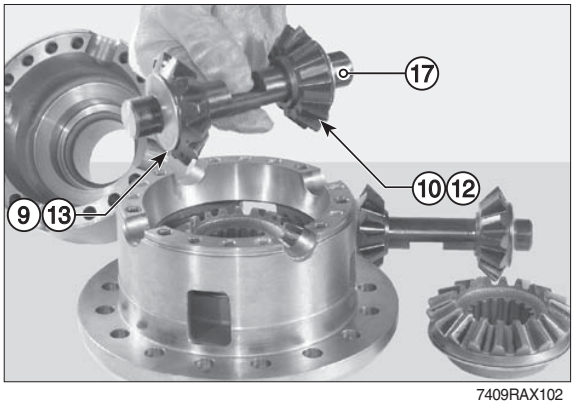

7409RAX100

(1) Install the shoulder ring (7) and planetary gear (8) into the halfbox (5).



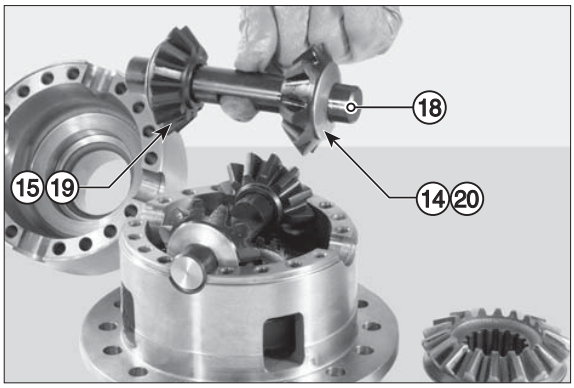
7409RAX101

(2) Install the planetary gears (10)(12) and spherical shoulder washers (9)(13) onto the shafts (17).
Install the planetary set.



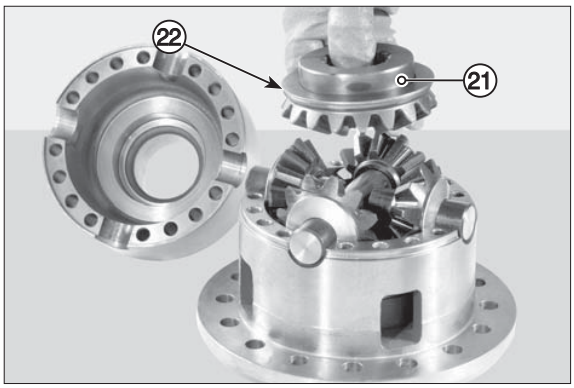
7409RAX102

(3) Install the planetary gears (15)(19) and spherical shoulder washers (14)(20) onto the shafts (18).
Install the planetary set.



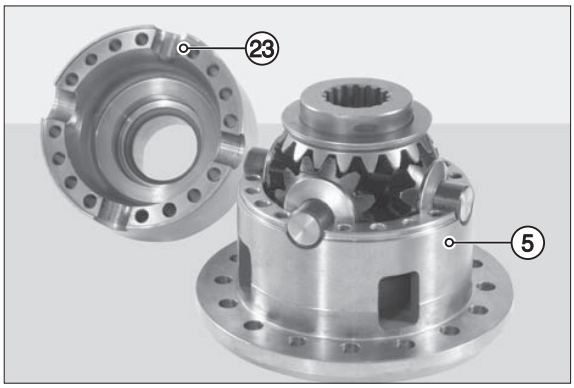
7409RAX103

(4) Install the planetary gear (21) and shoulder ring (22).



7409RAX104

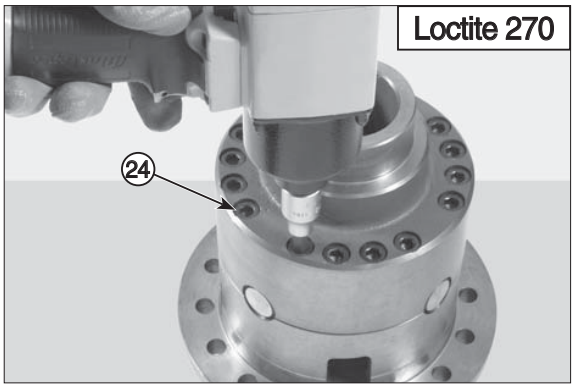
(5) Mount the locking half-box (5) onto the half-box (23)



7409RAX105

(6) Lock the half box with screws (24) coated with loctite 270.

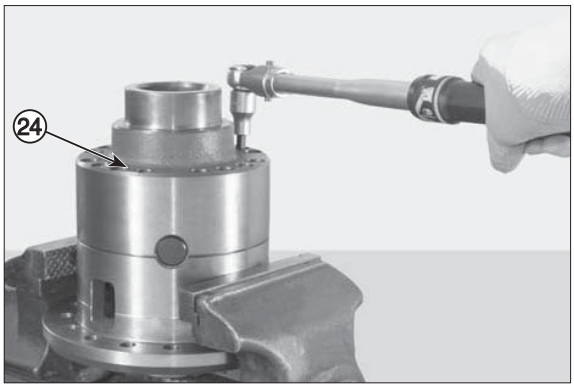
※ 1. The match marks on the two half-boxes must correspond.
2. Use only new screws.



7409RAX106

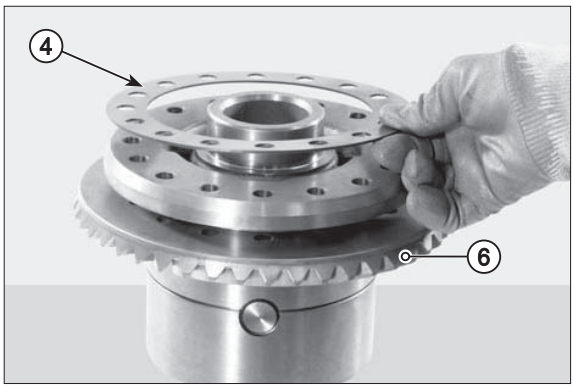
(7) Fit the complete differential unit in a vice and tighten the screws (24) holding the two half boxes together to a torque of 8.16 kgf · m (59 lbf · ft).

※ Tighten screws using the alternate and criss-cross method.



7409RAX107

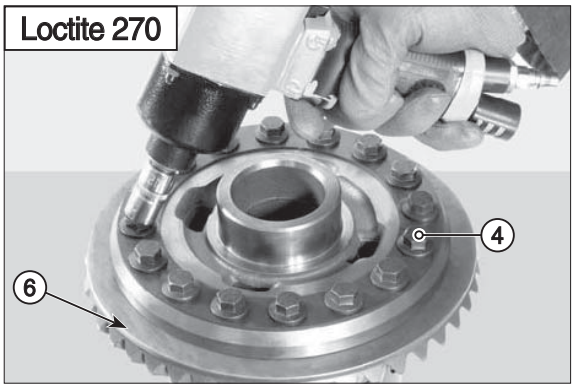
(8) Install the spacer (4) and the crown (6).



7409RAX108

(9) Mount the gear ring (6) and fasten it to the differential box with screws (4).

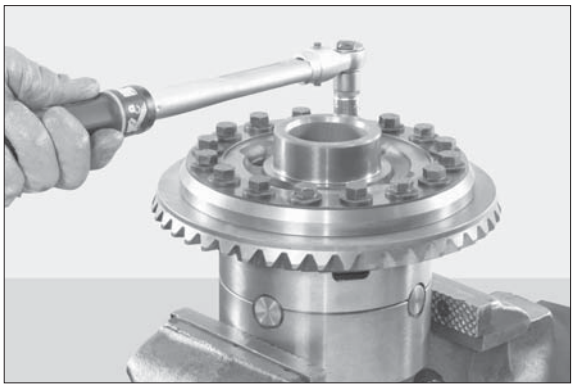
※ Use only new screws.



7409RAX109

(10) Lock the gear ring (6) by tightening the screws (4) to a torque of 15.3 kgf · m (111 lbf · ft).

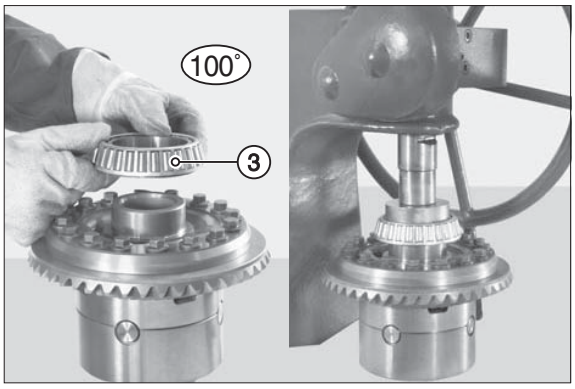
※ Use the alternate and criss-cross tightening method.



7409RAX110

Installation of the differential unit

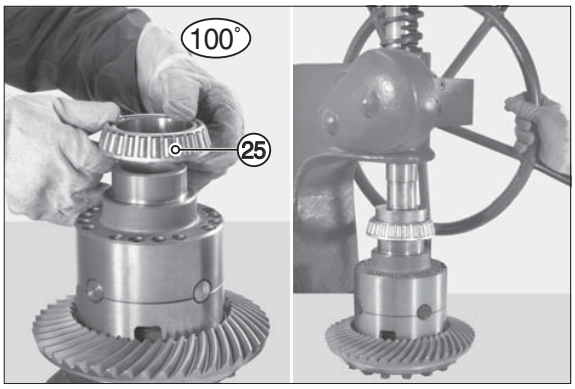
(11) Position the differential unit under a press and, using a driver with an adequate diameter, install the first bearing (3).



7409RAX111

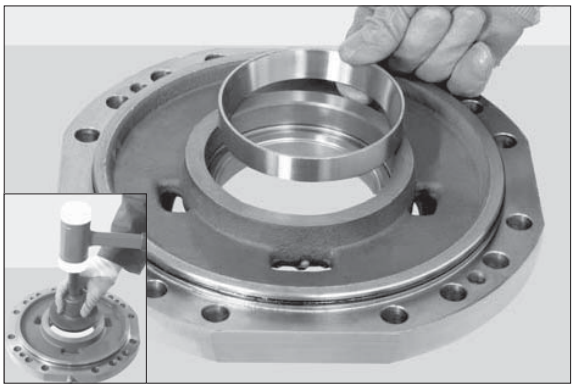
(12) Turn the unit upside down and install the second bearing (25).

※ Pay particular attention; position a shim with adequate diameter in order to engage the internal ring of bearing without engaging the cage.

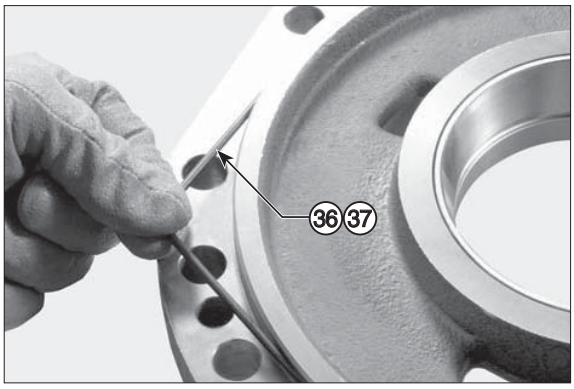


7409RAX112

(13) Only if bearings are replaced.
Insert the thrust blocks of the bearings into the intermediate covers.

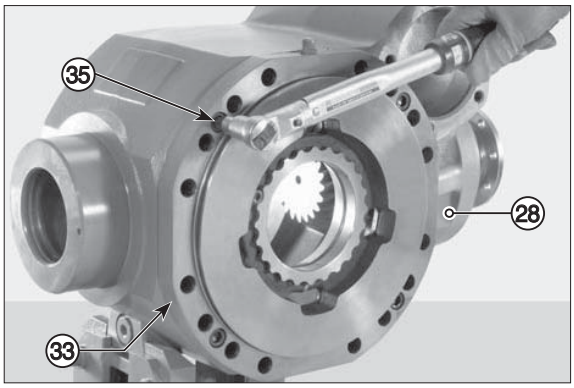

7409RAX113

※ Thoroughly check the state of the O-ring (36)(37).



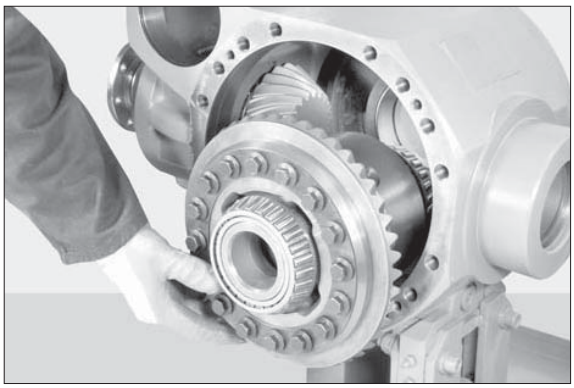
7409RAX114

(14) Fit the intermediate cover (33) on opposite side of ring gears :
lock cover with screws (35) coated with loctite 242.
Tighten screws to a torque of 14.3 kgf · m (103 lbf · ft).

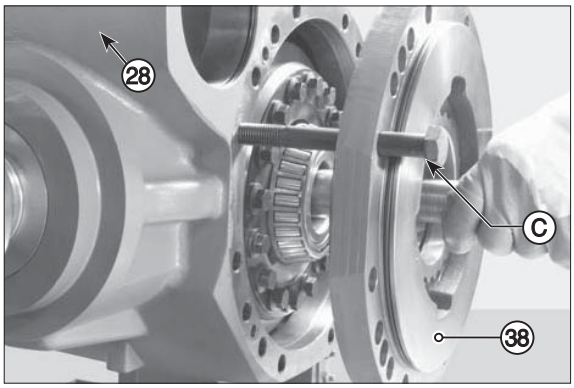


7409RAX115

(15) Position the differential unit in the central body with the help of a bar and fit the middle cover.

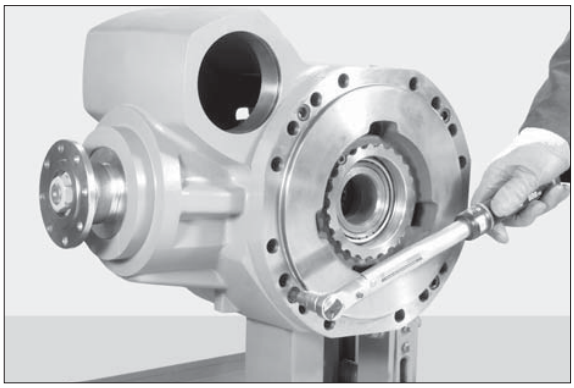

7409RAX116

(16) Tighten the two safety screws “C” into the main body (28) and install the intermediate cover (38).

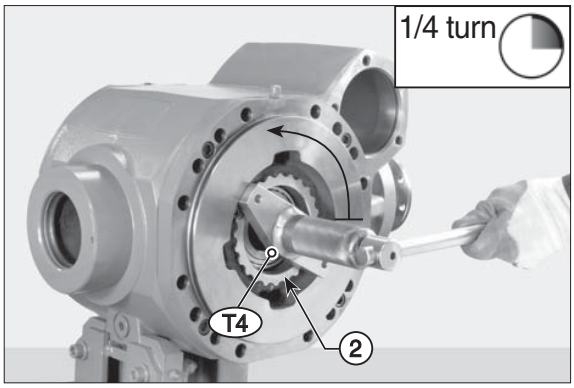


7409RAX117

(17) Tighten screws to a torque of 14.3 kgf · m (103 lbf · ft).


7409RAX118

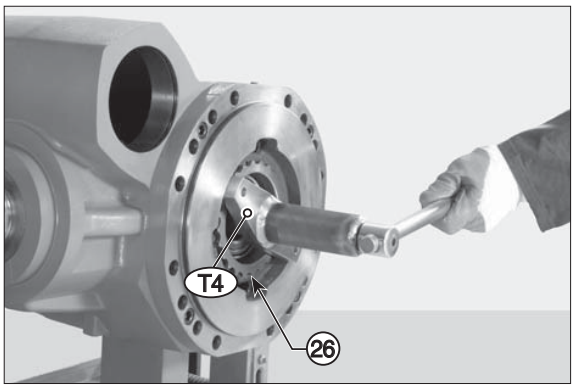
(18) Only if ring nuts have been removed. Tighten the ring nut (2) on gear ring side until clearances between pinion and gear ring are zeroed. Then, loosen by about 1/4 turn.



7409RAX119

(19) Only if ring nuts have been removed. Preload bearings with ring nut (26) on non-gear ring side in order to increase the torque of the pinion.

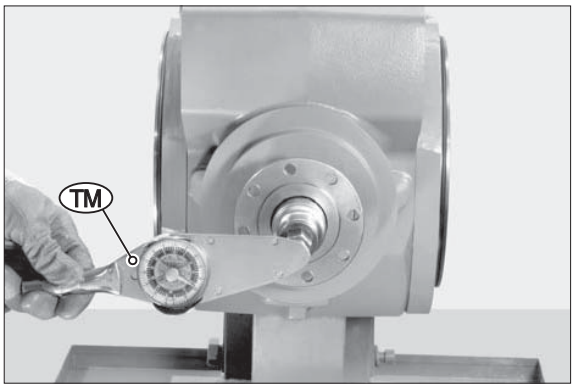
※ In the case of used bearings, check thrust torque ; in the case of new bearings, check continuous torque.



7409RAX120

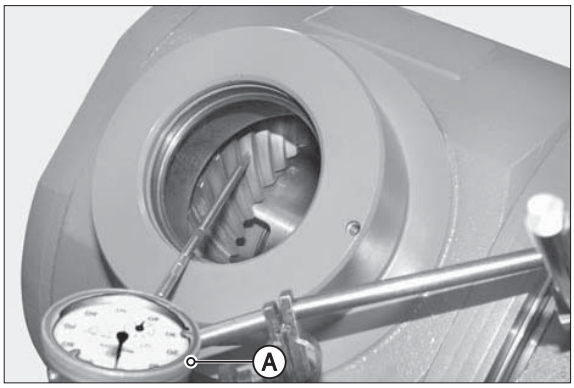
(20) Apply torque meter TM to pinion nut and check that torque will increase by 2.04~4.08 kgf · cm as a result of differential bearing preload.

- Example : pinion torque : 12.2~13.3 kgf · cm
- Pinion + differential torque : 14.3~17.3 kgf · cm



7409RAX121

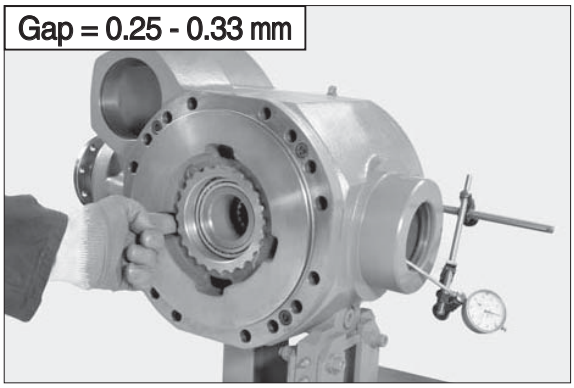
(21) Introduce a comparator “A” with long tracer through the hole provided for the cap.
Position the tracer on the side of a tooth of the gear ring, approximately 5 mm from the outer rim; preload by about 1 mm and zero the comparator.



7409RAX122

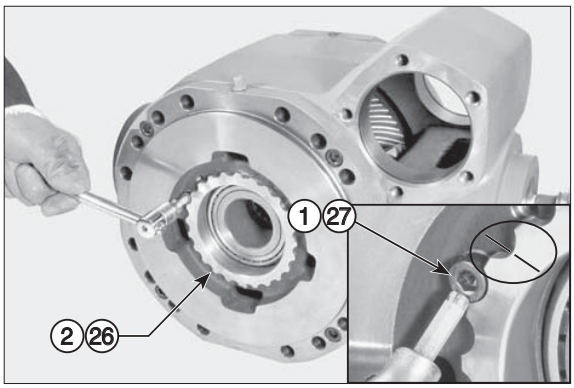
(22) As you hold the pinion in position, move the gear ring manually in both directions to check clearance between pinion and gear ring.

Standard clearance : 0.25 - 0.33 mm



7409RAX123

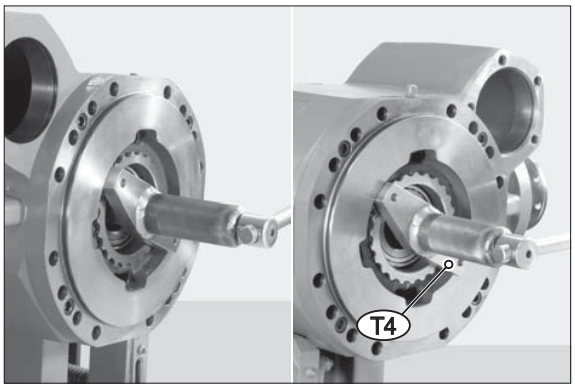
(23) If torque and/or pinion-gear ring clearance is not within tolerance values and the ring nuts have not been removed, mark the position of the ring nuts (2)(26) and remove the safety stops (1)(27).



7409RAX124

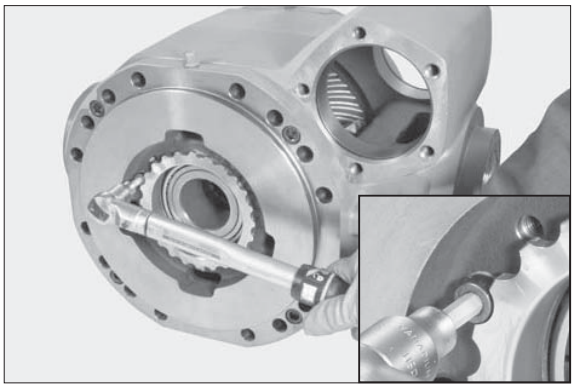
(24) Adjusting clearance between pinion and gear ring.

To INCREASE: loosen the ring nut on gear ring side and tighten the ring nut on non-gear ring side by the same measure.
To DECREASE: perform the same operations inversely.
To rotate ring nuts, use special wrench T4.



7409RAX125

(25) Engage screw (27) in the slot next to the holes provided for the check screws.
Coat screws (27) with loctite 242 and tighten to a torque of 2.45~2.65 kgf · m (17.7~19.2 lbf · ft).

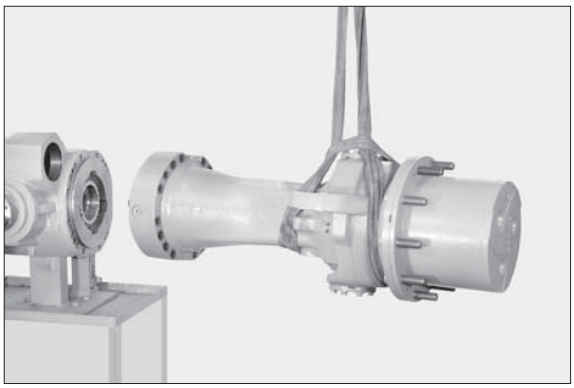


7409RAX126

(26) Fit the top plug after applying repositionable jointing compound for seals to the rims.
Install the snap ring.

7409RAX127

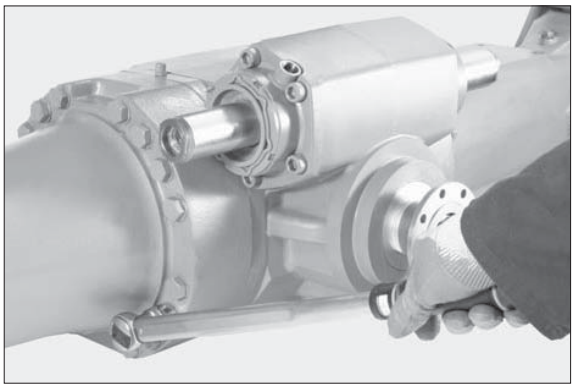
(27) Install the complete arm.



7409RAX128

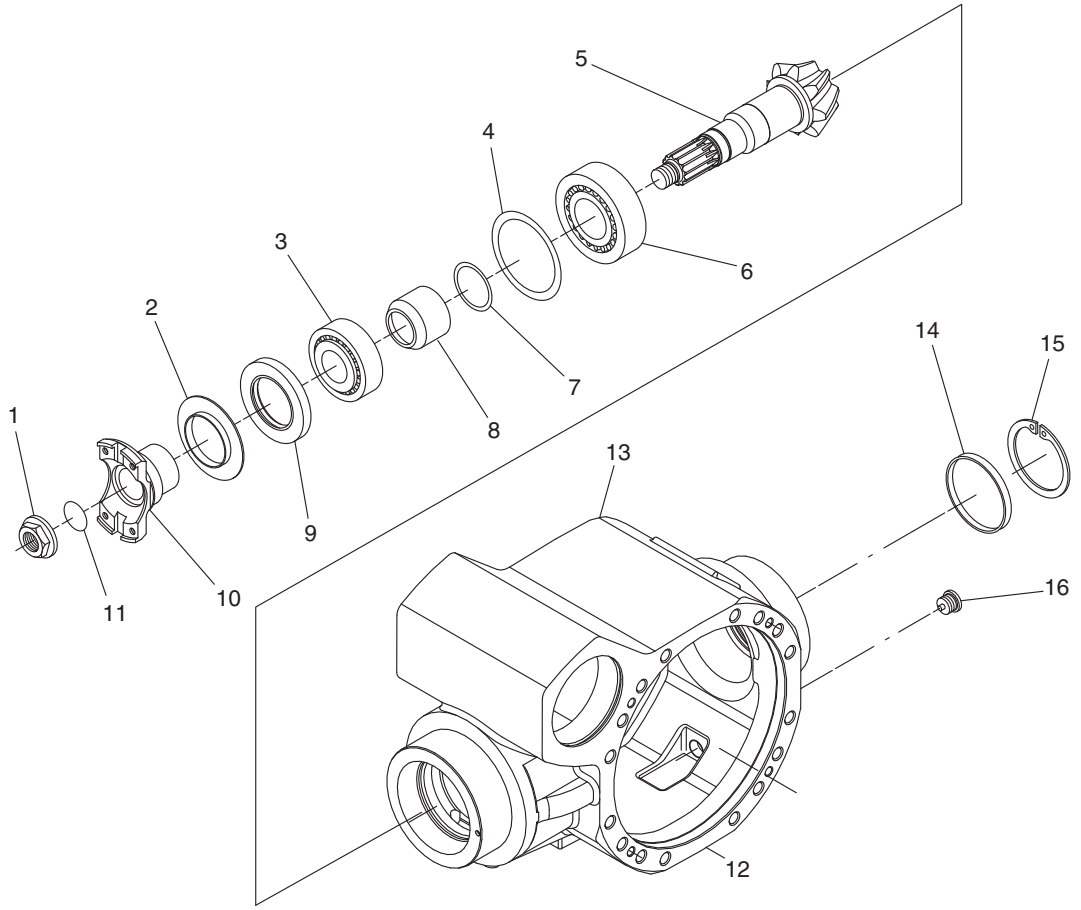
(28) Torque wrench setting :
28.9~31.8 kgf · m (209~230 lbf · ft)

※ Tighten using the criss-cross method.



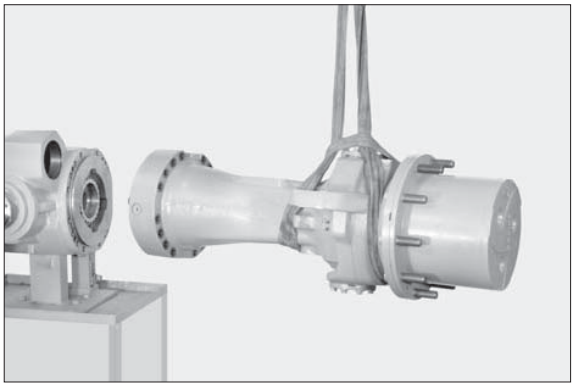
7409RAX129

7) DISASSEMBLY OF THE PINION



7409RAX130

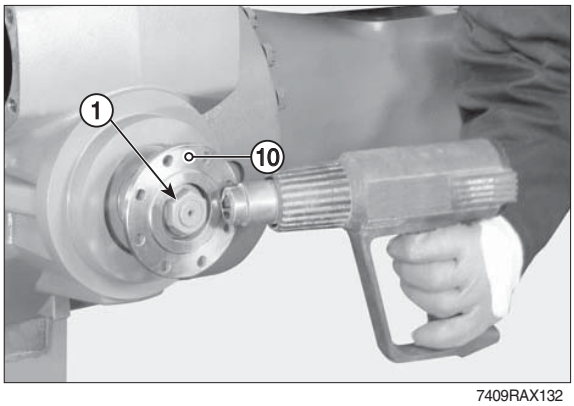
(1) Remove both axle arms.



7409RAX131

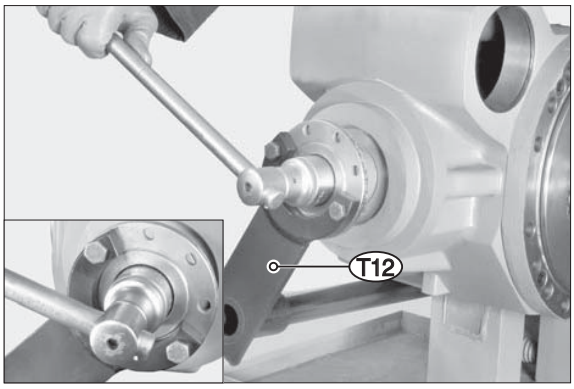
(2) If disassembly is awkward, heat the check nut (1) of the flange (10) at 80˚C.

※ Heating is meant to unloose the setting of loctite on the nut (1).

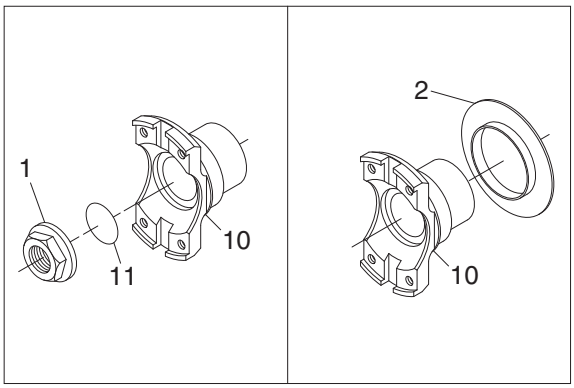


7409RAX132

(3) Position tool T12, so as to avoid pinion rotation.
Unloose and remove the nut (1); also remove the O-ring (11).

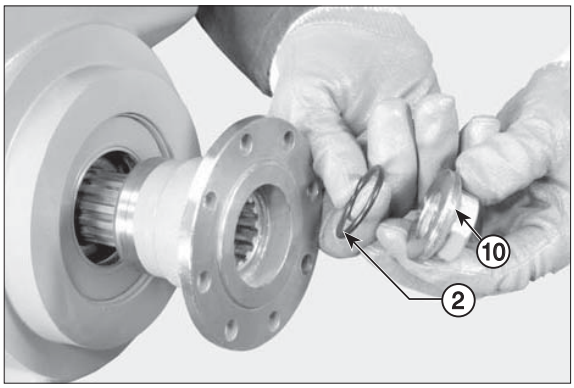


7409RAX133



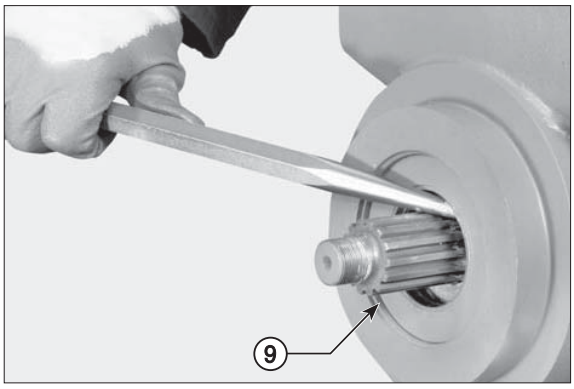
7409RAX134

(4) Remove the flange (10) complete with guard (2).



7409RAX135

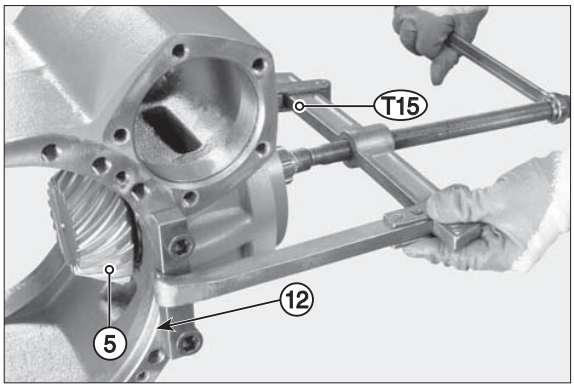
(5) Remove the sealing ring (9).



7409RAX136

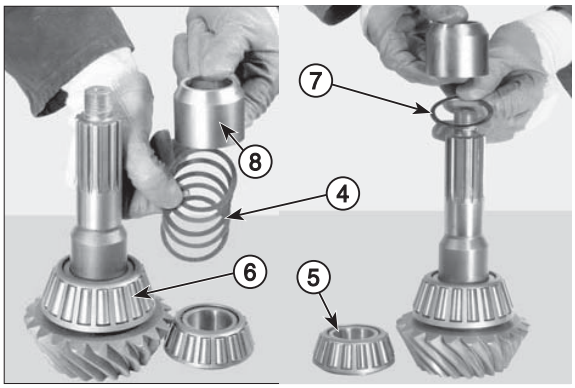
(6) Apply blocks T15 and, with the help of a puller, extract the pinion (5) complete with the internal bearing (6), the distance piece (8) and shims (4)(7).

※ The thrust blocks of the bearings remain in the central body (12).



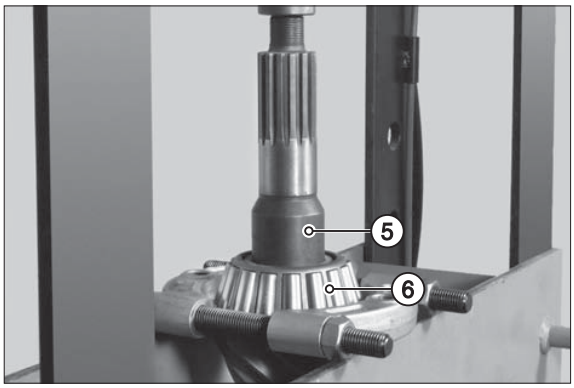
7409RAX137

(7) Refer and keep to the positions marked during disassembly.



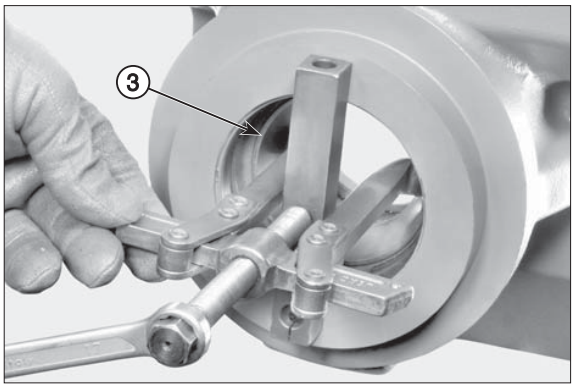
7409RAX138

(8) Using a puller and a press, remove the inner bearing (5) from the pinion (6).



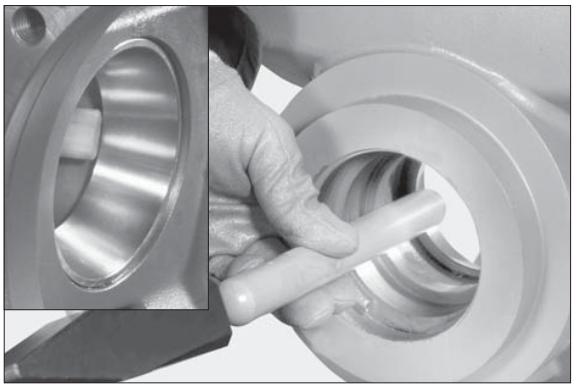
7409RAX139

(9) Remove the thrust block of the external bearing (3).



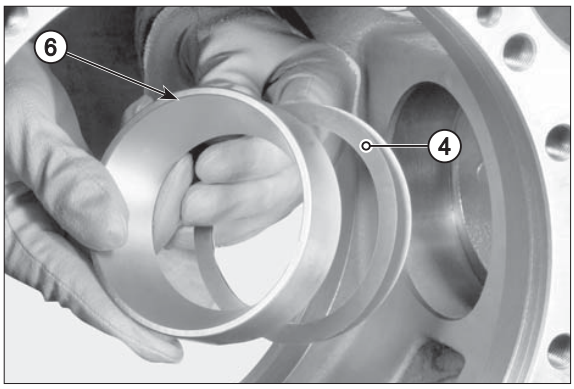
7409RAX140

(10) Insert a drift in the appropriate holes.



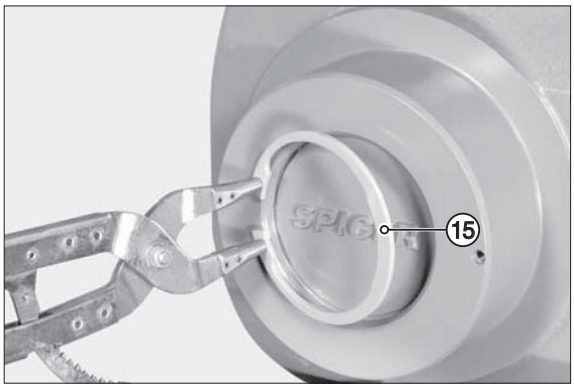
7409RAX141

(11) Remove the thrust block of the internal bearing (6) as well as the shim washers (4).



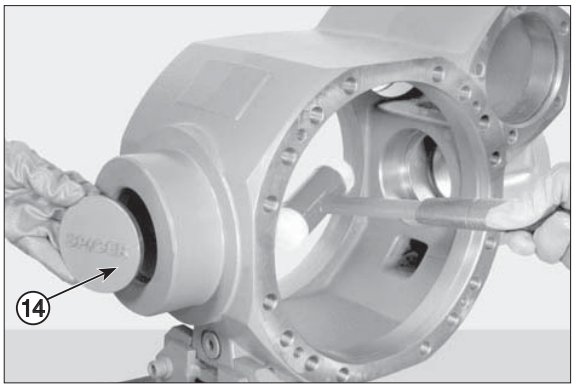
7409RAX142

(12) Remove the snap ring (15).



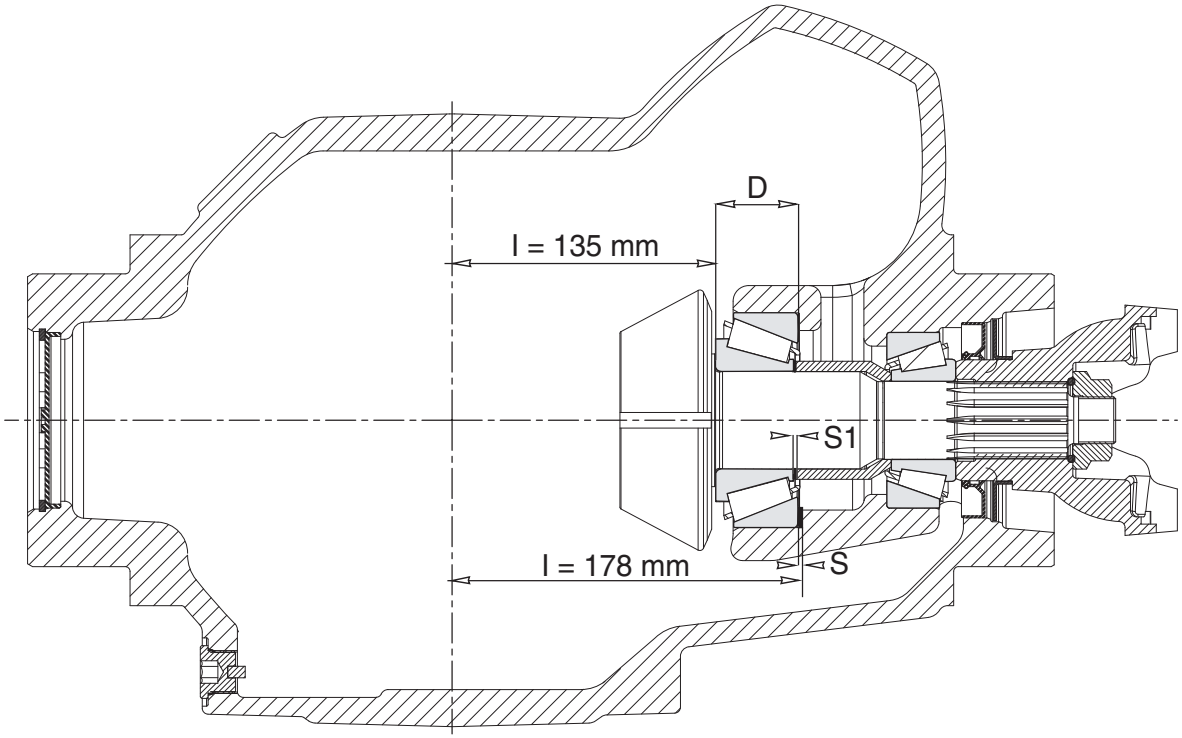
7409RAX143

(13) Remove the cap (14).



7409RAX144

8) ASSEMBLY OF THE PINION

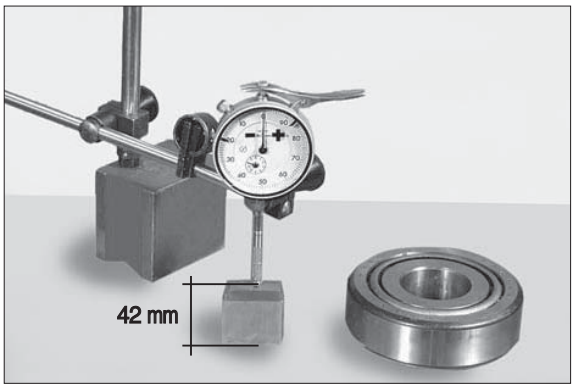


S = 178 - (I + D) S = shims Ø 110 mm
S1 = shims Ø 50 mm

7409RAX145

Calculating pinion center distance

(1) Using a faceplate, reset a centesimal comparator “DG” on a calibrated block (whose known thickness is 42 mm). Preload the comparator by about 3 mm.

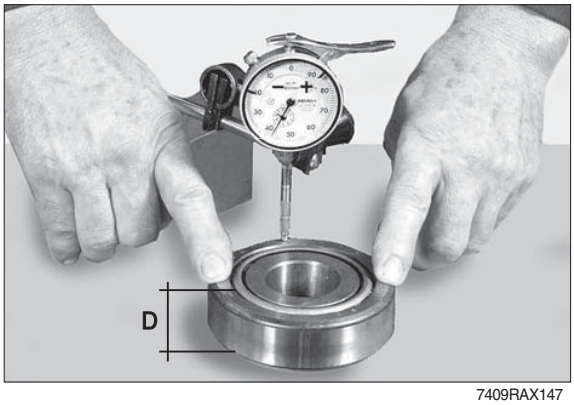


7409RAX146

(2) Bring inner bearing (6), complete with thrust block, under comparator "DG".

※ Press the thrust block centrally and carry out several measurements by rotating the thrust block.

Example : 42 + 0.5 = 42.5 = "D".

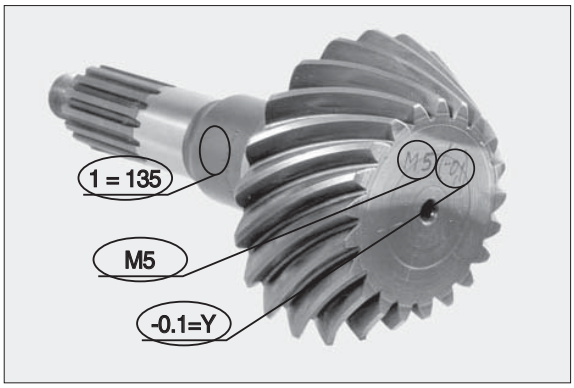


7409RAX147

(3) Check nominal dimension “I” as marked on the pinion. Add up to or subtract from “I” the variation indicated as “Y” to obtain the actual center distance “I”.

Example : I = 135 - 0.1 = 134.9

※ M5 = Match part number



7409RAX148

(4) Calculate shims “S” for insertion under the thrust block of the inner bearing using the following formula :

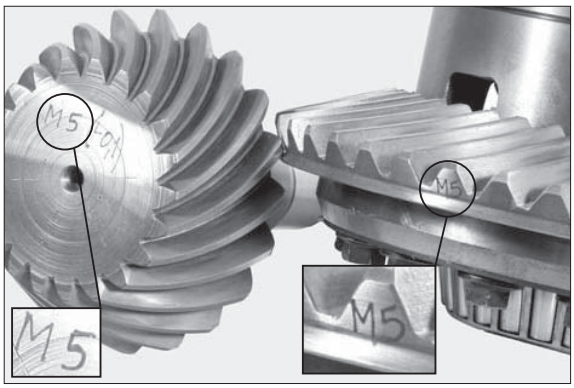
S = 178 - (I + D) where : 178 = fixed dimension

I = actual pinion center distance

D = total bearing thickness ;

Example :

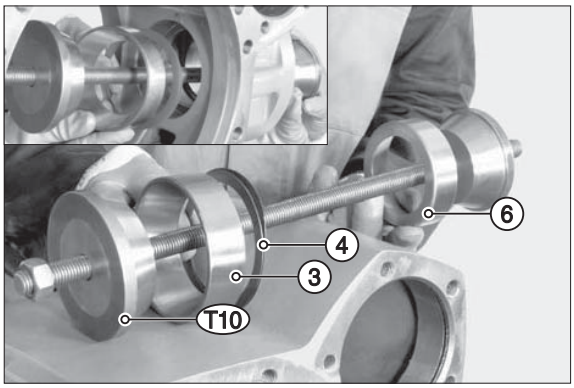
S = 178 - (134.9 + 42.5) = 0.6 ㎜.



7409RAX149

(5) Using special tool T10.

Partially insert the thrust block of the bearings (3) (6) and shims (4) .

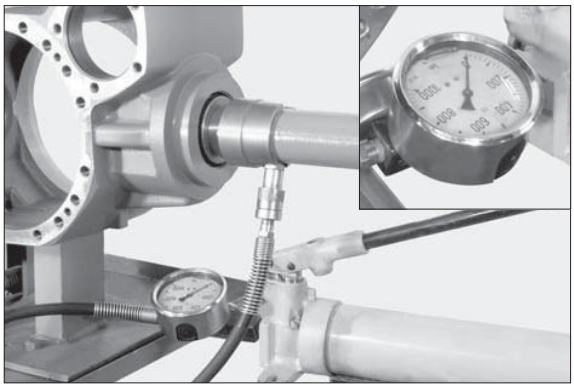


7409RAX150

(6) Connect the tension rod to the press and move the thrust block of bearings (3) (6) into the seats.

Disconnect the press and remove the tension rod.

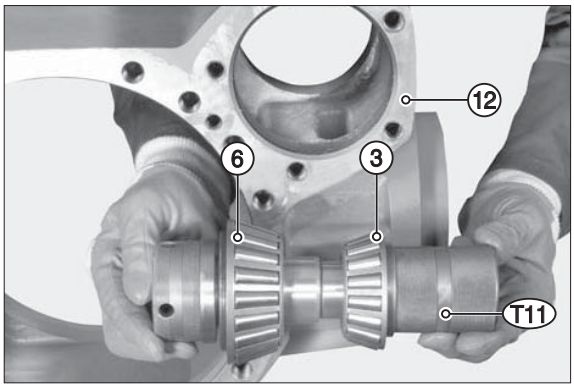
※ Before starting the next stage, make sure that the thrust block has been completely inserted into its seat.



7409RAX151

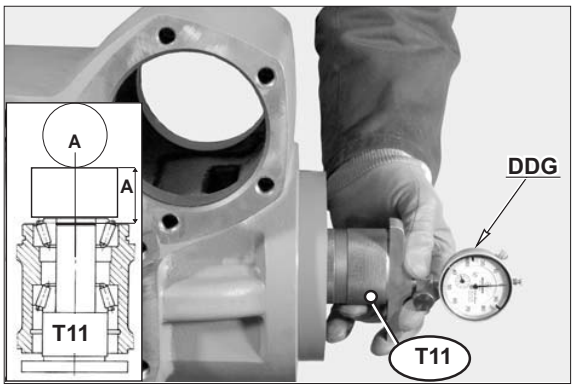
Calculating pinion bearings rolling torque

(7) Introduce tool T11 complete with bearings (3) and (6) into the main body (12); tighten by hand until a rolling torque is definitely obtained.



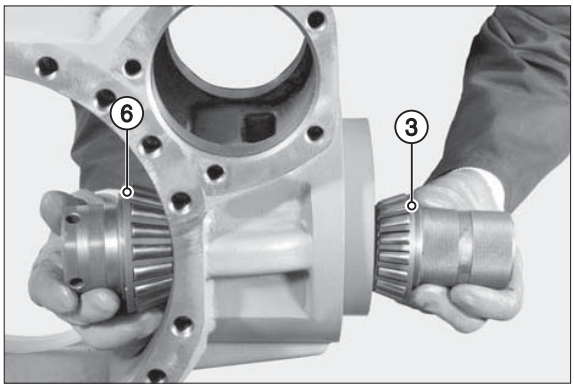
7409RAX152

(8) Introduce the tracer of a depth comparator "DDG" into either side hole of tool T11. Reset the comparator with a preload of about 3 mm.



7409RAX153

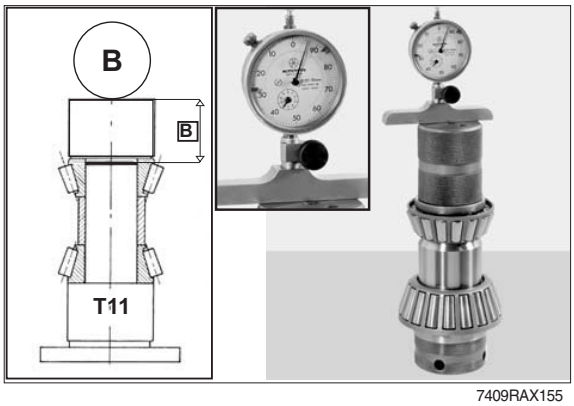
(9) Remove the comparator and take out tool and bearing kits from the main body. Reinstall every part, also introducing a distance piece between bearings (3) and (6). Tighten the entire pack by hand.



7409RAX154

(10) Introduce depth comparator "DDG" in tool T11 and measure deviation "H" from the previous reset.

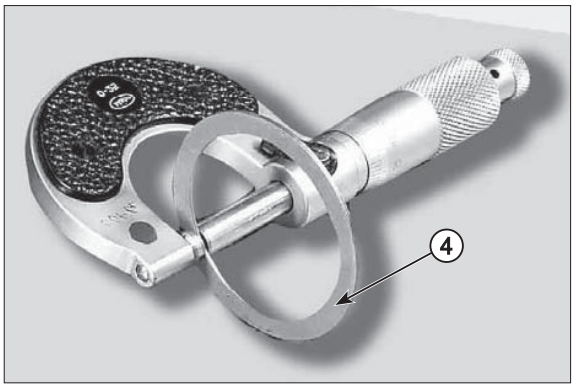
Example : H = A - B = 1.19 mm.



7409RAX155

(11) Deviation “H” must be added to a set value of 0.12~0.13 ㎜ (X) to make up the pack of shims “S1” (4) for insertion between inner bearing (6) and distance piece (8).
Dimension “S1” must be rounded off to the higher 5/100.

Example : S1=H+X=1.19+(0.12~0.13)
=1.33~1.35 ㎜.



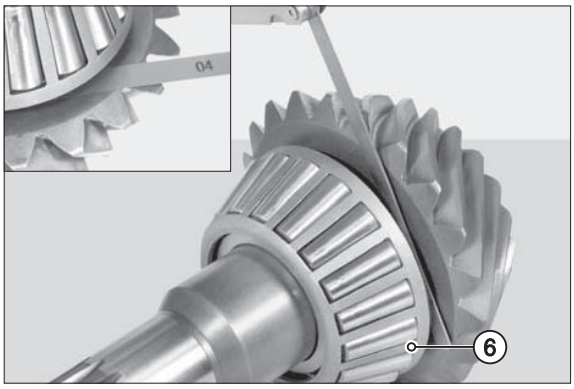
7409RAX156

(12) Heat the inner bearing (6) to about 100˚C and fit it to the pinion (5).

※ Once the bearing has cooled down, lightly lubricate bearing (6) with SAE 85W90 oil.

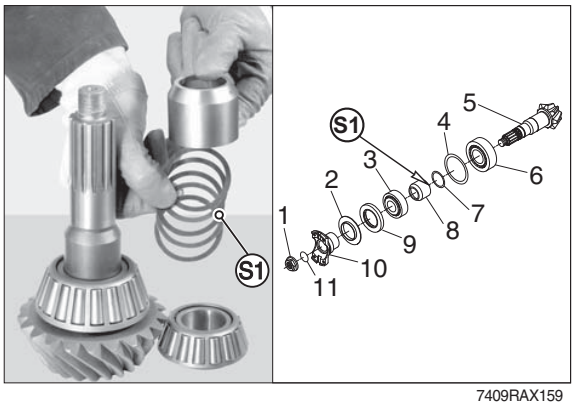
7409RAX157

(13) Make sure that the bearing (6) is well set.



7409RAX158

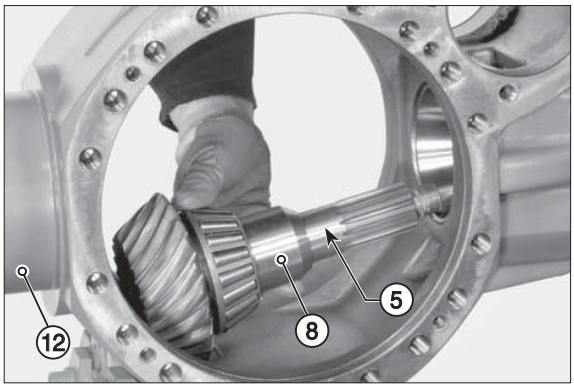
(14) Refer and keep to the positions marked during disassembly.



7409RAX159

(15) Fit the pinion (5), shim “S1” (7) and distance piece (8) in the main body (12).

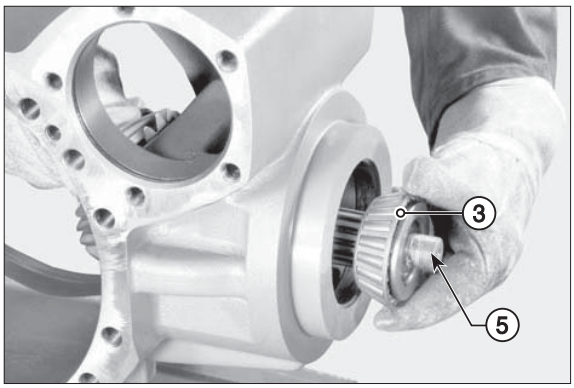
※ The finer shims must be placed in-between the thicker ones.



7409RAX160

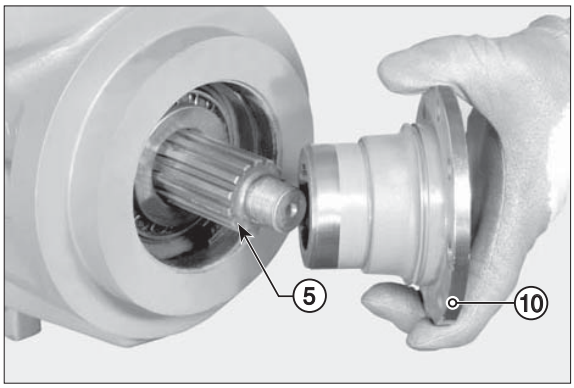
(16) Heat the external bearing (3) to a temperature of about 100˚C and fi t it on to the pinion (5) so as to complete the pack as shown in the figure.

※ Lightly lubricate bearing (3) with SAE 85W90 oil.



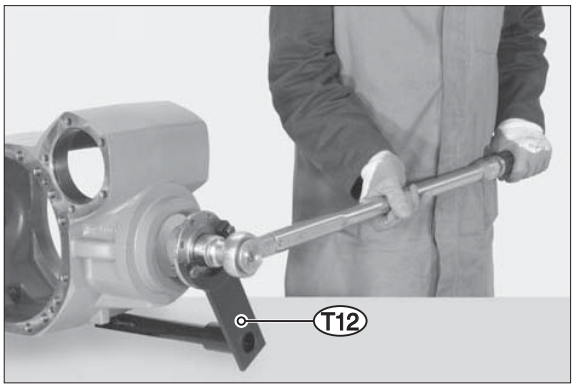
7409RAX161

(17) Install the flange (10) onto the pinion (5) without sealing ring.



7409RAX162

(18) Apply wrench to the ring nut (1) and bar-hold T12 to the pinion (5).
Lock the wrench T12 and rotate the pinion using a dynamometric wrench, up to a minimum required torque setting of 81.6~102 kgf · m (590~738 lbf · ft)



7409RAX163

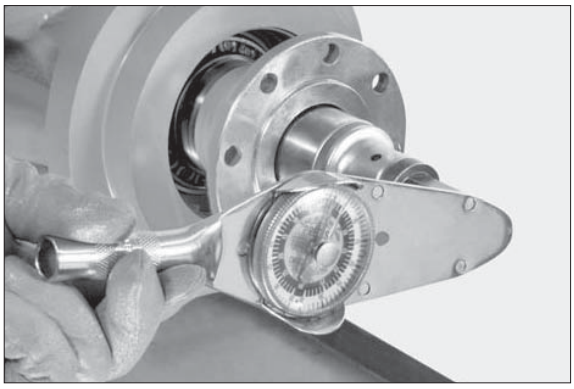
(19) Apply onto the pinion (5) the bar-hold and with the help of a torque meter, check the torque of the pinion (5).

· Torque : 12.2~18.4 kgf · cm

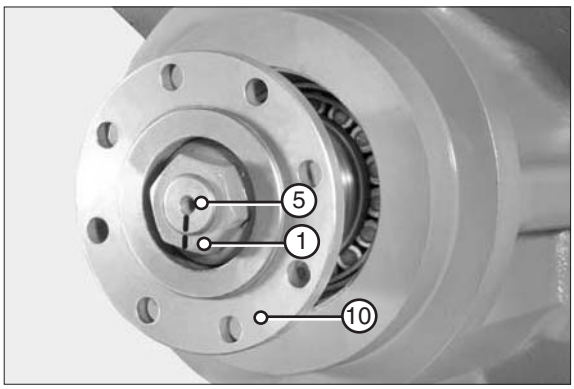
※ If torque exceeds the maximum value, then the size of shim "S1" (7) between the bearing (6) and the distance piece (8) needs to be increased.
If torque does not reach the set value, increase the torque setting of the ring nut (1) in different stages to obtain a maximum value of 81.6~102 kgf · m (590~738 lbf · ft).

※ If torque does not reach the minimum value, then the size of shim "S1" (7) needs to be reduced.

※ When calculating the increase or decrease in size of shim "S1", bear in mind that a variation of shim (4) of 0.01 mm corresponds to a variation of 6.12 kgf · cm in the torque of the pinion (5).

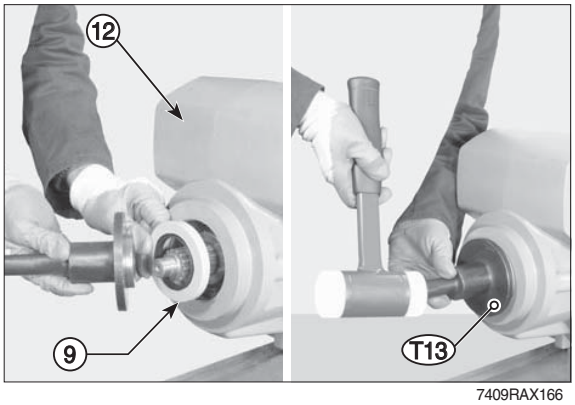

7409RAX164

(20) Make positional marks across nut (1) and pinion (5) tang ; then remove nut and flange (10)



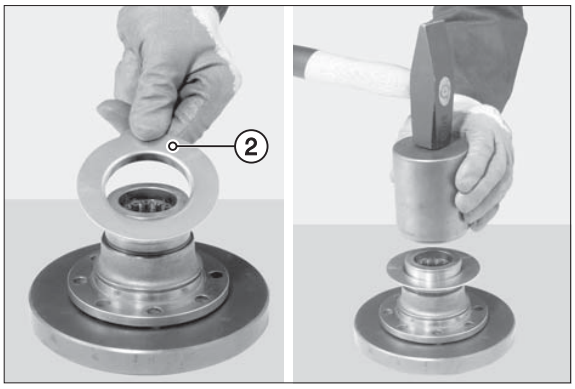
7409RAX165

(21) Apply Arexons rubber cement to the outer surface of the new seal ring (9) and fit ring in the main body (12) using driver T13.



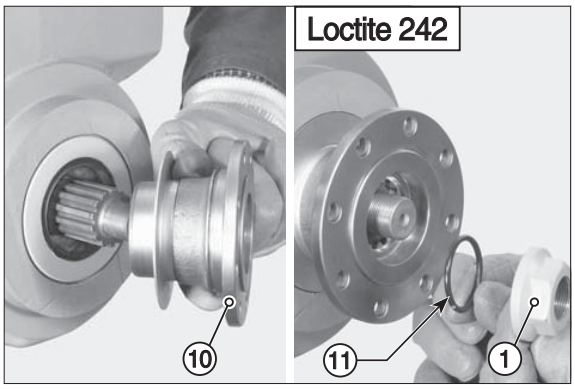
7409RAX166

(22) Fit the safety flange (2).



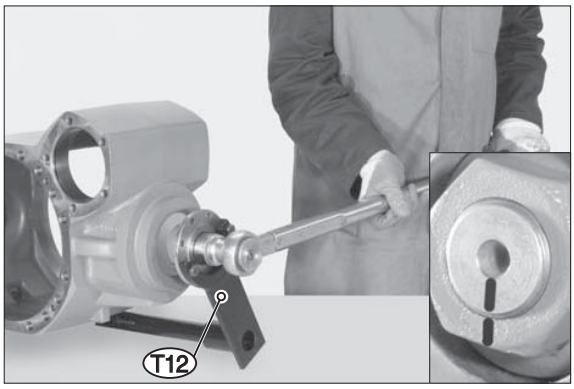
7409RAX167

(23) Oil seal ring lips and install flange (10). Mount O-ring (11) and apply loctite 242 to pinion tang; tighten nut (1).



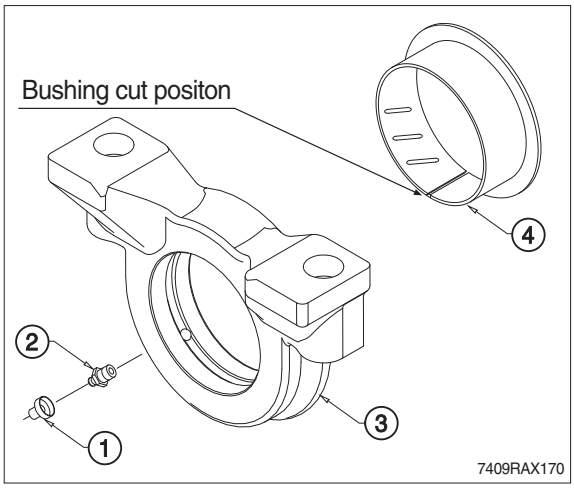
7409RAX168

(24) Tighten the nut until the match marks made at stage “a” line up.

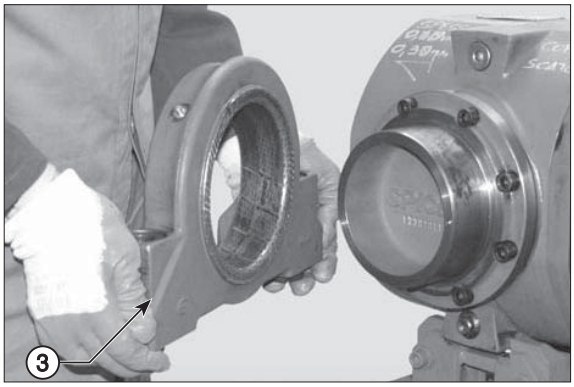


7409RAX169

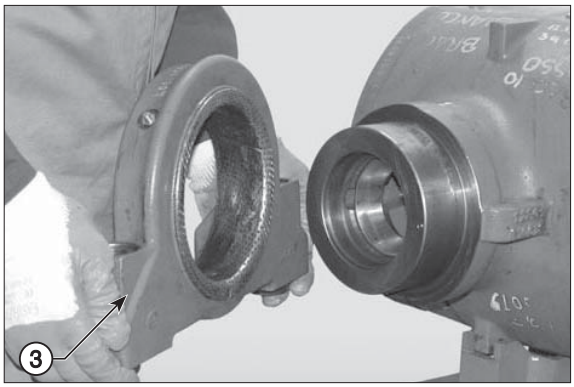
9) DISASSEMBLE THE SWINGING SUPPORT



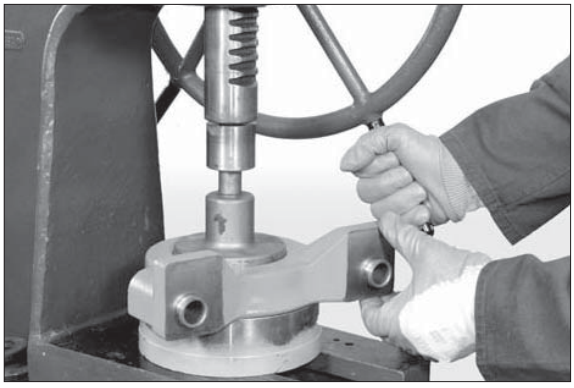
(1) Remove the swinging support (3).

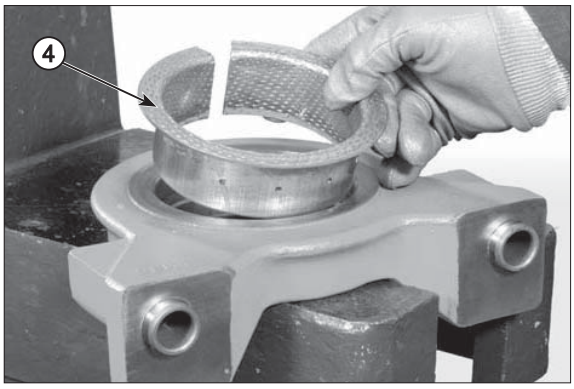


(2) Remove the swinging support (3) on the side opposite the drive.



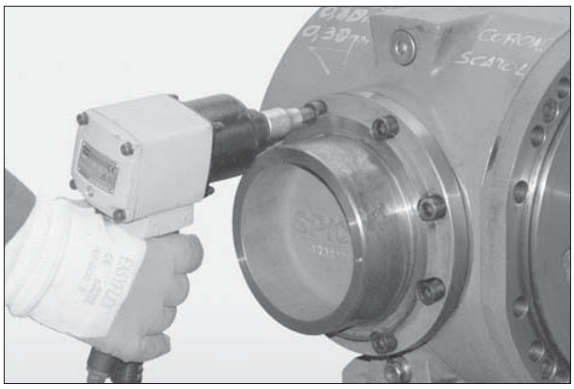
(3) Position the swinging support (3) under a press and remove the complete bushing (4).



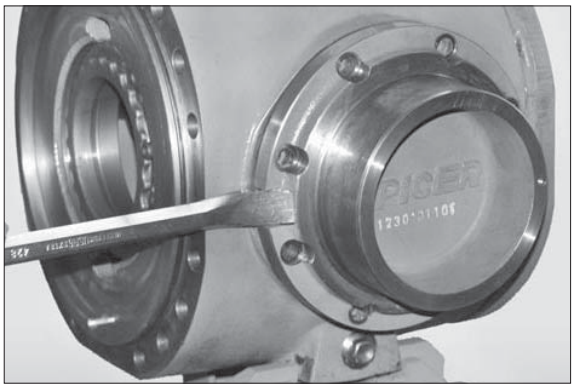


7409RAX174

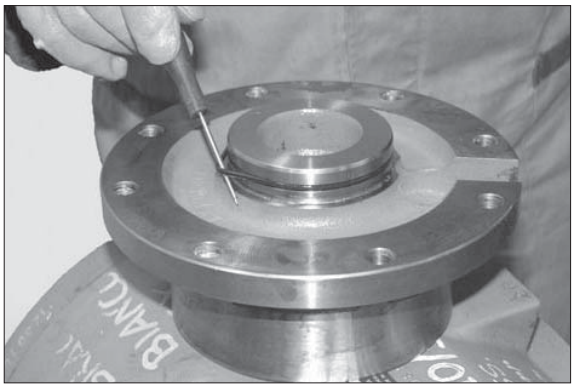
(4) Remove the screws.


7409RAX175

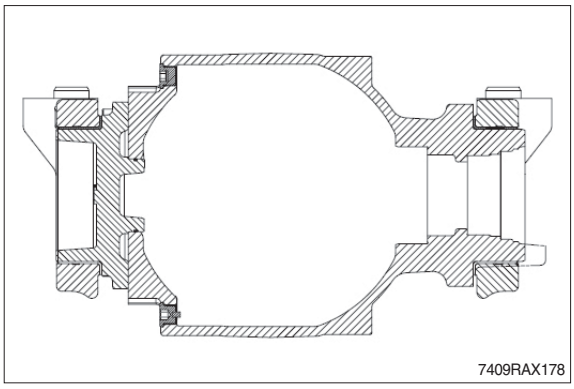
(5) Disjoin the cover from the differential box by alternatively forcing a screwdriver into the appropriate slots.


7409RAX176

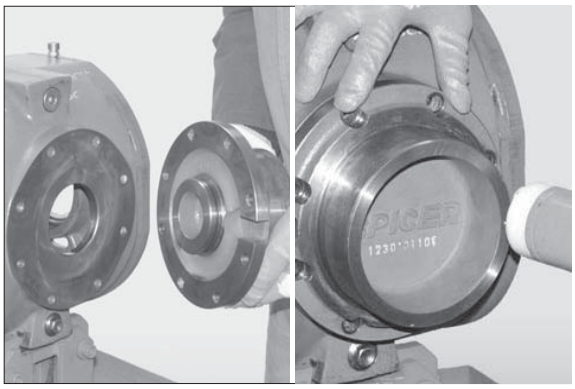
(6) Check integrity and position of the cylinder's O-ring.


7409RAX177

10) ASSEMBLY THE SWINGING SUPPORT

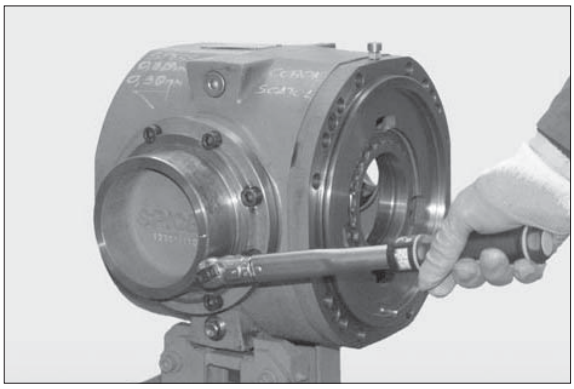

7409RAX178

(1) Install the cover.

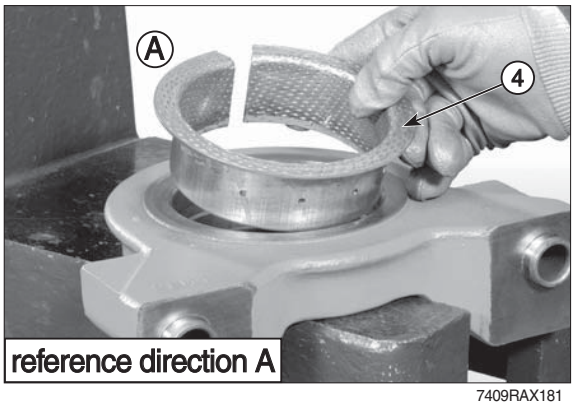

7409RAX179

(2) Lock the cover by tightening the screws.

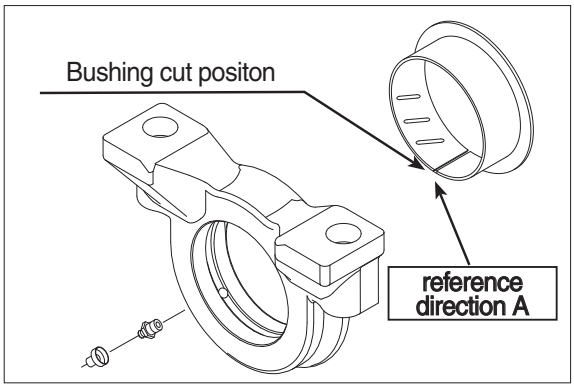
Torque wrench setting for screws :
4.08~5.1 kgf · m (29.5~36.9 lbf · ft)


7409RAX180

※ If the bushing (4) is worn and needs replacing, note down the assembly side of the connection notch "A".

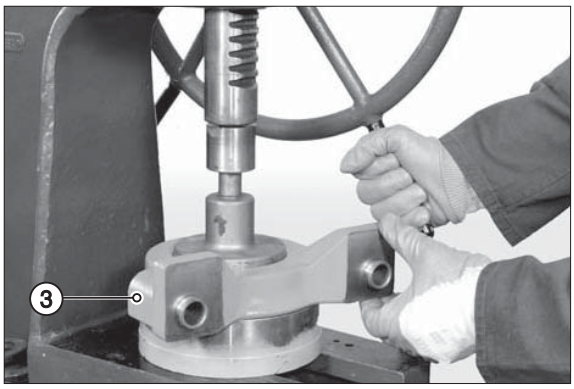


7409RAX181



7409RAX182

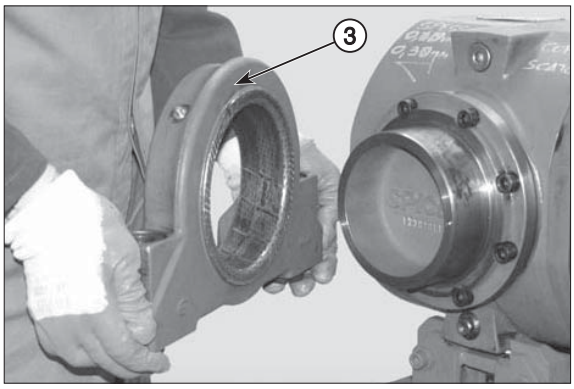
(3) Position the swinging support (3) under a press and insert the complete bushing (4).



7409RAX183

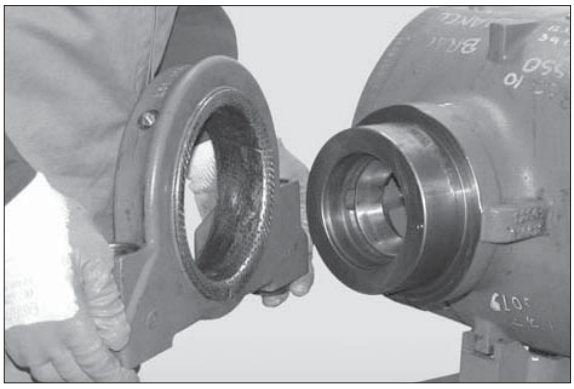
(4) Install the swinging support (3).

※ Check that it is properly oriented.



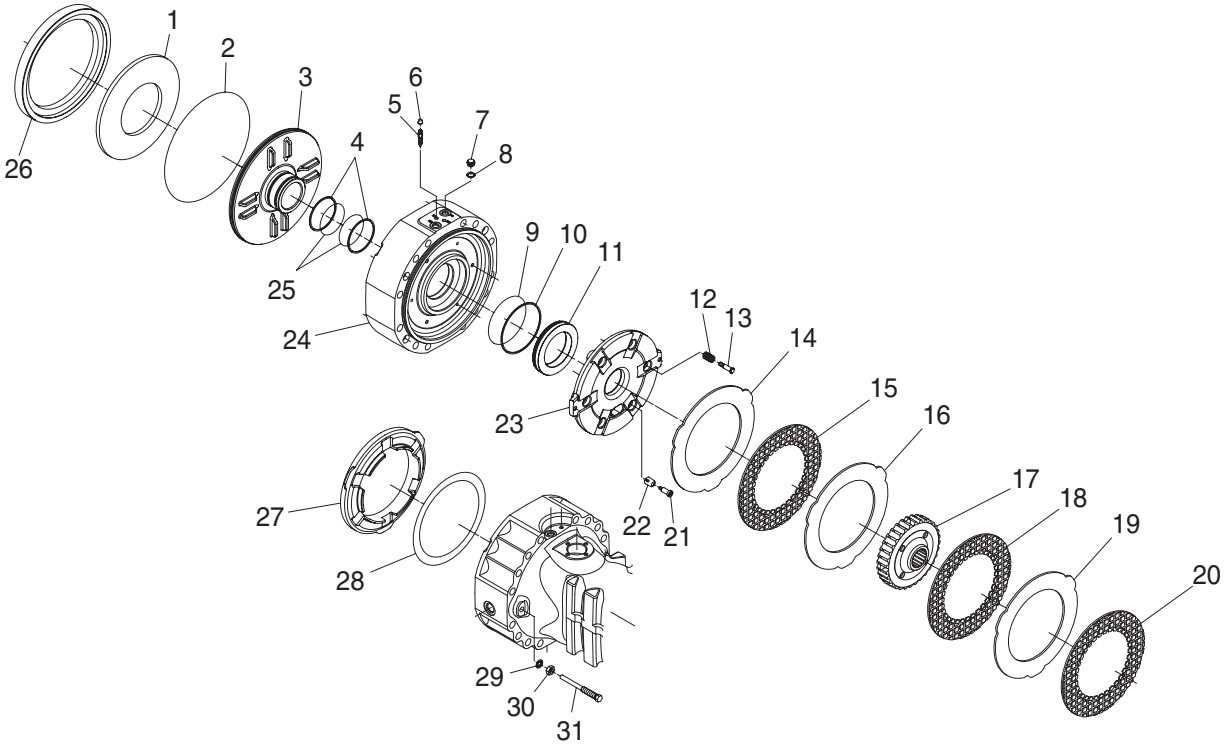
7409RAX184

(5) Install the swinging support (4) on the side opposite the drive.



7409RAX185

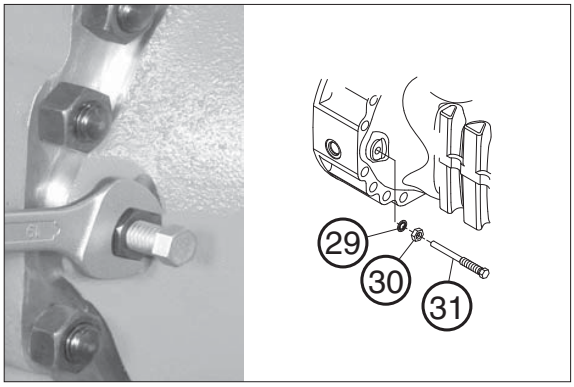
11) NEGATIVE BRAKE : ASSEMBLING NEGATIVE BRAKE DISKS



7409RAX186

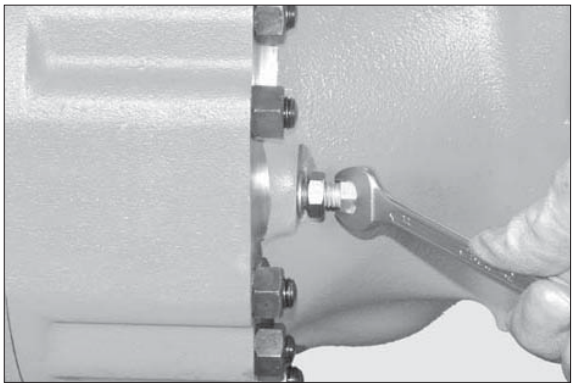
Manual emergency release

(1) Loosen nuts (30) of screws (31) provided for the mechanical and manual release of the braking units, then move the nuts backwards by approx. 8 mm.



7409RAX187

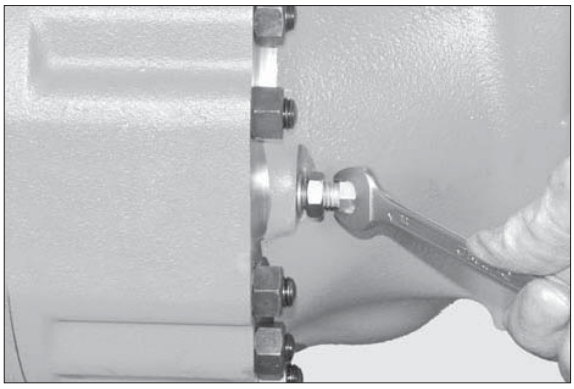
(2) Tighten screws (31) so as to fasten them onto the pressure plate (23).



7409RAX188

(3) Using a wrench, tighten the screws (31) in an alternate sequence by 1/4 turn at a time so as to compress the belleville washers (1) and disengage the braking disks.

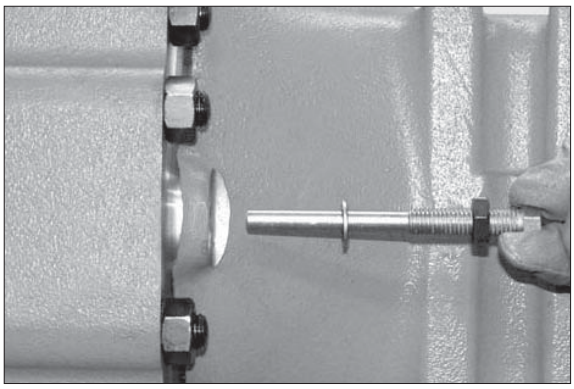
※ Tighten max. by one turn.



7409RAX189

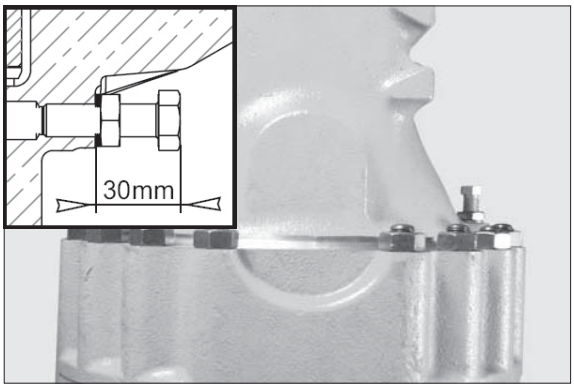
Adjustment after manual release

(4) Remove screws complete with nuts and seals.
Replace seals, apply grease to the screws and install all parts into the arm.



7409RAX190

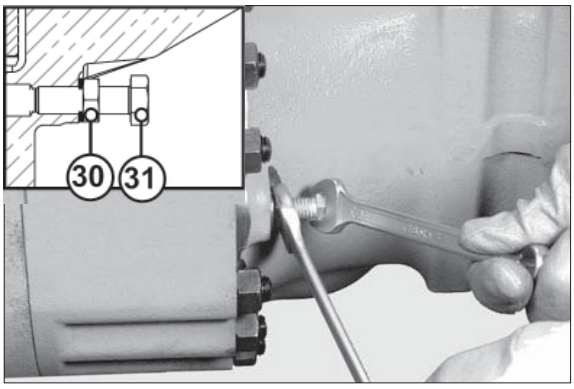
(5) Adjust screws (31) to obtain a jut of 30 ± 0.5 mm in relation to the arm.



7409RAX191

(6) Lock into position with nuts (30).

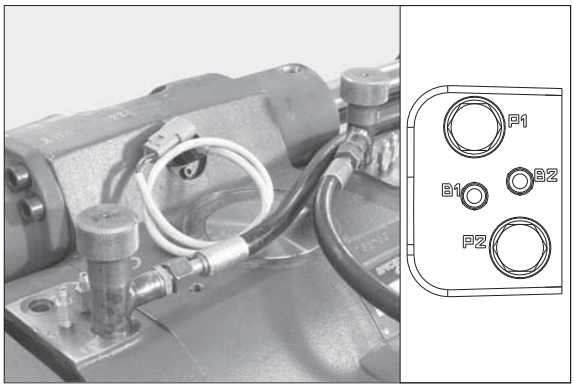
※ Hold screws (31) into position while locking the nuts (30); after locking, check the jut of screws (31) once more.



7409RAX192

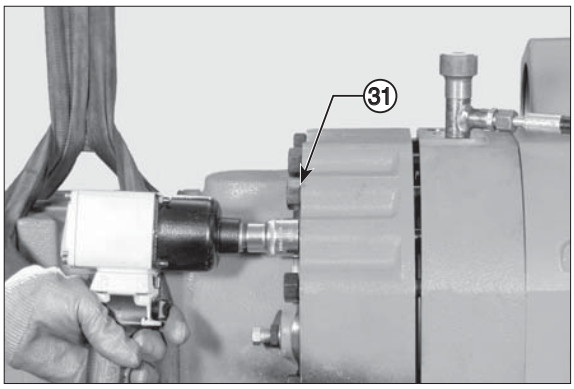
11) NEGATIVE BRAKE : DISASSEMBLING

(1) Connect an external pump to the union piece “P1” of the negative brake and introduce a pressure of 21.4~35.7 kgf/cm^2 (304~508 psi) to eliminate the pressure of the belleville washers (1).



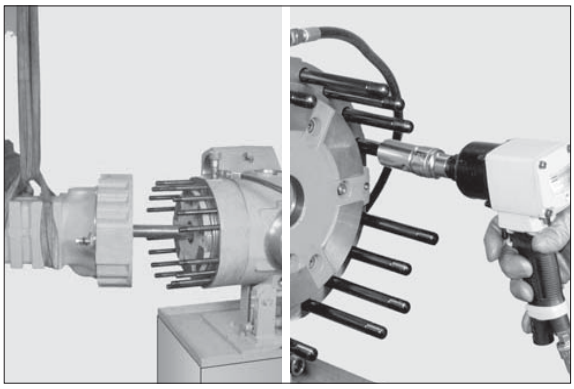
7409RAX193

(2) Sling the arm to be removed and connect it to a hoist.
Loosen and remove screws (31).

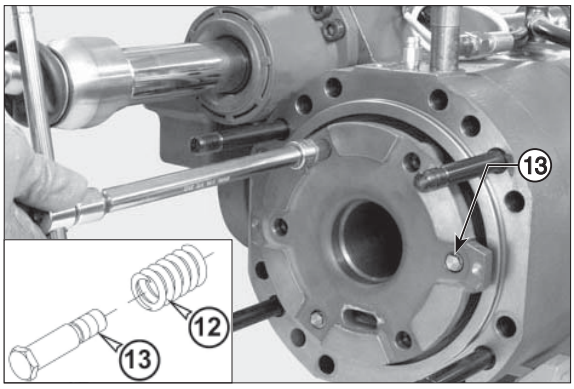


7409RAX194

(3) Remove arm together with brakes and axle shafts; lay down the arm vertically.
Release pressure.

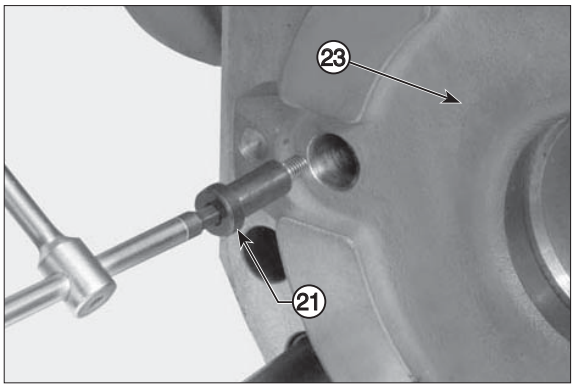

7409RAX195

(4) Remove the reversal springs (13)



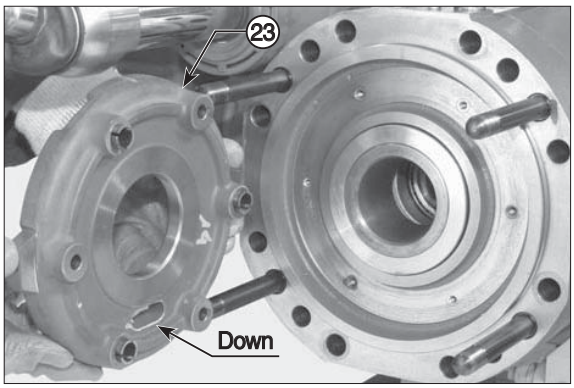
7409RAX196

(5) Remove the adjusting screws (21) from the counterwasher (23).



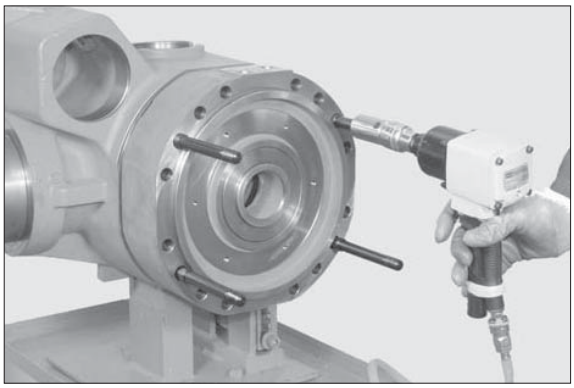
7409RAX197

(6) Note down their order of assembly and remove the counterwasher (23).

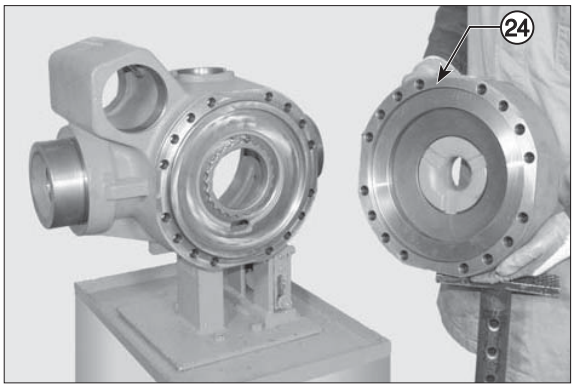


7409RAX198

(7) Loosen the studs in an alternate manner and remove them.

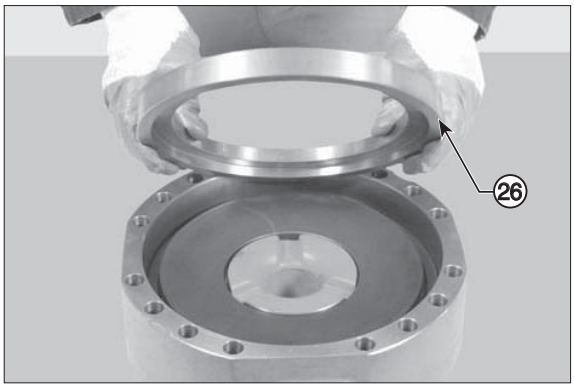

7409RAX199

(8) Remove the cylinder (24).



7409RAX200

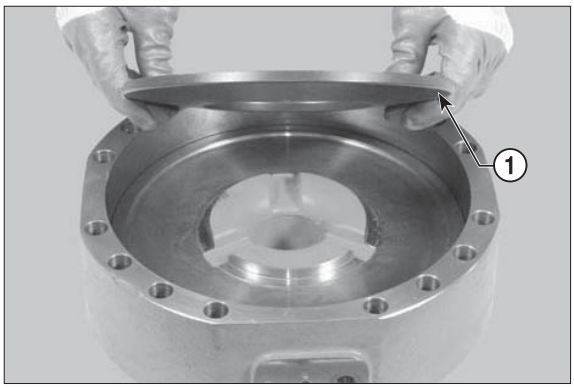
(9) Remove the centering device (26) in the cylinder.



7409RAX201

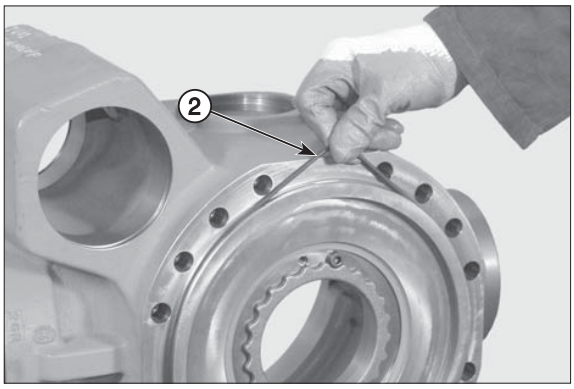
(10) Remove the belleville washers (1).

※ Check the sense of direction of washers (1).



7409RAX202

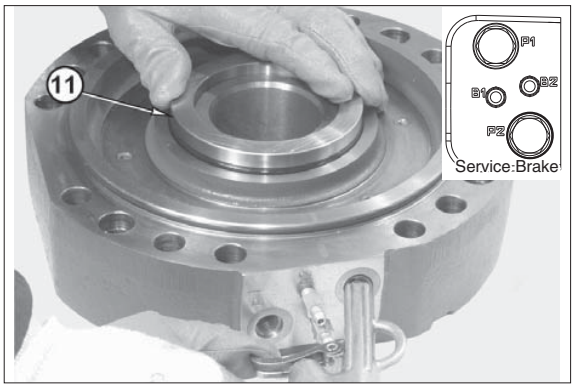
※ The O-rings (2) must be replaced each time the unit is disassembled.



7409RAX203

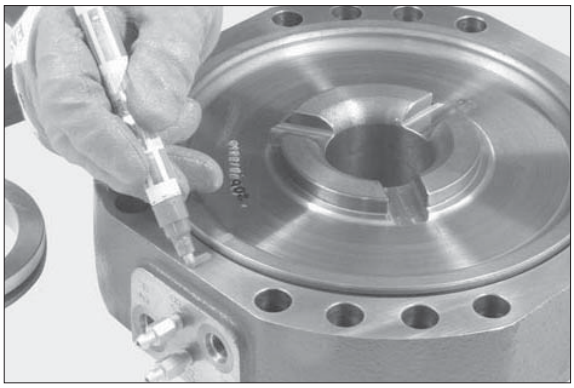
(11) Slowly introduce low-pressure compressed air through the connection member for the service brake (P2), in order to extract the piston (11).

※ Hold the piston (11) back, as it may be suddenly ejected and damaged.



7409RAX204

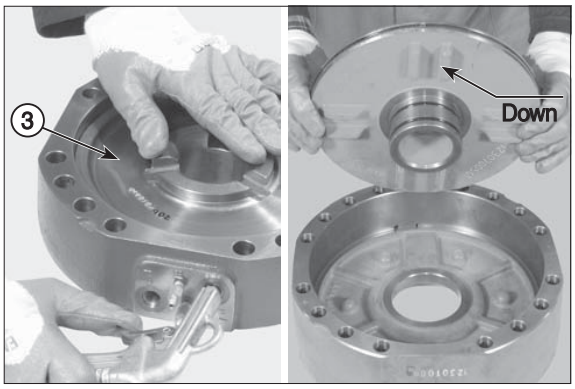
(12) Note down their order of assembly.



7409RAX205

(13) Slowly introduce low-pressure compressed air through the connection member for the service brake (P1), in order to extract the piston (3).

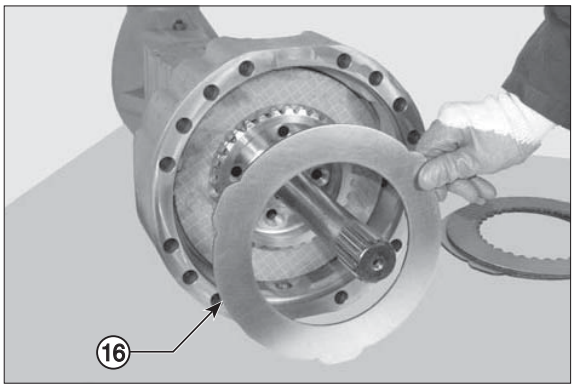
※ Hold the piston (3) back, as it may be suddenly ejected and damaged.



7409RAX206

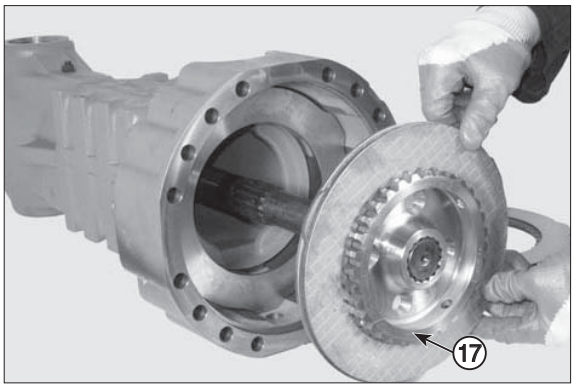
(14) Remove braking discs (14)(15)(16), noting down direction of assembly.

※ If disks are not to be replaced, avoid changing their position.

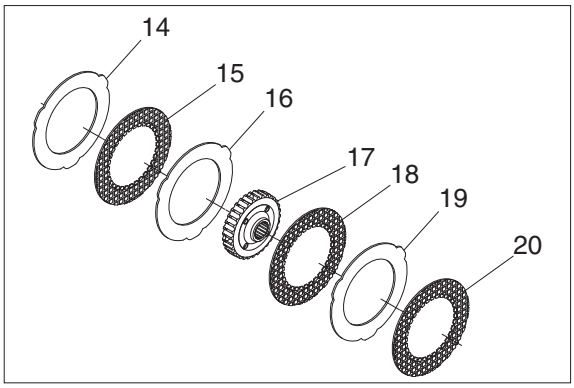


7409RAX207

(15) Remove the flange (17) complete with the discs (20)(19)(18).



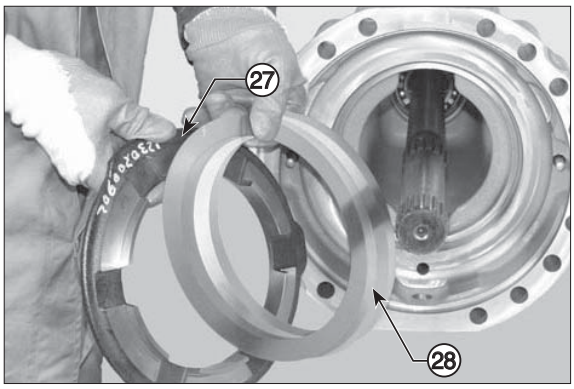
7409RAX208



7409RAX209

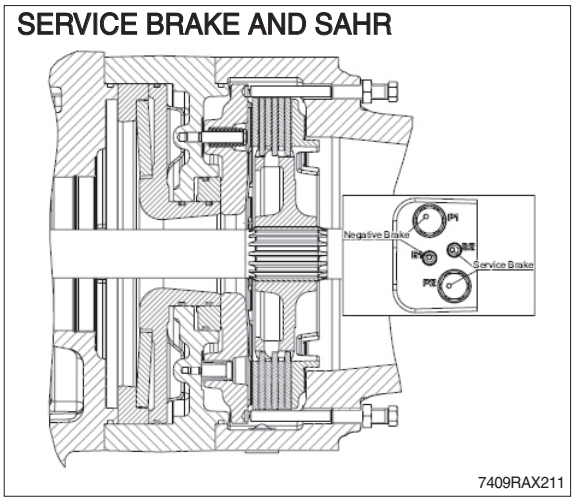
(16) Remove distance piece-braking discs (27) and shims (28), noting down direction of assembly.

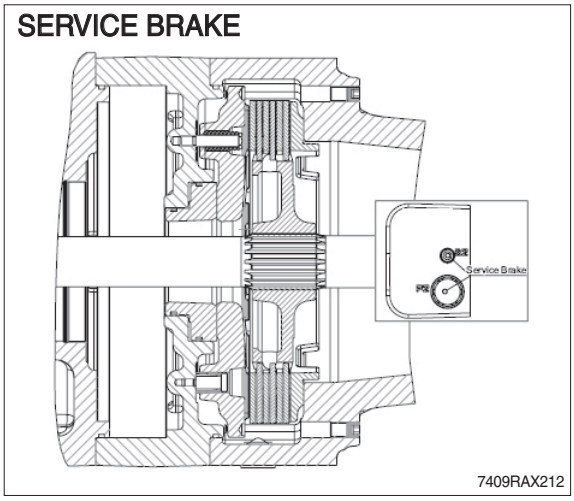
※ Build a stack of washers and check the measure.



7409RAX210

13) NEGATIVE BRAKE : ASSEMBLING

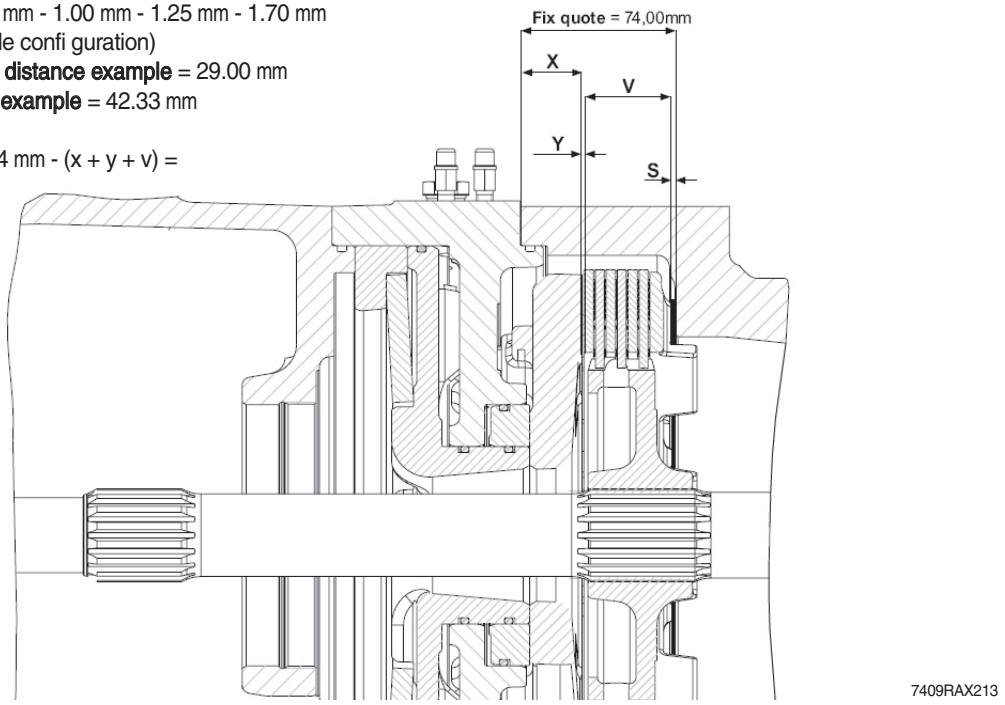




Fix quote = 74.00 mm
Y = brake gap = 0.75 mm - 1.00 mm - 1.25 mm - 1.70 mm
(depending on axle confi guration)
X = intermediate disc distance example = 29.00 mm
V = brake discs pack example = 42.33 mm

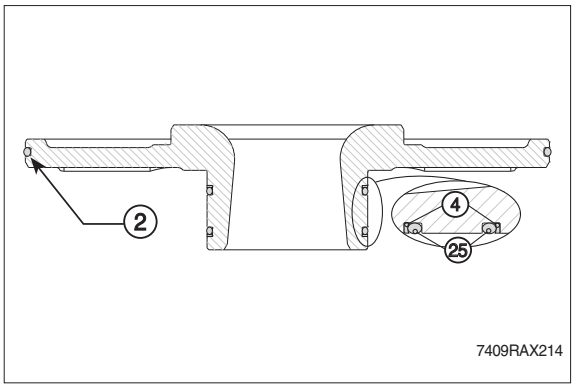
S = adjust. shims = 74 mm - (x + y + v) =

example =
74-(29+1.25+42.33)
= 74-72.58
= 1.42 mm = **S**



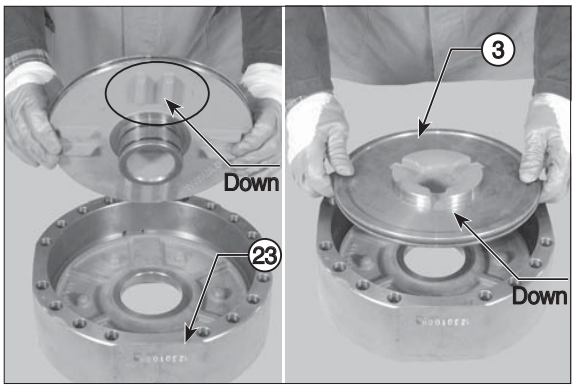
(1) Complete the O-rings and anti-extrusion rings on all pistons.

※ The O-rings always have to be assembled from the pressure facing side.



7409RAX214

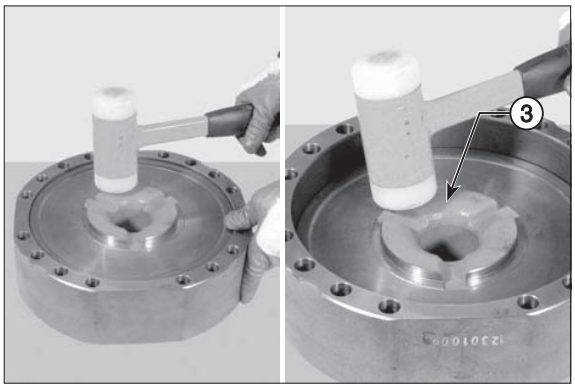
(2) Check the position of the anti-extrusion (4) and O-rings (2) (25).
Lubricate the piston and the O-rings and install the unit (3) into the cylinder (24) .



7409RAX215

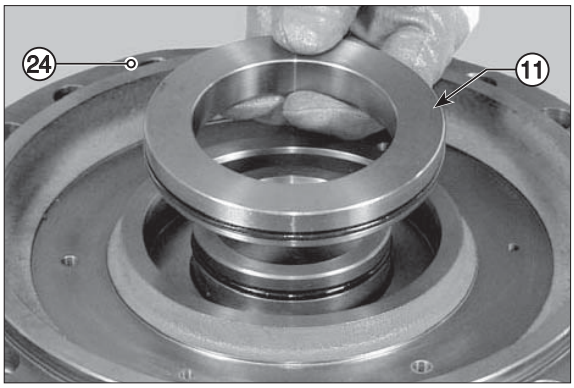
(3) Using a plastic hammer, ram the piston (3) into the cylinder (24).

※ Lightly hammer all around the edge in an alternate sequence.



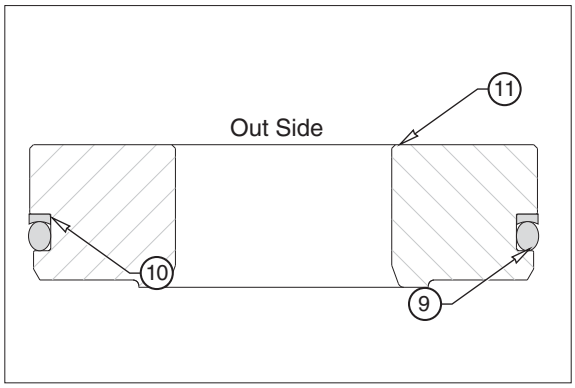
7409RAX216

(4) Fit O-ring (9) and anti-extrusion ring (10) onto the piston (11).
Lubricate the piston and the O-rings and install the unit into the cylinder (24).



7409RAX217

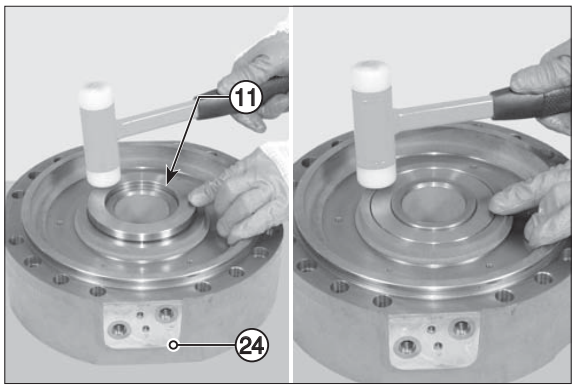
※ The O-rings always have to be assembled from the pressure facing side.



7409RAX218

(6) Using a plastic hammer, ram the piston (11) into the cylinder (24).

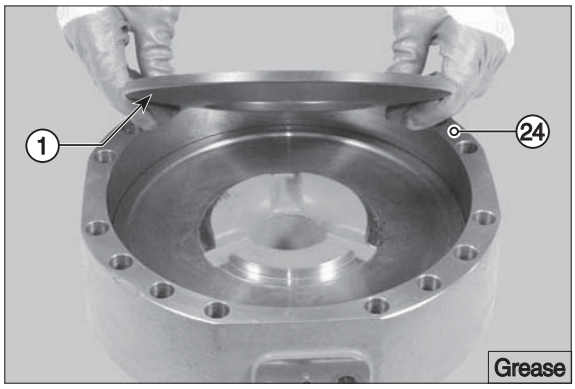
※ Lightly hammer all around the edge in an alternate sequence.



7409RAX219

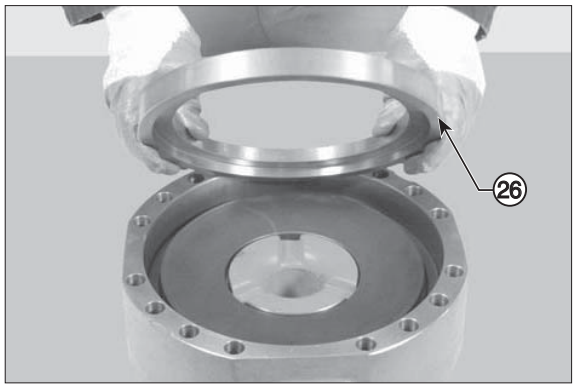
(7) Position the belleville washers (1) and engage the cylinder (24).

※ Check the sense of direction of belleville washers (1) and relative centering.

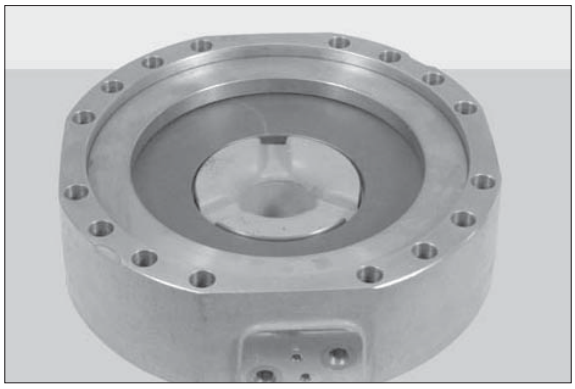


7409RAX220

(8) Install the centering device (26) in the cylinder.

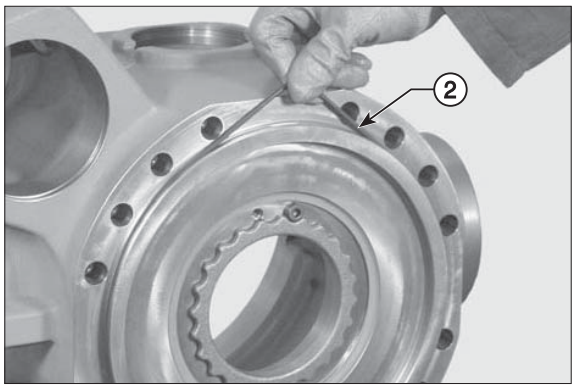


7409RAX221



7409RAX222

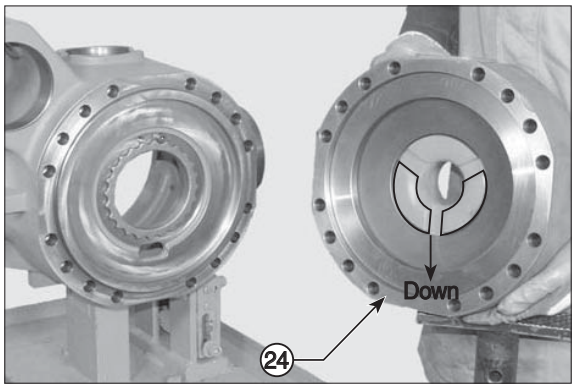
(9) Check integrity and position of the cylinder's O-ring (2).



7409RAX223

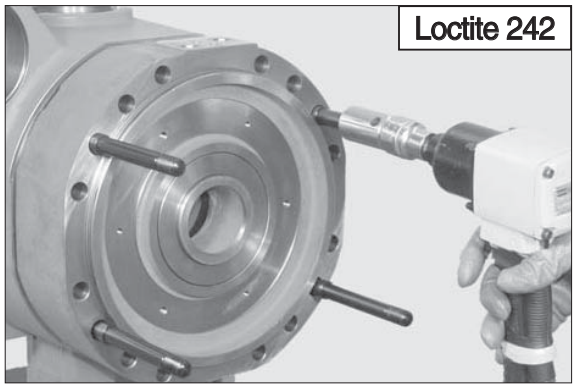
(10) Engage the cylinder (24).

※ Check the sense of direction of washers (1) and relative centering.



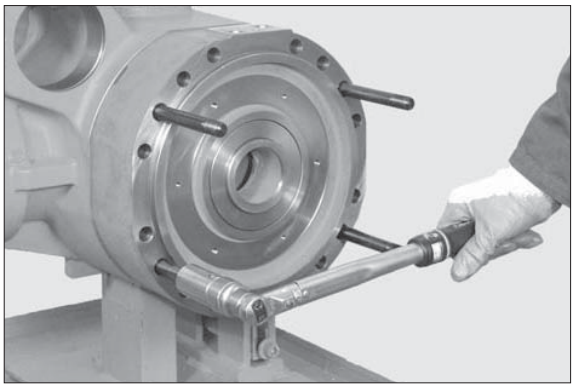
7409RAX224

(11) Insert the screws and tighten them alternately.
Lock the cylinder.

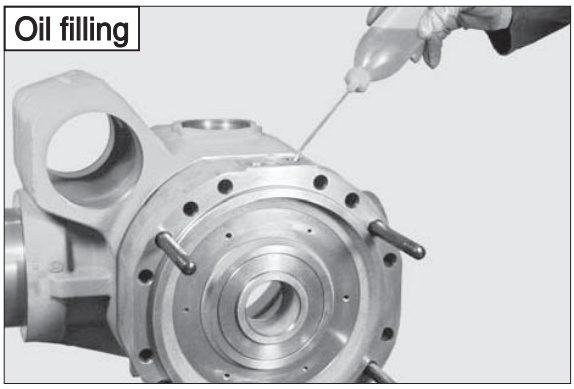


7409RAX225

(12) Tightening the studs with a dynamometric wrench set to a torque of 3.06~3.57 kgf · m (22.1~25.8 lbf · ft).

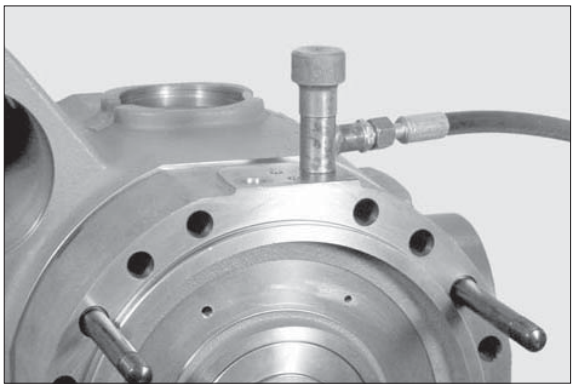


7409RAX226

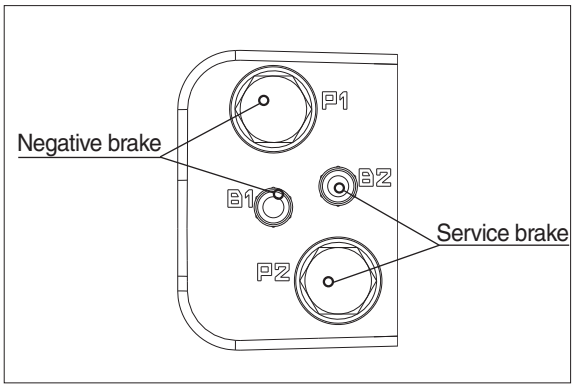


7409RAX227

(13) Connect an external pump to the negative brake and introduce pressure to 21.4~35.7 kgf/cm^2 (304~508 psi).

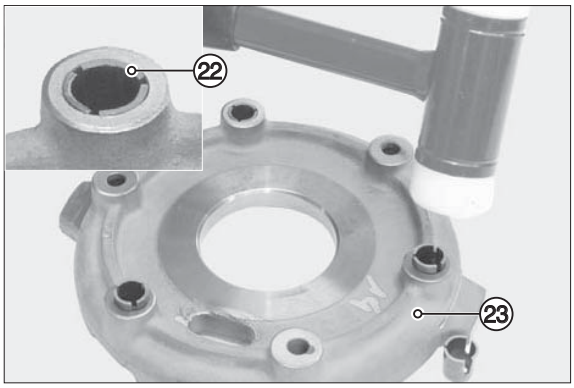


7409RAX228



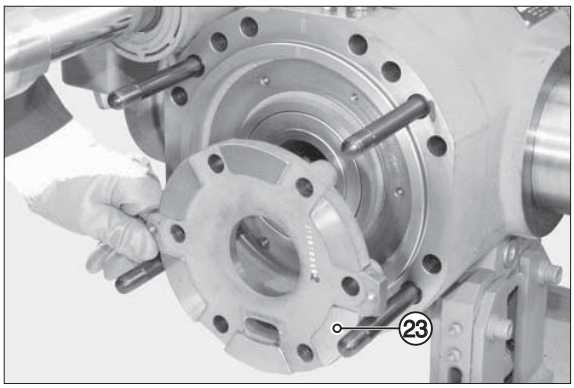
7409RAX229

(14) Insert the stroke automatic regulation springs (22); place them in line with the piston (23).



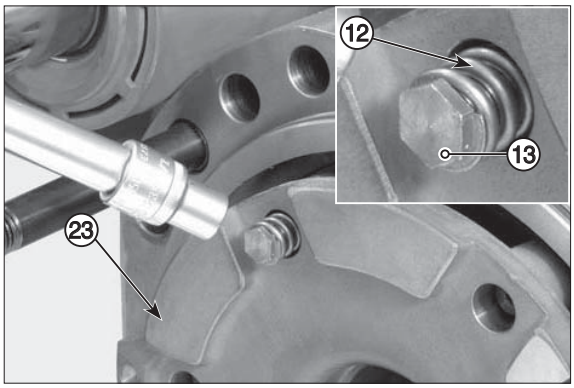
7409RAX230

(15) Insert the intermediate disk (23).



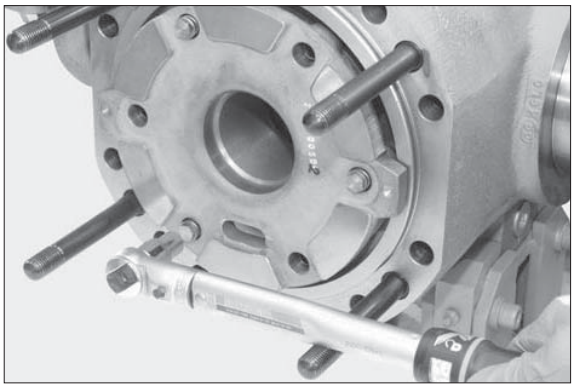
7409RAX231

(16) Fit the reversal springs (12)(13) on the intermediate disk (23).

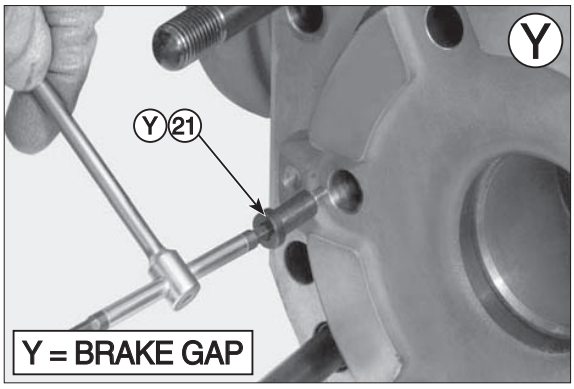


7409RAX232

(17) Apply loctite 242 to the thread of the adjustment screw.
Tighten with torque wrench setting of 1.02~1.53 kgf · m (7.38~11.1 lbf · ft).


7409RAX233

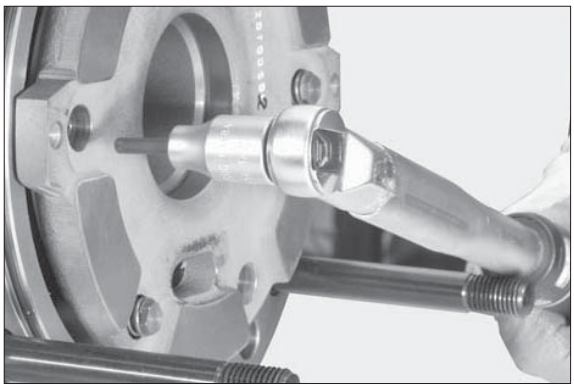
(18) Y=brake gap
(0.75 mm 1.00 mm 1.25 mm 1.50 mm)
depending on axle configuration.



7409RAX234

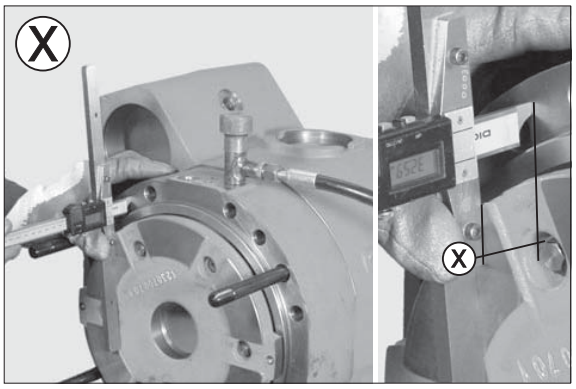
(19) Fit the pin screws.
Apply loctite 270 to the thread.

· Torque wrench setting :
0.51~0.71 kgf · m (3.69~5.16 lbf · ft)


7409RAX235

(20) Take the measure from the surface of the intermediate disk to the cover sealing surface with 30.6 kgf/cm^2 (435 psi) of pressure introduced.

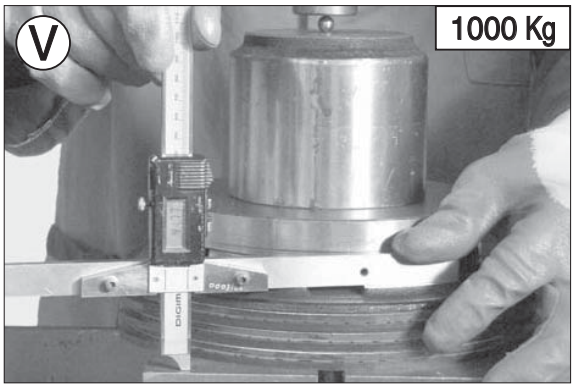
Example : 29 mm



7409RAX236

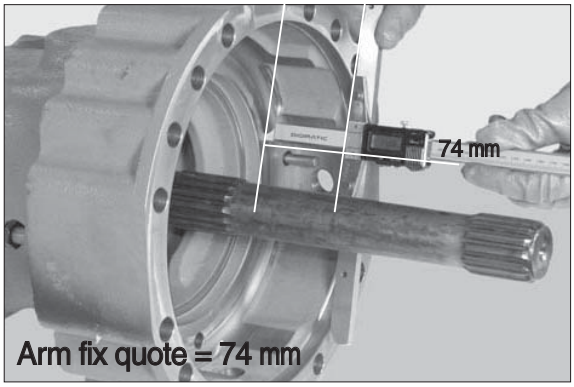
(21) Put the brake disc pack including the shim under a press, load with 1000 kg and take the measure "V".

Example : V = 42.33 mm



7409RAX237

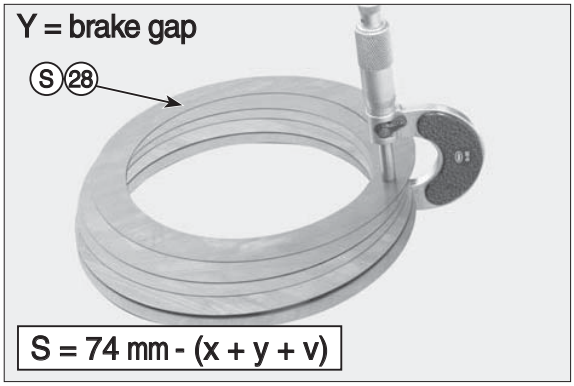
(22) Arm fix quote = 74 mm



7409RAX238

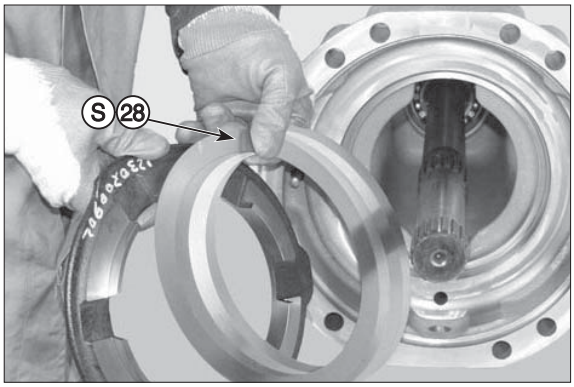
(23) **S = 74 mm - (x + y + v)** = Thickness of shims to insert under the shim washer.

Example :
74 mm - (29 + 42.33 + 1.25) = S = 1.42 mm

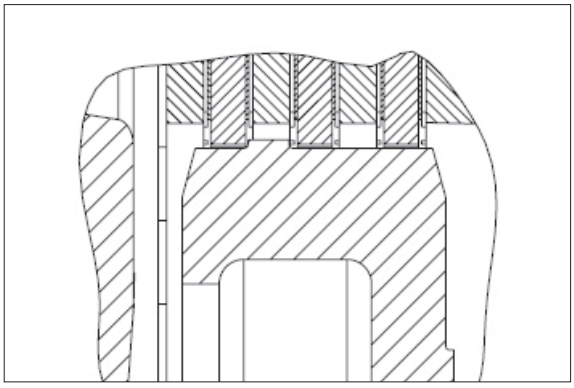


7409RAX239

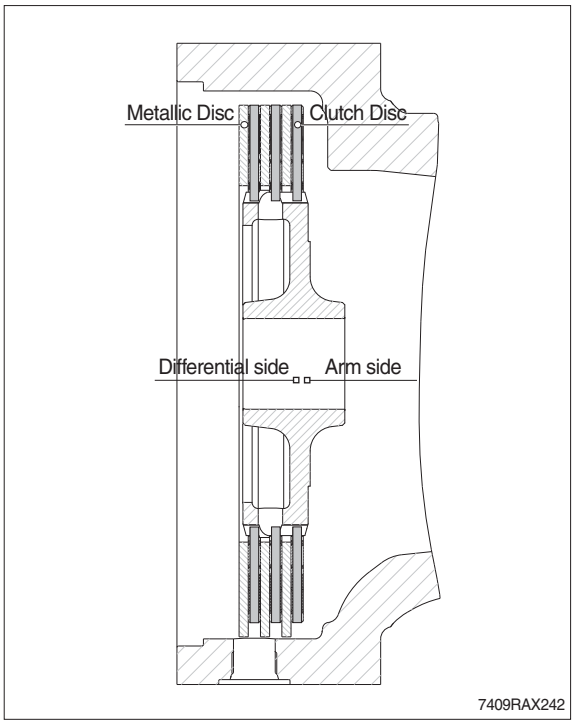
(24) Insert under the shim washer a thickness of shims (28).



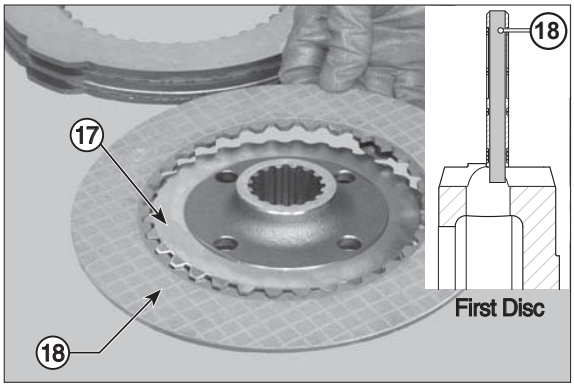
7409RAX240

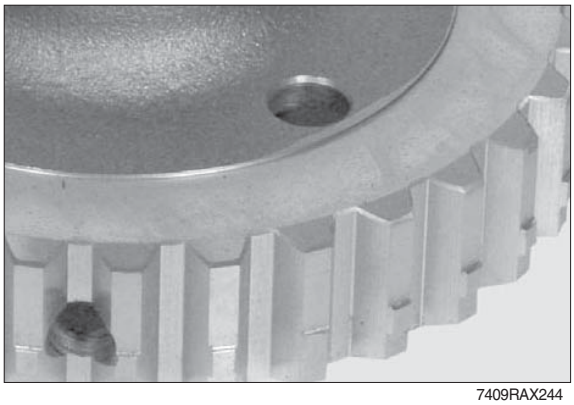


7409RAX241

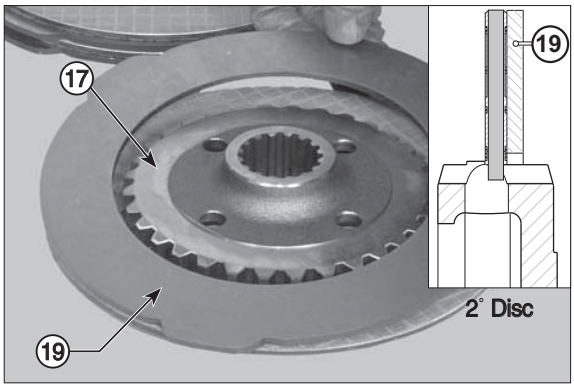


(25) Install the friction disc (18) on the flange (17) from arm side.



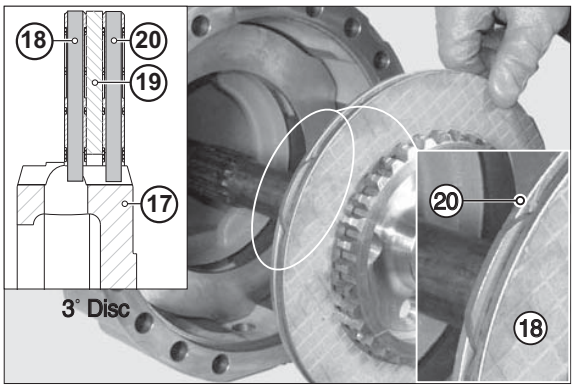


(26) Install the metal disc (19) on the flange (17) from arm side.



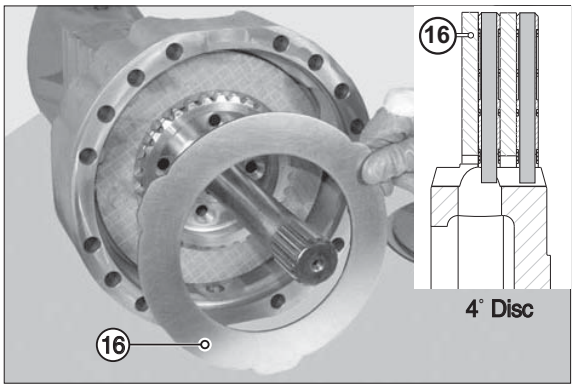
7409RAX243

(27) Install the friction disc (18) on the flange from arm side and insert the group on the u-joint.

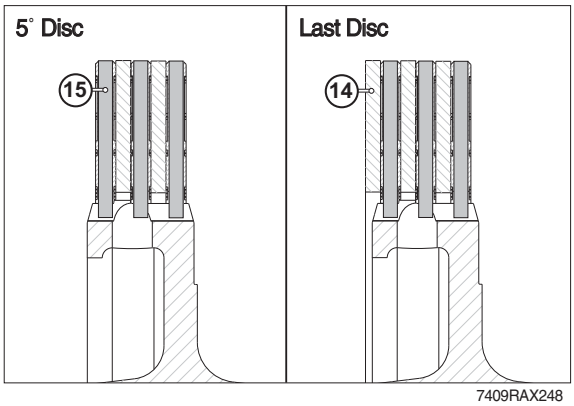


7409RAX246

(28) Insert on the fl ange the discs (16)(15) (14).

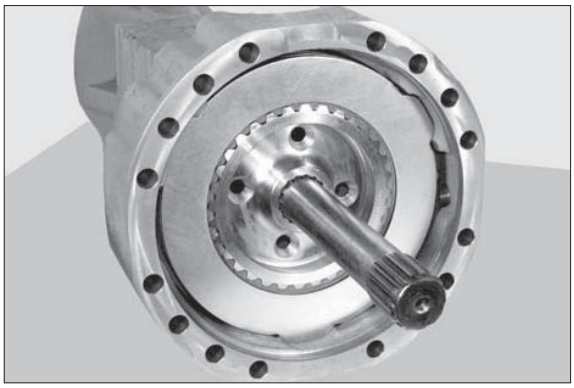


7409RAX247

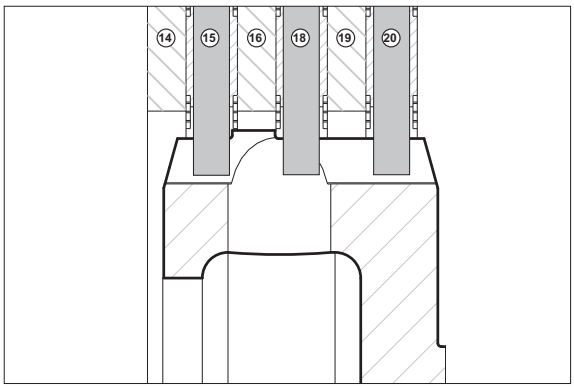


7409RAX248

(29) Check the alignment of last disc (14) and flange.



7409RAX249

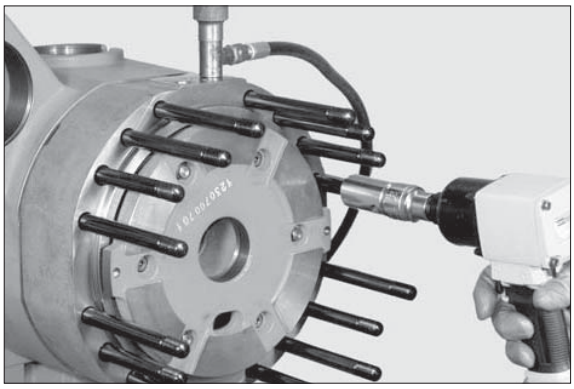


7409RAX250

(30) **Apply loctite 242 to the studs and tighten it using a dynamometric wrench.**

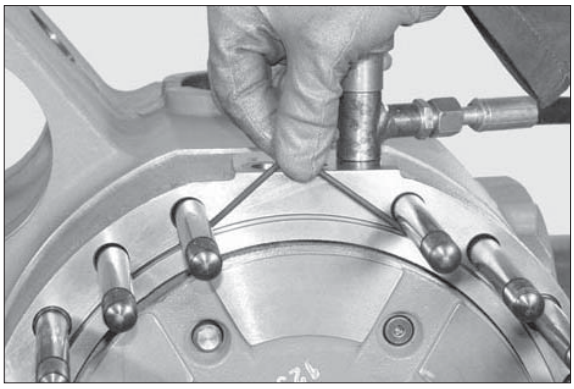
· Torque wrench setting :

3.06~3.57 kgf · m (22.1~25.8 lbf · ft)



7409RAX251

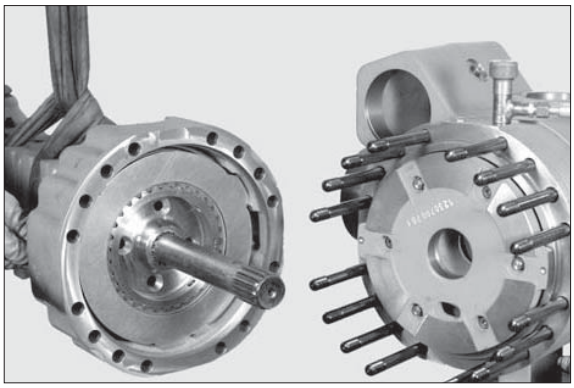
(31) Check integrity and position of the cylinder's O-ring.



7409RAX252

(32) Check integrity and position of the arm's O-ring; install the complete arm.

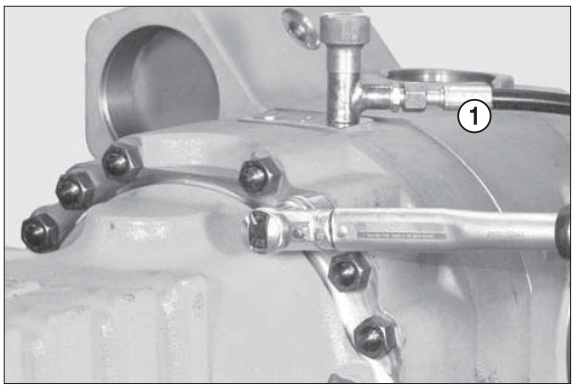
※ To assist axle shaft centering, slightly move the wheel hub.



7409RAX253

(33) Apply loctite 242 to the nuts and cross tighten it in two stages.

· Torque wrench setting :
20.4~22.5 kgf · m (148~163 lbf · ft)



7409RAX254