SECTION 3 POWER TRAIN SYSTEM

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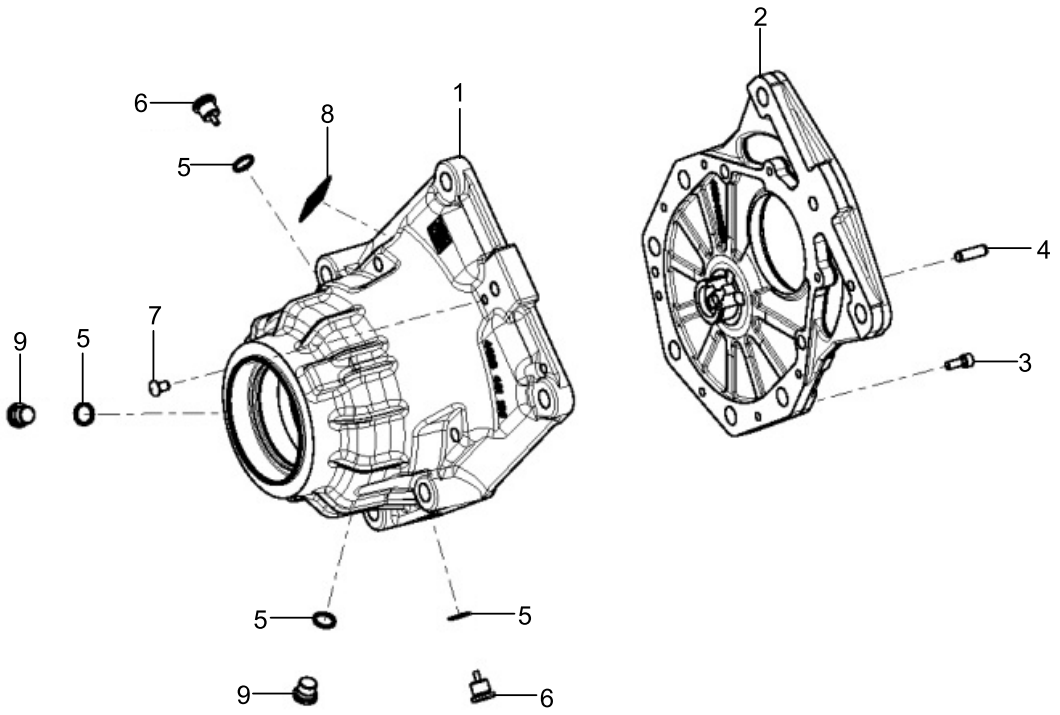
GROUP 1 STRUCTURE AND OPERATION

1. DRIVE UNIT

1) STRUCTURE

(1) Housing



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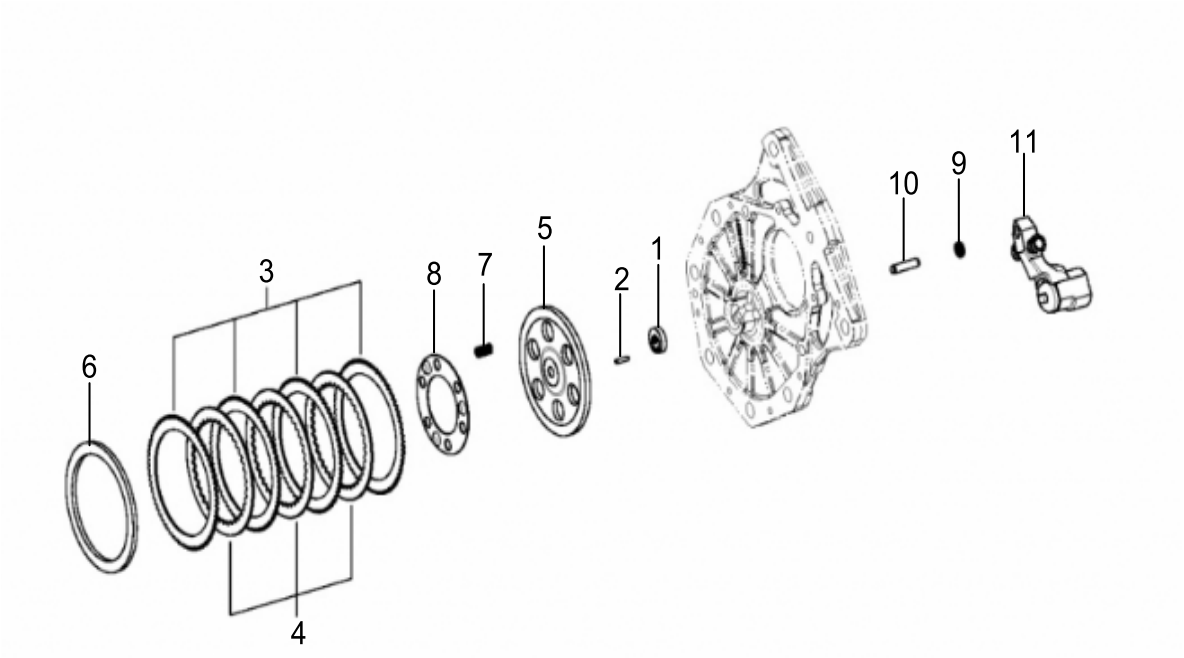
1	Housing	4	Cylinderical Pin	7	Breather
2	Housing Cover	5	Sealing Ring	8	Type Plate
3	Cap Screw	6	Screw Plug	9	Screw Plug

(2) Brake Parts



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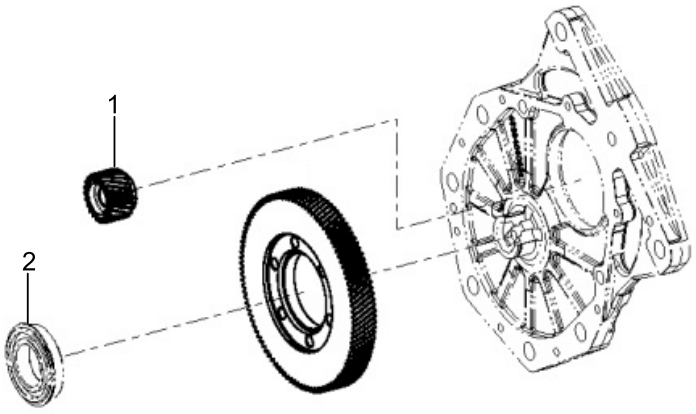
1	Axial Bearing	5	Pressure Disc	9	Sealing Ring
2	Cylindrical Pin	6	Pressure Disc	10	Pin
3	Outer Clutch Disc	7	Compression Spring	11	Brake Lever
4	Inner Clutch Disc	8	Fixing Plate		

(3) Input



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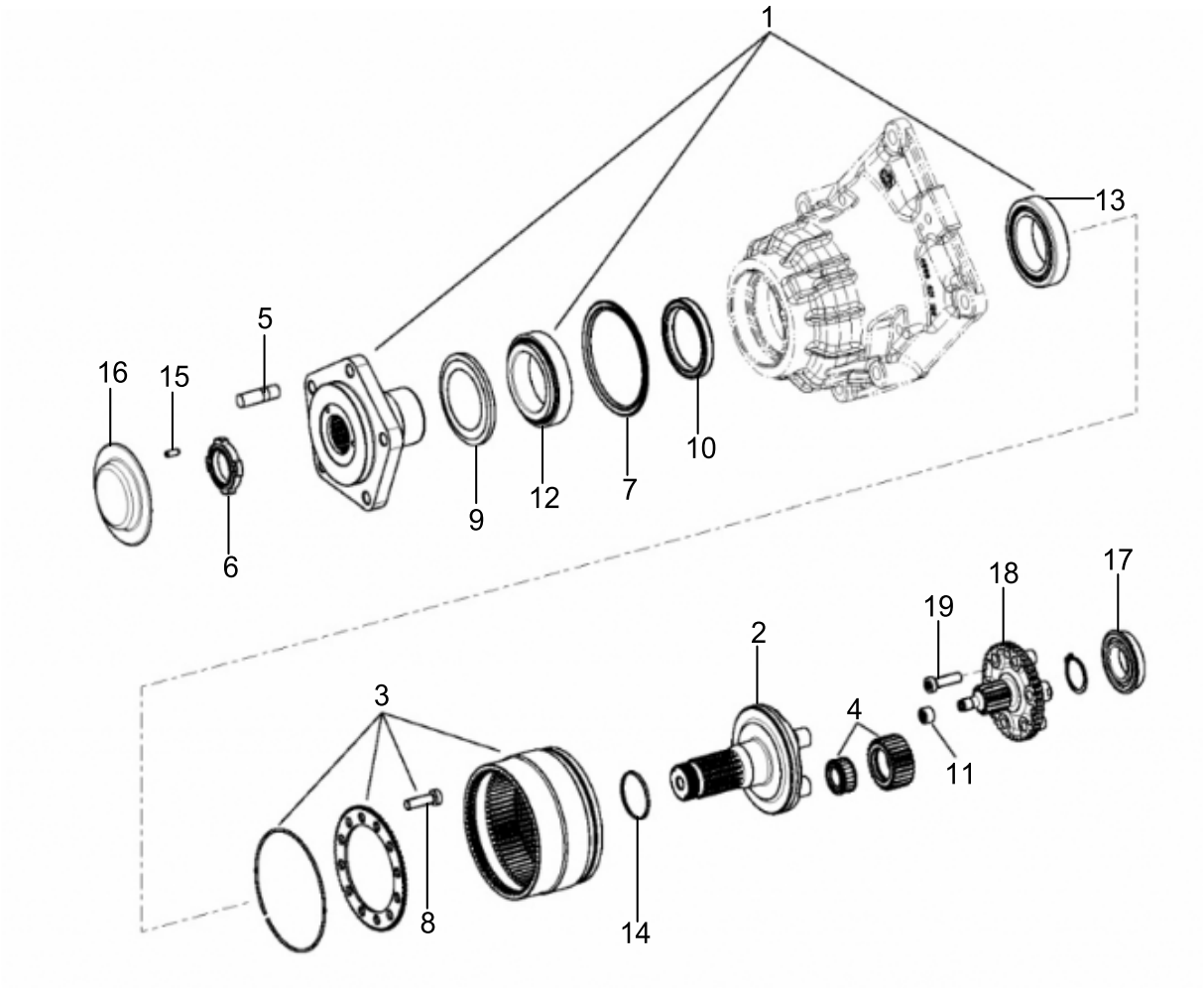
1	Drive Pinion	2	Spur Gear

(4) Output



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1	Wheel Shaft	8	Torx Screw	15	Ball bearing
2	Planet Carrier	9	Nilos Ring	16	Protection Cap
3	Ring Gear	10	Shaft Seal	17	Ball Bearing
4	Planetary Gear	11	Needle Sleeve	18	Inner Disc Carrier
5	Wheel Stud	12	Tapered Roller Bearing	19	Torx Screw
6	Slotted Nut	13	Tapered Roller Bearing		
7	Sealing Ring	14	O-Ring		

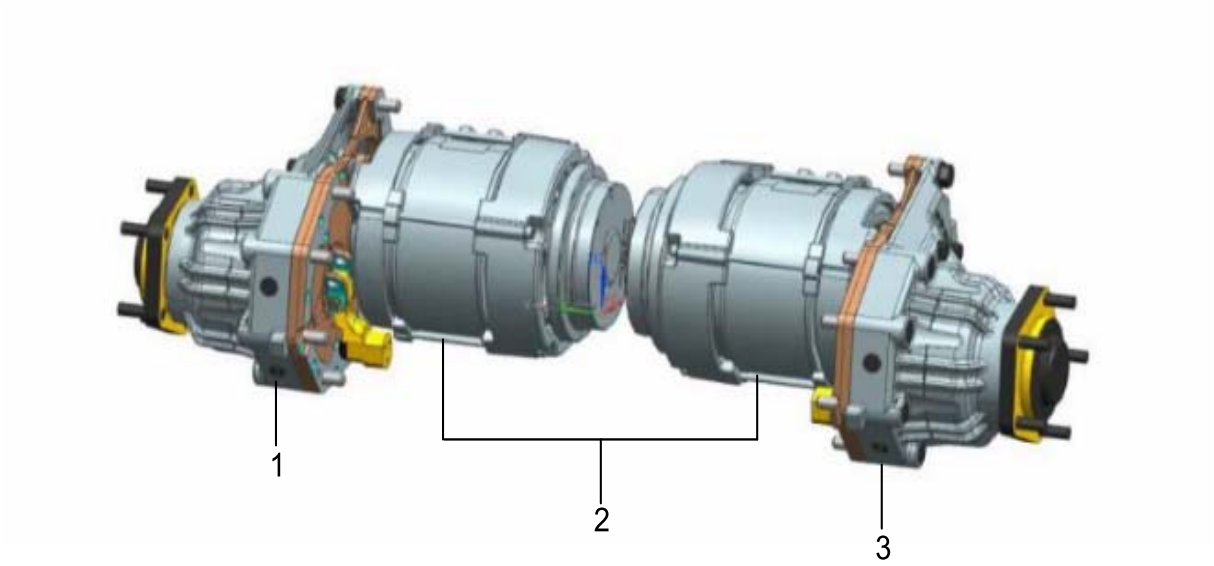
2) SPECIFICATION

Item	Unit	Specification
Max. output torque	N · m	1320
Max. static wheel load	kg/lb	2850/8818
Max. input speed	rpm	5000
Gear ratio available	-	14.0 to 26.6
Weight with oil	kg/lb	Up to 78/171
Oil quantity(ATF)	ℓ /U.S. · qt	0.35/0.36

3) PRINCLPLE OF OPERATION

(1) Outline of the power transmission system

The drive units are composed of the drive unit (LH) and the drive unit (RH) which are connected with the motor as a power transmission system to assemble the drive wheel for the battery type fork lift.



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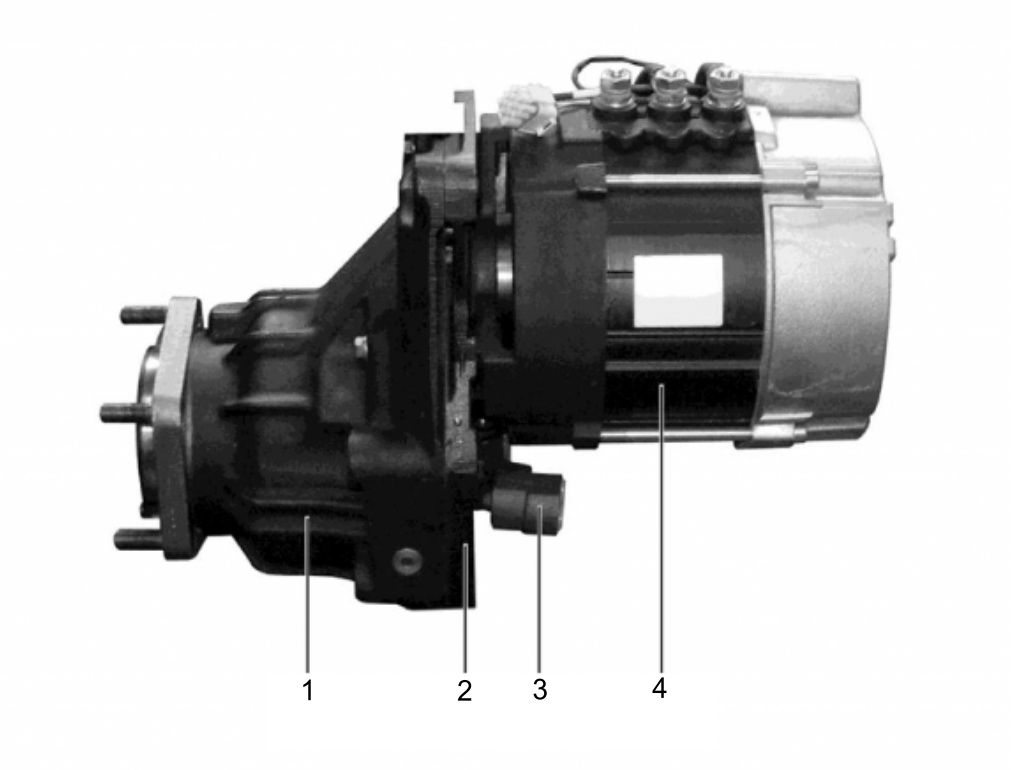
1 Drive unit (LH) 2 Motor 3 Drive unit (RH)

The power of the drive motor which is received from signal of the controller transmits to the dirve gear and the power transfered from the drive gear transmits to the drive wheel via the planetary gear and wheel hub. As a result, it is able to drive to forward and reverse of the fork lift.

(2) Principle of the operation

① Structure of the drive unit



1	Housing	3	Brake lever	4	Motor
2	Cover				

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② Technical description

The Drive Unit is only designed for use in fork-lift trucks (front-wheel drive concept for electric counter balanced lift trucks).

The Drive Unit is equipped with an integrated service and parking brake.

Depending on the application, The Drive Unit may be used in vehicles up to a maximum static wheel load of 2850 kg. The Drive Unit is attached to the vehicle chassis by fixtures mounted on the drive unit. The following optional accessories are always available to complete the Gearbox into a drive unit:

- Electric drive motor
- Wheel
- Fixing elements

GROUP 2 TROUBLESHOOTING

Problem	Cause	Remedy
1. High-pitch hitting noise(depending on rpm)	· Teeth of spur gear stage damaged when mounting motor	· Check gear teeth of input pinion and spur gear for damage (Replace a damaged input pinion; if the spur gear is damaged, you may carefully refile the gear teeth using a diamond file.)
2. High-pitch, singing noise	· Mechanical engine connection defective motor bearing defective	· Check motor dimensions and motor connection and if necessary retighten input pinion to hub. Inspect motor and replace if necessary
3. Dull, grinding noise	· Defective Wheel bearing	· Inspect wheel bearing, replace if necessaryl
	· Incorrect bearing pretension of wheel bearing	· Check bearing pretension, correct if necessary
	· Defective teeth in planetary gear	· Inspect planetary stage gear set and wheel bearing, replace if necessary
4. Bleeder	· Oil level too high	· Check oil level, correct if necessary
5. Housing cover	· Bolts not tightened to specified torque	· Check tightening torque, retighten bolts if necessary
6. Gear shaft	· Radial shaft sealing ring damaged or worn	· Check radial shaft sealing ring, replace if necessary
7. Brake Lever	· Defective sealing ring	· Check sealing ring, replace if necessary
8. Screw plugs	· Screw plugs not tightened to specified torque · Incorrect or defective sealing ring mounted	· Check tightening torque, if necessary retighten bolts · Remove screw plugs and use genuine sealing rings
9. Motor Connection	· Defective motor O-ring	· Remove motor and replce O-ring
10. Motor	· Worn radial shaft sealing ring on motor shaft · Defective connecting cable/loose · Carbon brushes(if fitted) fretted/worn · Insulation burned through	· If necessary replce motor · Replace/tighten connecting cable · Replace carbon brushes · Replace motor
11. Drive unit	· Blocked motor/gear box · Service brake blocked	· Replce motor/gear box · Carry out maintenance/repair to service brake

12. Foot brake	· Air in hydraulic system · Worn brake discs · Worn axial slide bearing · Ruptured brake cable	· Bleed or top up brake fluid · Replace brake discs · Replace axial slide bearing · Replace brake cable

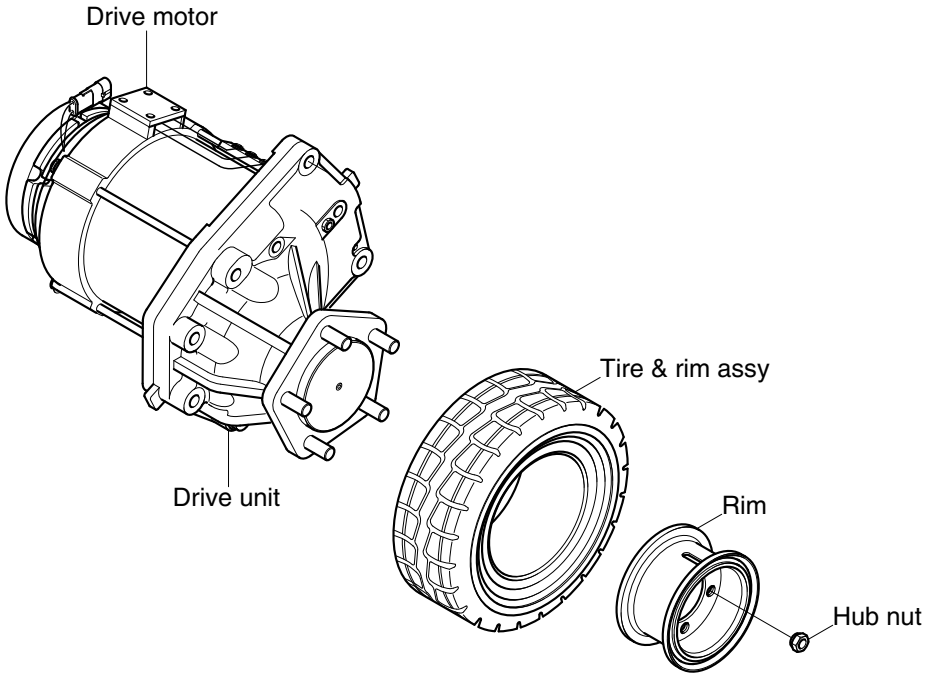
GROUP 3 DISASSEMBLY AND ASSEMBLY

1. Disassembly

Drain oil from transmission before removal of the drive unit. Loosen and remove the wheel nuts as well as take off the drive wheel. See the related chapter for further work on the drive motor of the drive unit.

1) REMOVAL OF THE DRIVE UNIT

(1) Removal of Drive unit. (refer to see page 2-8)



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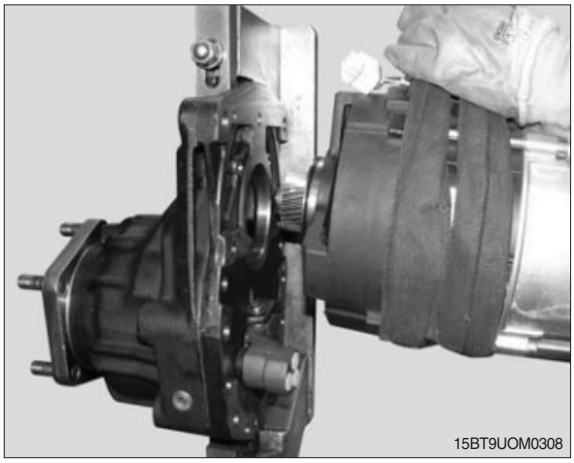
2) REMOVAL OF THE DRIVE MOTOR

(1) Drive motor and accessories mounted to the drive motor have to be disconnected.

(2) Take off cautiously the drive motor from the drive unit.

⚠ **Do not damage the teeth of the motor pinion and the spur gear.**
Damages can cause louder running noises.

※ In case of an inadequate removal of the drive motor from the drive unit there is danger to damage the sealing surface for the O-ring in the housing.
If only the drive motor is removed, the released drive unit opening is to be sealed in order to avoid that dirt can get inside the drive unit.



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2. GENERAL INSTRUCTIONS FOR CORRECT DISASSEMBLY AND REASSEMBLY

Cleanliness is essential for a correct work.
Drive unit removed from the vehicle have to be cleaned prior to opening.
Special care and cleanliness are essential for a correct disassembly and reassembly of the unit as well as for the installation of each spare part. A fault during installation can result in an early wear and chips as well as foreign particles in the unit could cause fatal damage in the drive unit.
Prior to reassembly all parts must be cleaned and inspected for wear and other defects.
It would be a false economy to reinstall parts which are not in a perfect condition.
All parts have to be oiled carefully during reassembly. Apply a sealing compound onto housing-and cover faces, which must be tight towards the outside.

For heating of bearings etc. use heating plates, heating elements or heating furnaces.
Never heat directly with an open flame. This avoids damage to the bearings.

If not otherwise indicated heat ball bearings, gears, flanges etc. to approx. 90-100℃.

Parts which have been mounted in a warm condition must be subsequently installed after cooling down to ensure a perfect contact.
Lubricate both parts before shafts, bearings etc. are pressed into position.

For reassembly all of the indicated setting values, test data and tightening torques must be observed.
HYUNDAI-units will be filled with oil after repair work.

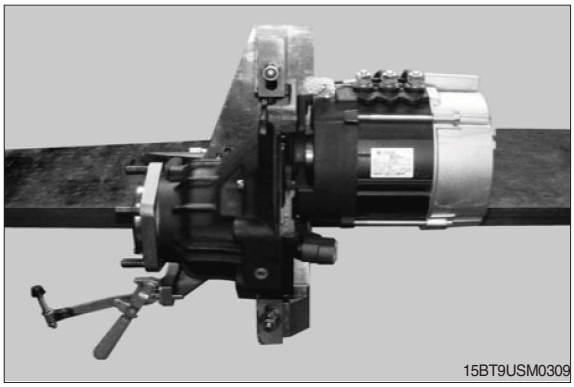
The following description of disassembly and reassembly serves to inform both the after-sales service.
※ Centers of HYUNDAI and of the vehicle manufacturer, where adequate workshop facilities and trained specialists are present.

3. DISASSEMBLY OF THE DRIVE UNIT

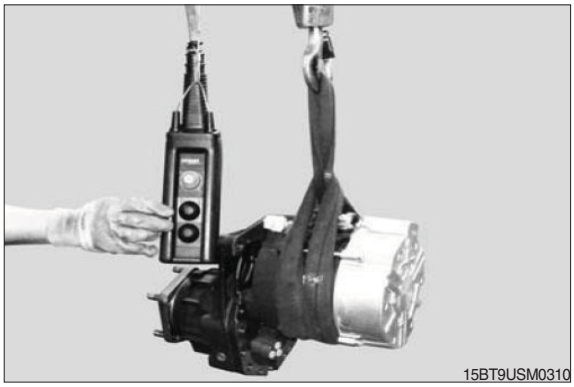
1) Motor Disassembly

※ Always keeps clean working area when disassebling the drive unit.

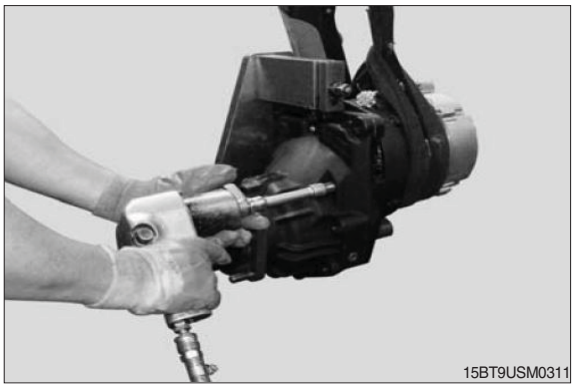
(1) Clamp the drive unit in the assembly fixture and turn the drive unit.



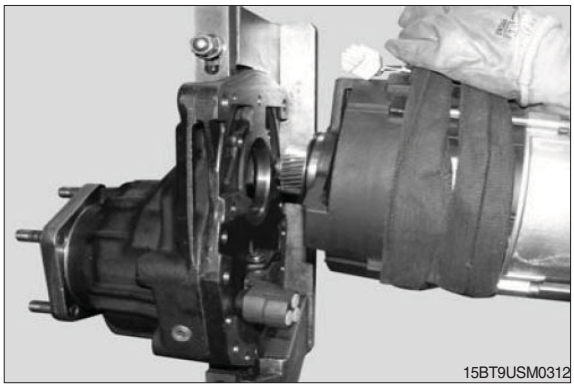
(2) Fasten the motor to suitable lifting gear using approved attachment equipment.



(3) Undo the 3 Allen bolts and remove.



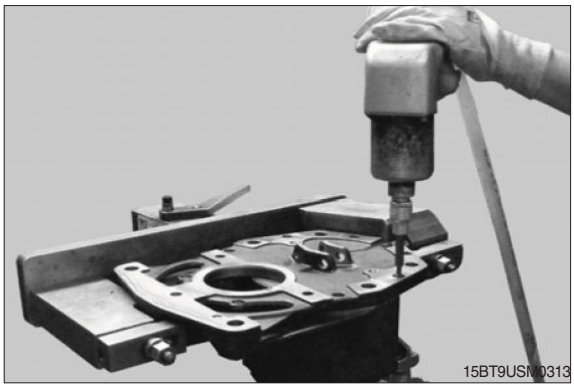
(4) Carefully remove the motor from the drive unit and set it down on a suitable support piece. Secure the motor against falling.



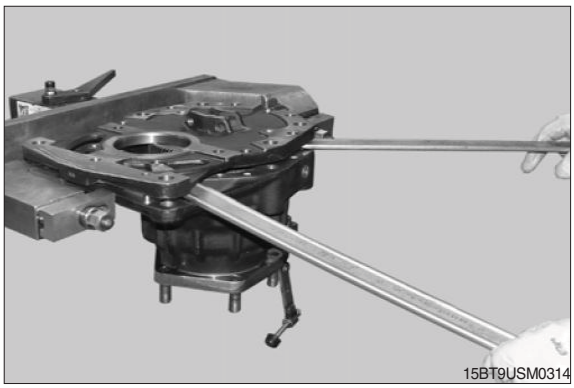
2) Removing the Housing cover

※ The brake lever shall be removed before removing the housing cover.

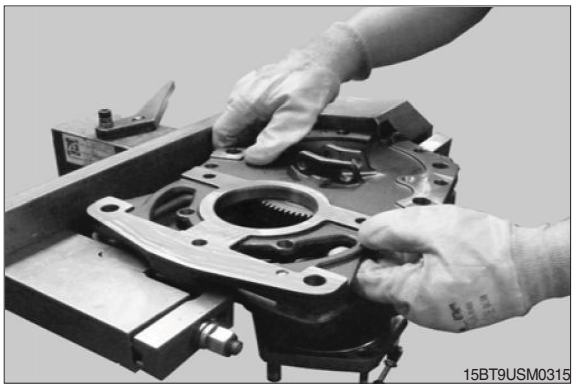
(1) Undo the 8 Allen bolts and remove from the housing cover.



(2) Release the housing cover using assembly levers and raise slightly and evenly.

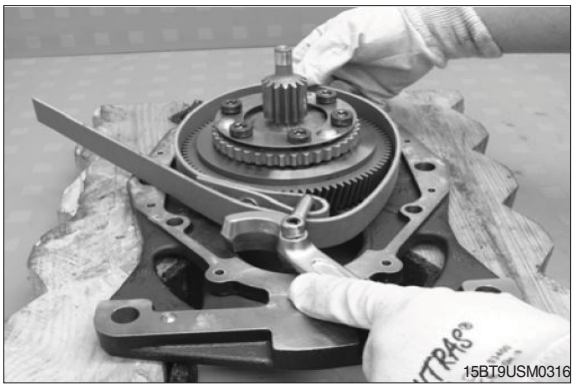


(3) Remove the housing cover from housing.

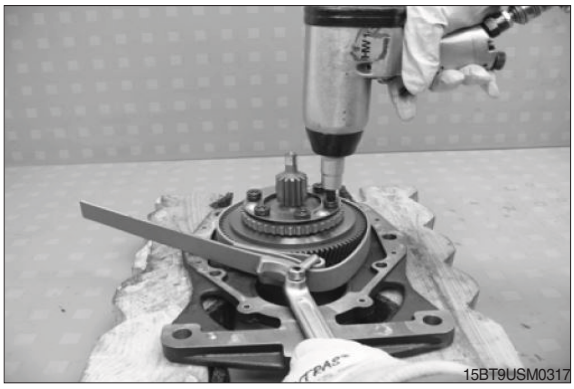


Inner disc carrier

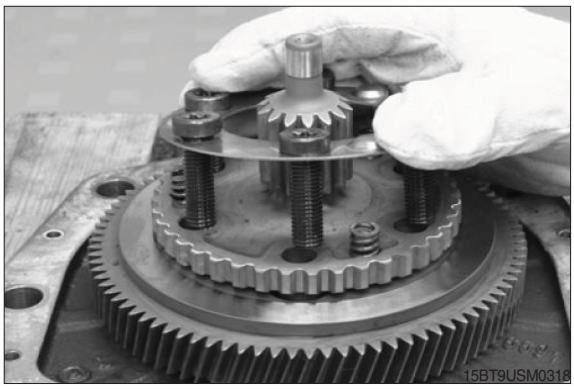
(4) Place the cover assembly onto a suitable support and assure an even and stable rest. Place the strap around the spur gear and tighten it by using the wrench lever.



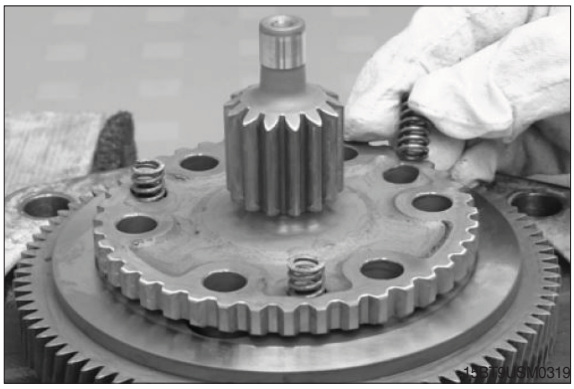
(5) Hold the spur gear tight using the strap wrench. Undo the 6 Torx bolts.



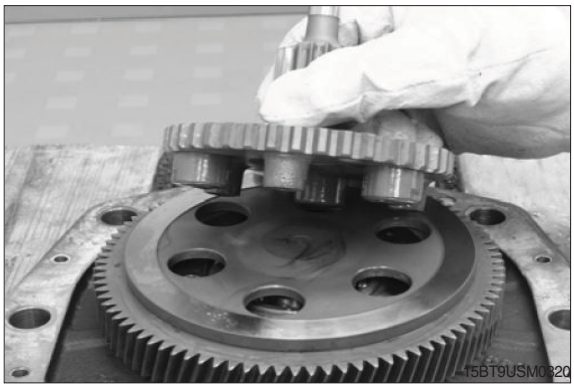
(6) Manually remove the retaining plate from the spur gear together with the 6 Torx bolts.



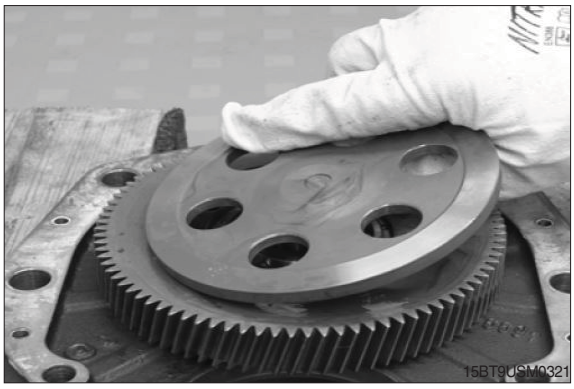
(7) Manually remove the 3 pressure springs 1.6x8.0x21.5 from the spur gear.



(8) Manually remove the inner disc carrier from the pressure disc.

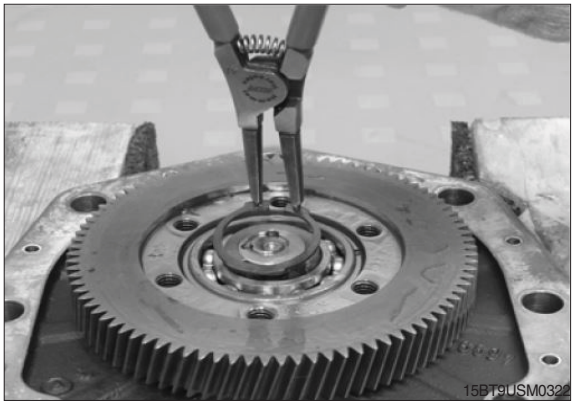


(9) Manually remove the pressure disc from spur gear.



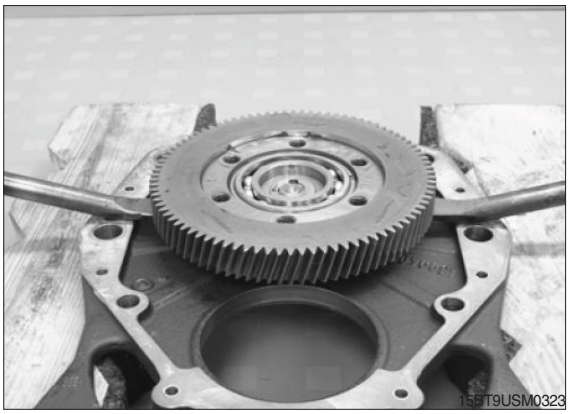
Spur gear

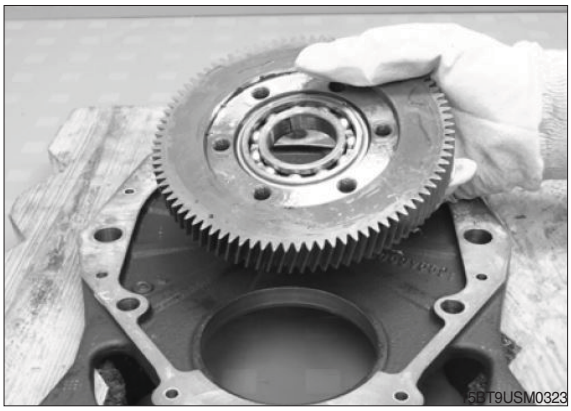
(10) Remove the spur gear retaining ring.



(11) By levering the spur gear alternately on both sides, manually remove it from the housing cover.

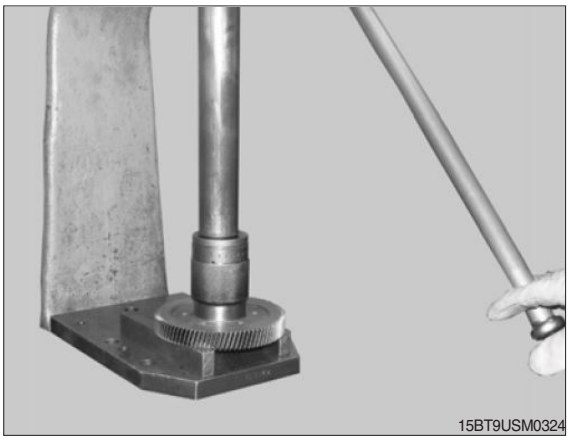
※ Be careful not to damage the toothing when levering.





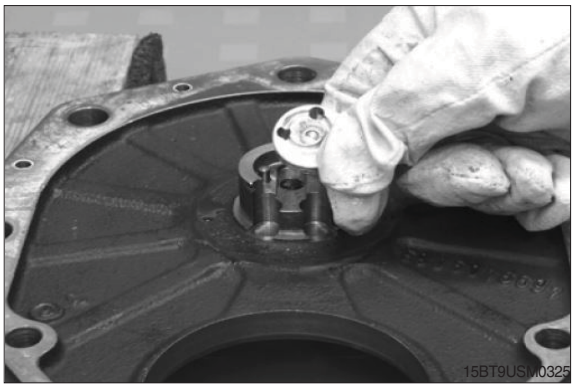
(12) Remove the grooved ball roller bearing from the spur gear using tool and the hand lever press.

※ Risk of accident and injury from crushing. When pressing out the grooved ball roller bearing, do not place hands between the punch and the tool.



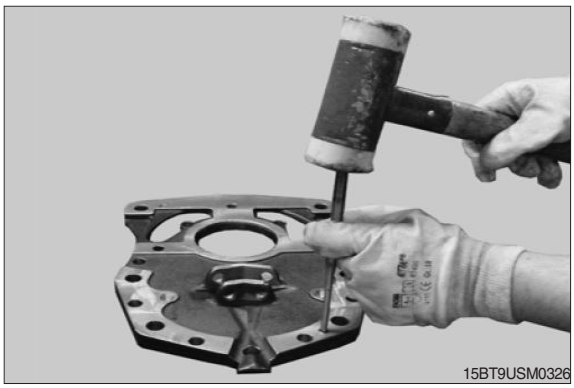
Axial bearing

(13) Lever the axial bearing out of the housing cover using a screw driver and remove.



Cylinderical pin

(14) Remove the 2 cylindrical pins from the housing cover. If one or both of the cylindrical pins remain in the housing during disassembly, they shall be removed using pliers. The pins will be destroyed in the process and shall be replaced during reassembly.

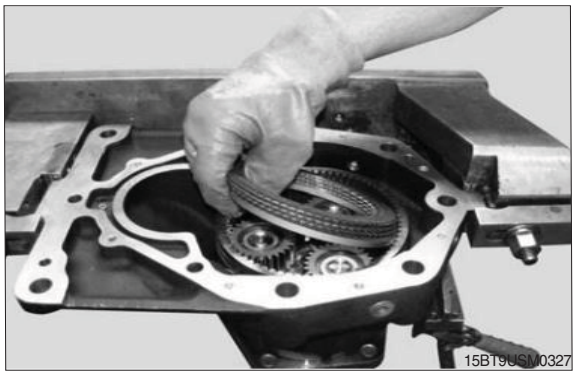


3) Housing disassembly

※ When changing the disc set in one gearbox, the disc set of the gearbox on the other side of the vehicle shall also be changed. If this is disregarded, there may be a pronounced difference in braking effect between the left-hand and right-hand gearbox. The difference in braking effect may lead to longer braking distances or to the vehicle breaking out to the side. Iways keeps clean working area when disassebling the drive unit.

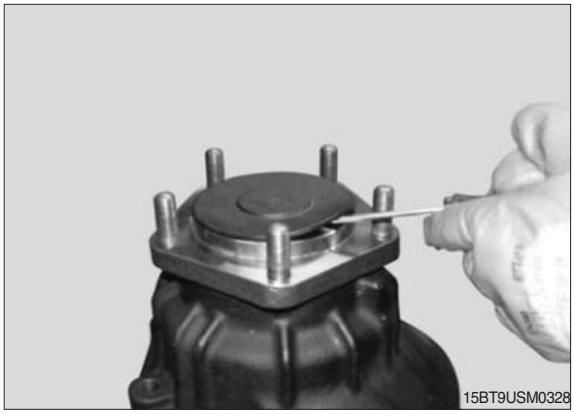
Brake disc set

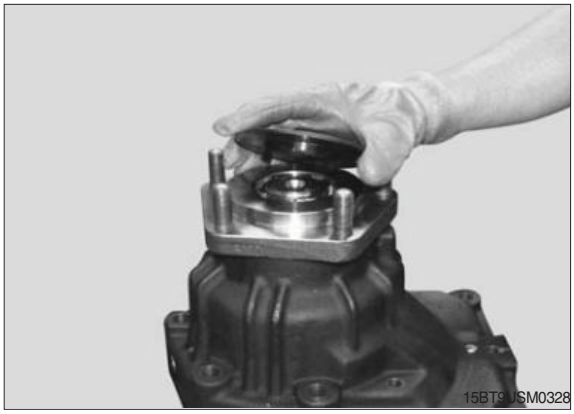
(1) Remove the brake disc from the internal gear.



Protective cap

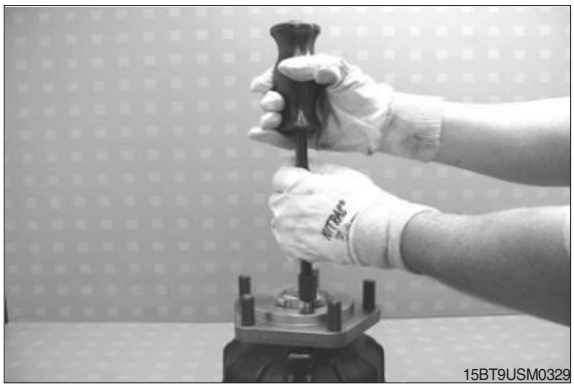
(2) Release the protective cap from the wheel shaft and remove manually.





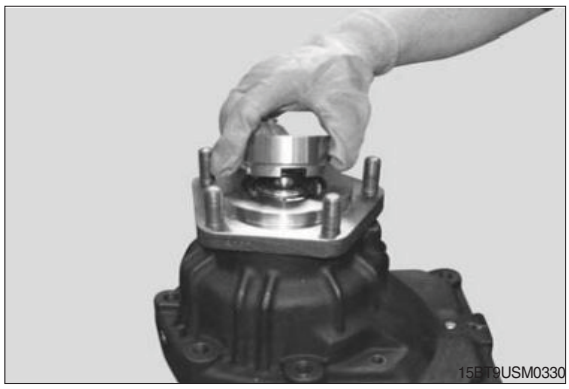
Cylindrical pin

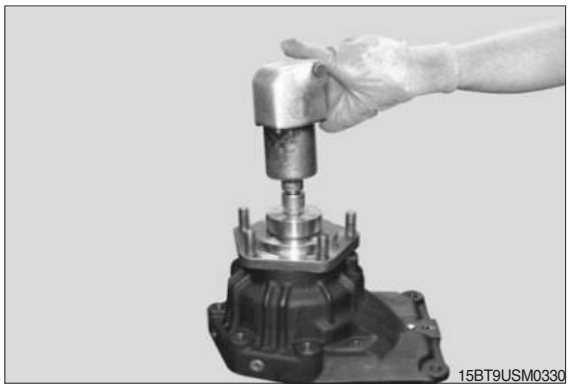
(3) Remove the cylindrical pin which secures the grooved nut from the wheel shaft.
To do this, screw the thread of Pinion extractor with hammer stroke fully into the cylindrical pin. Slide the hammer upwards several times with enough drive to pull out the cylindrical pin.



Grooved nut

(4) Undo the grooved nut from the wheel shaft and remove manually.





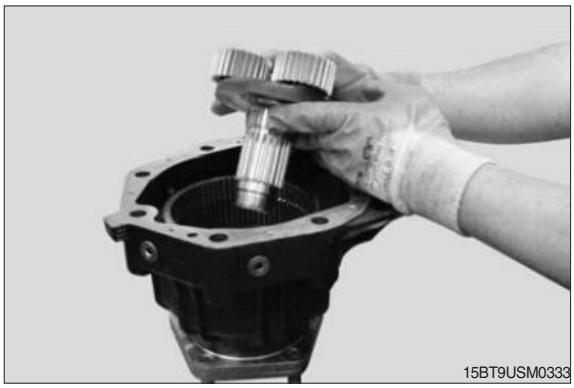
(5) Place the housing on the press table with the mating surface facing downwards.

Planet carrier

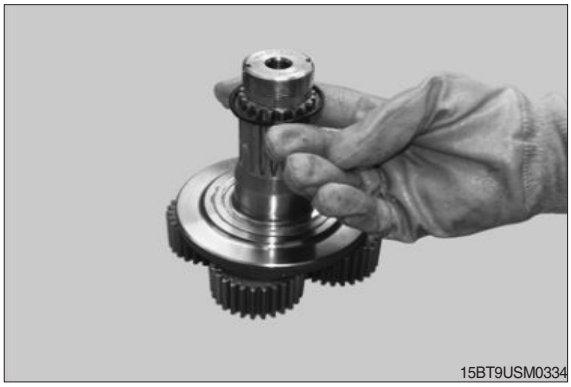
(6) Press the planet carrier out of the housingousing sub assy.

※ Risk of accident and injury from crushing. When pressing out the planet carrier, do not place hands between the punch and the tool.

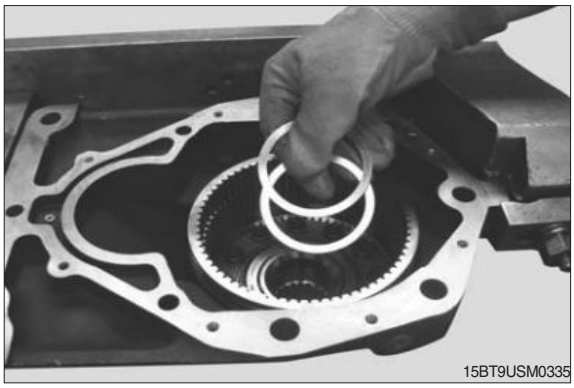
(7) Remove the planet carrier from the housing.



(8) Remove O-ring from planet carrier by hand.

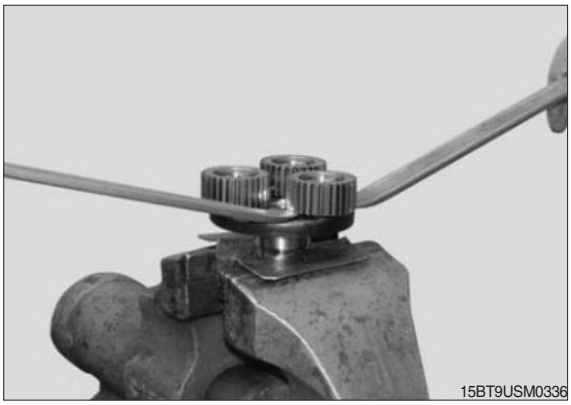


(9) Clamp the housing in the assembly fixtures. Remove the spacers from the housing.

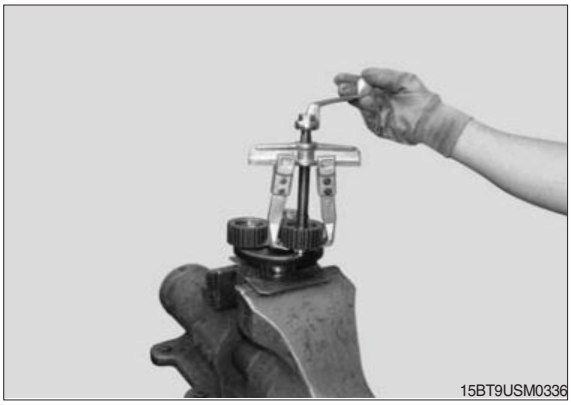


Planetary gears

(10) Version with 3 planet gears
Clamp the planet carrier in a vice.
Fit the jaws of the vice with protective jaws (e.g. copper, aluminium or brass) to prevent the surfaces from being damaged.



Remove the 3 planetary gears from the planet gear.

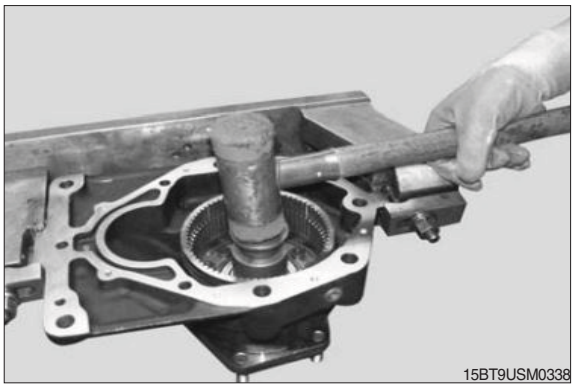


(11) Version with 4 planet gears
Clamp the planet carrier in a vice.
Fit the jaws of the vice with protective jaws (e.g. copper, aluminium or brass) to prevent the surfaces from being damaged.

Remove the 4 planetary gears from the planet gear.

Gear shaft

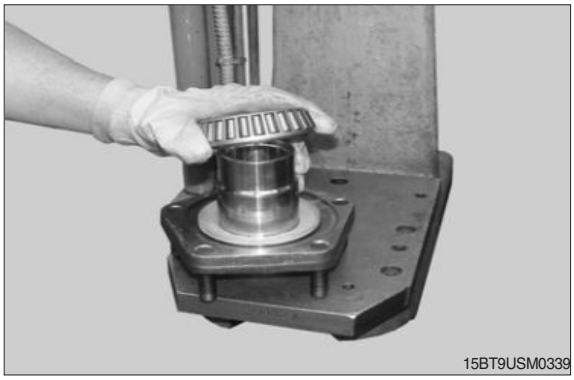
(12) Drive the wheel shaft out of the housing. Secure the drive against falling from below with your hand.



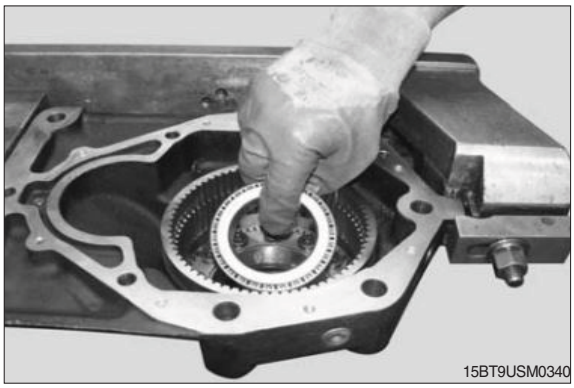
Wheel shaft taper roller bearing

(13) If necessary, heat the taper roller bearing to facilitate removal. Wear prescribed protective equipment and use appropriate tools.
Remove the wheel shaft side taper roller bearing from the wheel shaft. If necessary, heat the taper roller bearing.

※ Risk of accident and injury caused by hot surface.

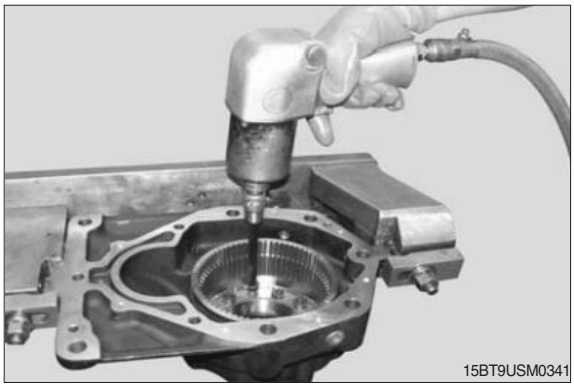


(14) Remove the planet carrier side taper roller bearing.



Internal gear

(15) Remove the 12 Torx bolts from the internal gear.

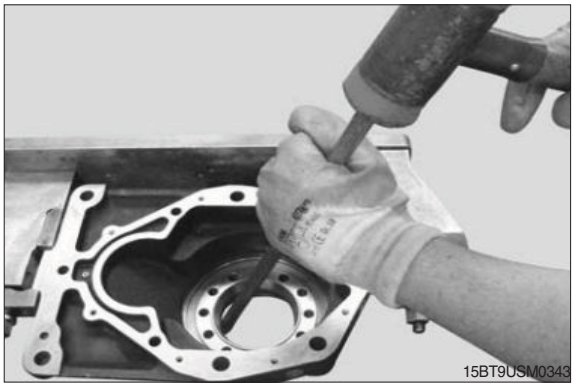


(16) Remove the internal gear from the housing.

If the internal gear is damaged, it shall be replaced as a complete unit.

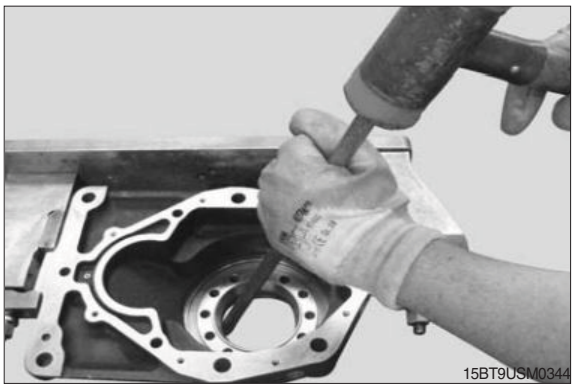
Wheel shaft sealing ring

(17) Drive the sealing ring downwards and out of the housing by impacting it alternately on opposite sides.
The shaft sealing ring is destroyed in the process. During reassembly, a new shaft sealing ring shall be used.



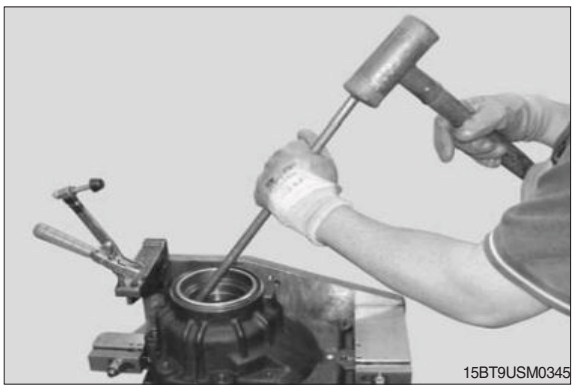
Wheel shaft side bearing cup

(18) Drive the wheel shaft side bearing cup of the taper roller bearing downwards and out of the housing by impacting it alternately on opposite sides.



Planet carrier side wheel shaft

(19) Drive the planet carrier side bearing cup of the taper roller bearing downwards and out of the housing by impacting it alternately on opposite sides.



Wheel shaft sided sealing

(20) Disassemble the sealing ring by using a chisel.
The sealing ring is destroyed in the process. During reassembly, a new sealing ring shall be used.

3. ASSEMBLY OF THE DRIVE UNIT

1) Housing reassembly

Wheel shaft sided sealing ring

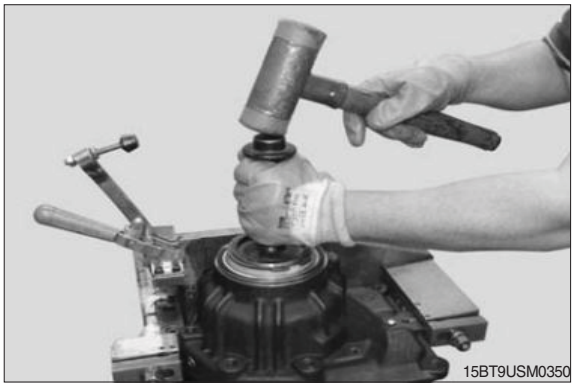
(1) Place the wheel shaft sided sealing ring onto the transmission housing
Make sure that the sealing lip is facing upwards.

(2) Drive up the sealing ring into the transmission housing against the block.

Shaft sealing ring

(3) Place the shaft sealing ring into the tool (Assembly mandrel).
The closed side of the shaft sealing ring shall be facing the flange connection for the wheel.

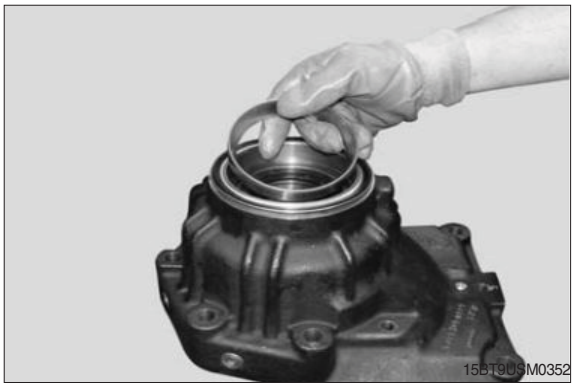
(4) Drive the shaft seal into the bore by using an assembly mandrel.
The shaft seal has reached its correct position as soon as its upper surface has reached at least the lower end of the bore's chamfer.

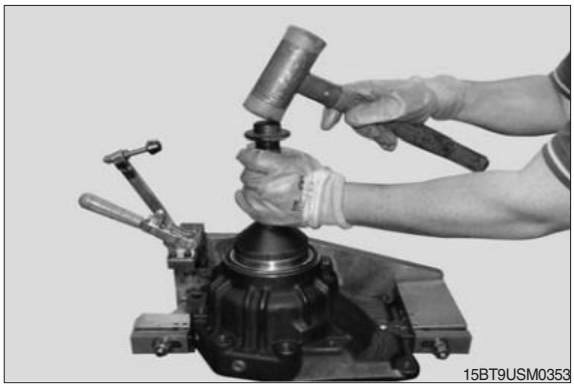


Wheel shaft side bearing seat

(5) Clean the wheel shaft side bearing seat of the taper roller bearing in the housing .

(6) Drive the wheel shaft side bearing cup of the taper roller bearing into the bearing seat.
The inside of the bearing cup shall narrow to a taper towards the bearing seat and the wide edge of the bearing cup shall be positioned at the bottom.



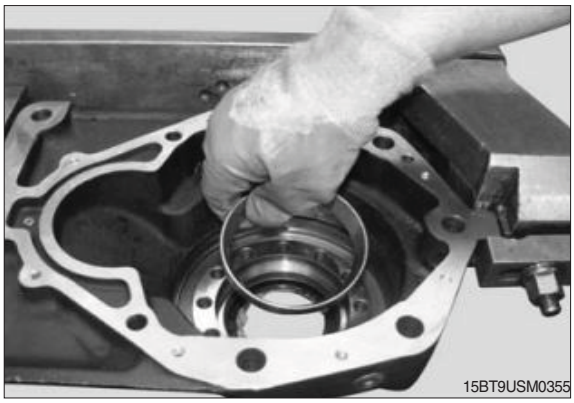


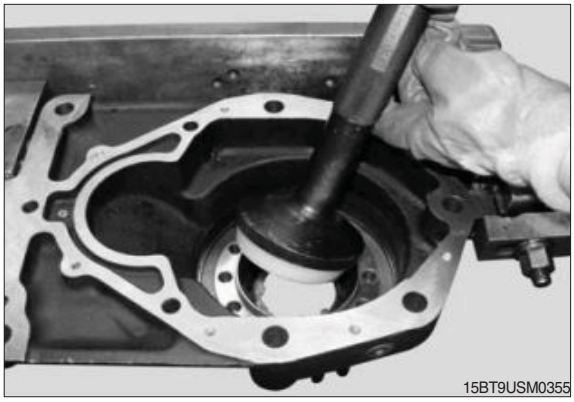
(7) Coat the inner lip of the shaft sealing ring with multipurpose

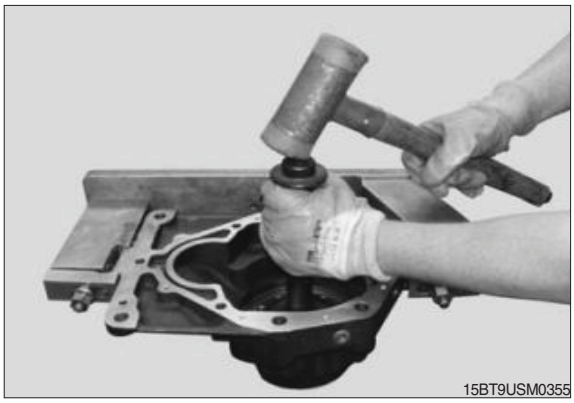
Planet carrier side bearing seat

(8) Drive the planet carrier side bearing cup of the taper roller bearing into the bearing seat.

The inside of the bearing cup shall narrow to a taper towards the bearing seat and the wide edge of the bearing cup shall be positioned at the bottom. Drive in the bearing cup until a dull metallic sound signals that the bearing cup is resting against the bearing seat.

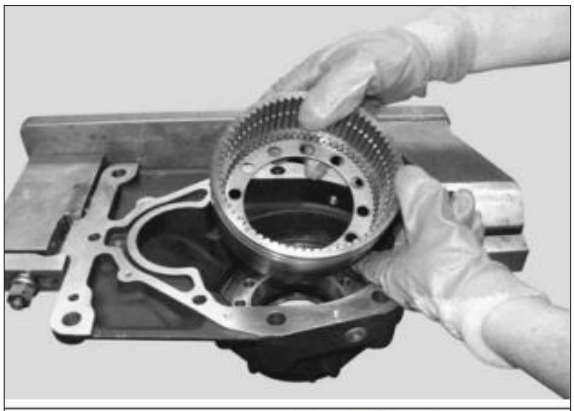






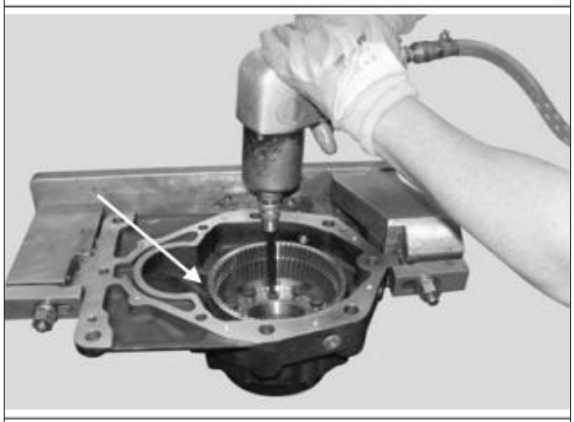
Internal gear

(9) Manually slot the toothed disc into the internal gear.
Lay the ring into the groove of the internal gear.
Place the internal gear into the housing by hand.



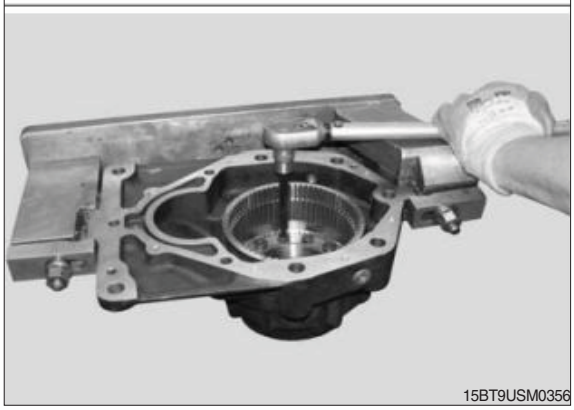
The opening of the ringshall be visible (see arrow). Bolt on the internal gear with 12 Torx bolts .

① Pretighten the bolts with a compressed-air screw driver in a cross wise pattern.
② Firmly tighten the bolts using a torque wrench.



When tightening the bolts, note the tightening torque of 79 Nm.

Check whether it is still possible to move the internal gear in a rocking motion after tightening the bolts. If it is possible, continue with work. If it is not: Remove the internal gear again and replace it.
Remove from the housing all the parts which have so far been installed and replace the housing.

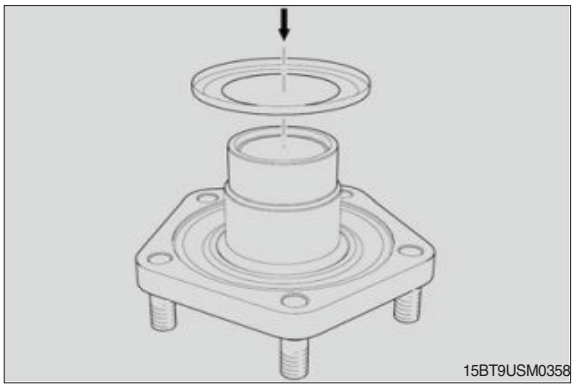

15BT9USM0356

Gear shaft

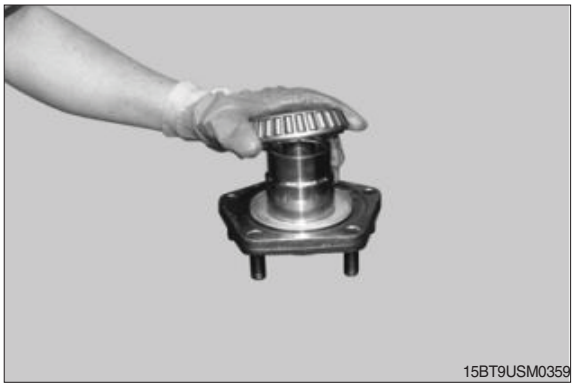
(10) Coat the Nilos ring with multipurpose grease.


15BT9USM0357

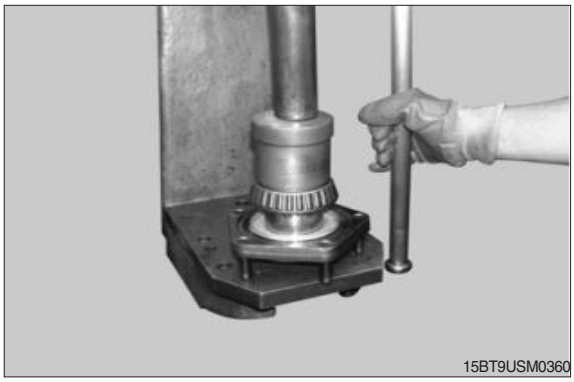
(11) Slide the Nilos ring onto the wheel shaft.



(12) Fit taper roller bearing on gear wheel side to gear shaft by hand.

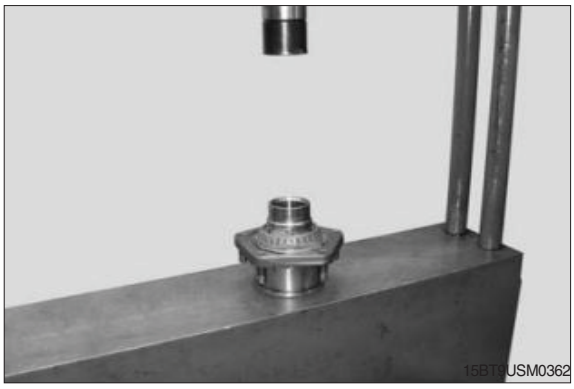


(13) Press taper roller bearing on gear wheel side onto gear shaft using lever press and tool.
Plunger of lever press, tool and gear shaft must align vertically with no offset.



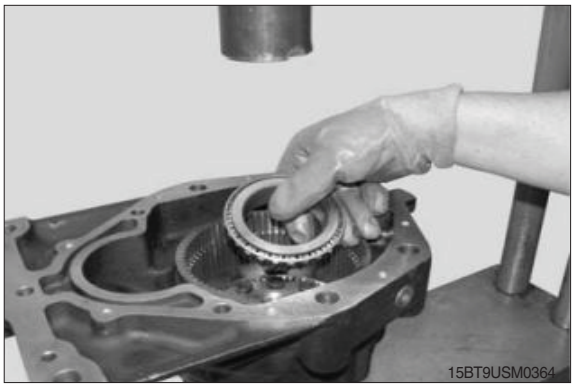
(14) Grease the taper roller bearing.

(15) Place the wheel shaft on the press table so that the wheel studs point downwards. The wheel shaft shall stand on a suitable sleeve and the wheel studs shall be clear of the table.



(16) Fit the housing perpendicularly onto the wheel shaft.
The mating surface of the housing shall face upwards.

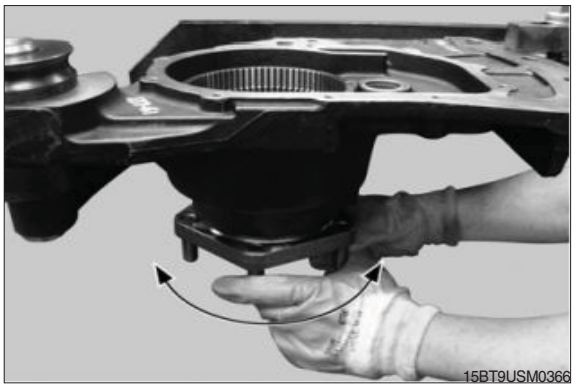
(17) Place the taper roller bearing onto the seat of the wheel shaft.



(18) Press the planet carrier side taper roller bearing onto the wheel shaft.

The punch of the hand lever press, tool and taper roller bearing shall be positioned vertically to each other without deflection.

(19) Check the wheel shaft for smooth running. It shall be possible to move the wheel shaft easily by hand. In order that the taper rollers can align themselves correctly in the bearing races, a soft head hammer should be used to tap at various points around the wheel shaft. If the taper rollers are correctly aligned, continue with the work. If they are not: Remove the wheel shaft again. Check both bearings (wheel shaft side and planet carrier side) for any damage which may have occurred during the press fitting procedure. If damage is found, remove the bearings and replace with new ones.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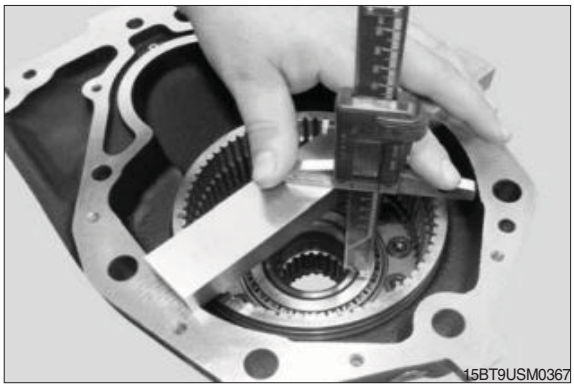
Measuring and adjusting

(20) Measuring the distance between the bearing surface of the taper roller bearing and the surface of the wheel shaft.

① Rest spacer on the mating surface of the housing.

② Set the depth gauge onto spacer.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It shall be ensured that the greatest possible contact area of the depth gauge is resting on spacer.

③ Adjust the depth gauge to the surface of the wheel shaft.

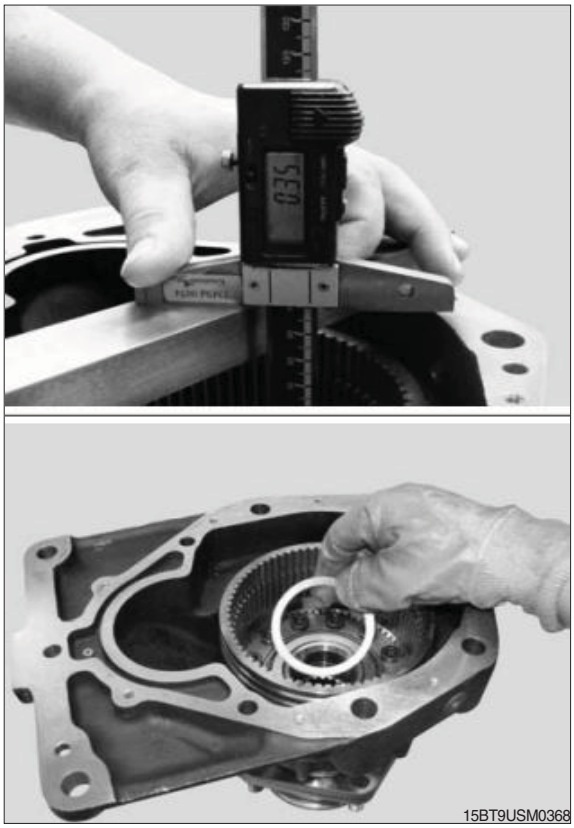
④ In the position, zero the depth gauge.

⑤ Adjust the depth gauge to the surface of the taper roller bearing

⑥ Read off the difference between the two settings.

⑦ Repeat the measurement on the opposite side. The difference in measurement may not exceed 0.5 mm.

⑧ Select spacers. The thickness of the spacer set shall be the same as the difference between the measurements. A preloading on the wheel shaft is then achieved. The preloading on the wheel shaft shall be between 3 and 7 Nm.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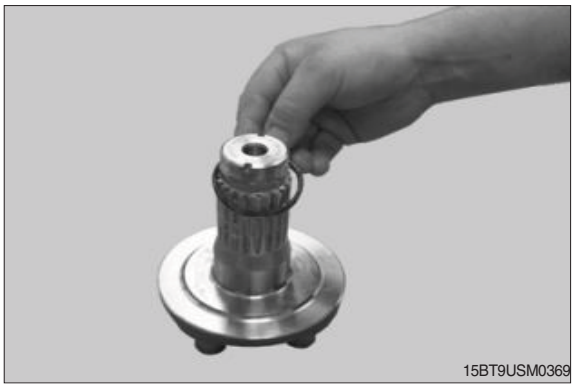
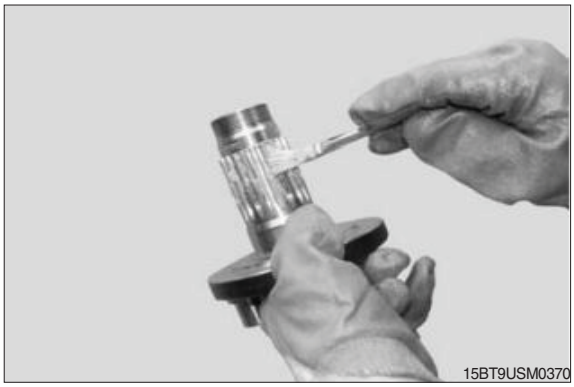
Planet carrier

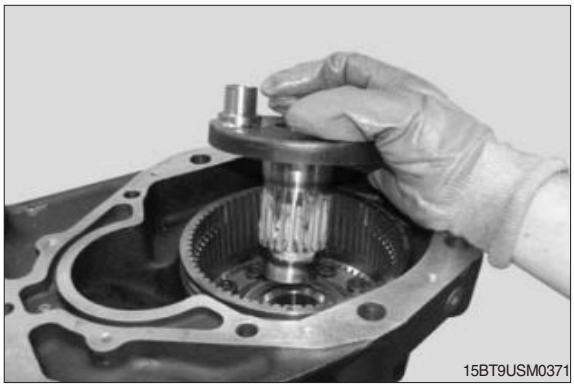
(21) O-ring and press on planet carrier by hand.



(22) Coat the toothing of the planet carrier and the o-ring with Klüberplex BEM 34-132 (Klüber Lubrication) or Optimol White Paste T.



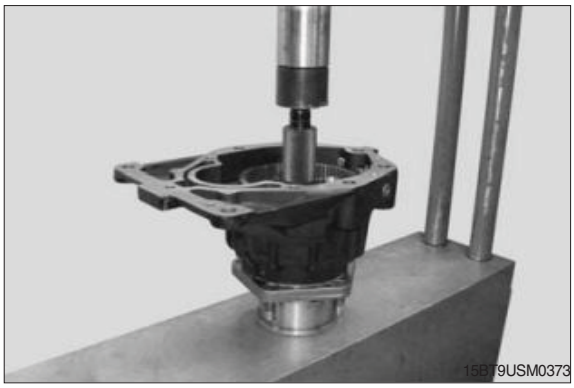
(23) Blow out the seating of the planet carrier in the housing with compressed air and fit the planet carrier.



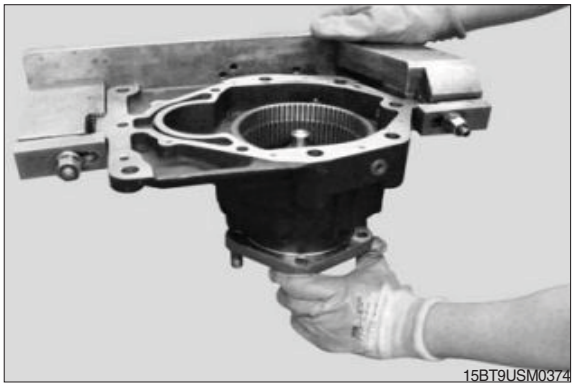
(24) Place the housing on the press table so that the wheel shaft is facing downwards. The wheel shaft shall stand on a suitable sleeve and the wheel studs shall be clear of the table.

(25) Press the planet carrier into the wheel shaft.
Make sure that the outer toothing of the planet carrier and the inner toothing of the wheel shaft mesh together correctly.
The punch of the hand lever press, tool and wheel shaft shall be positioned vertically to each other without deflection.

※ Risk of accident and injury from crushing. When pressing in the planet carrier, do not place hands between the punch and the tool.

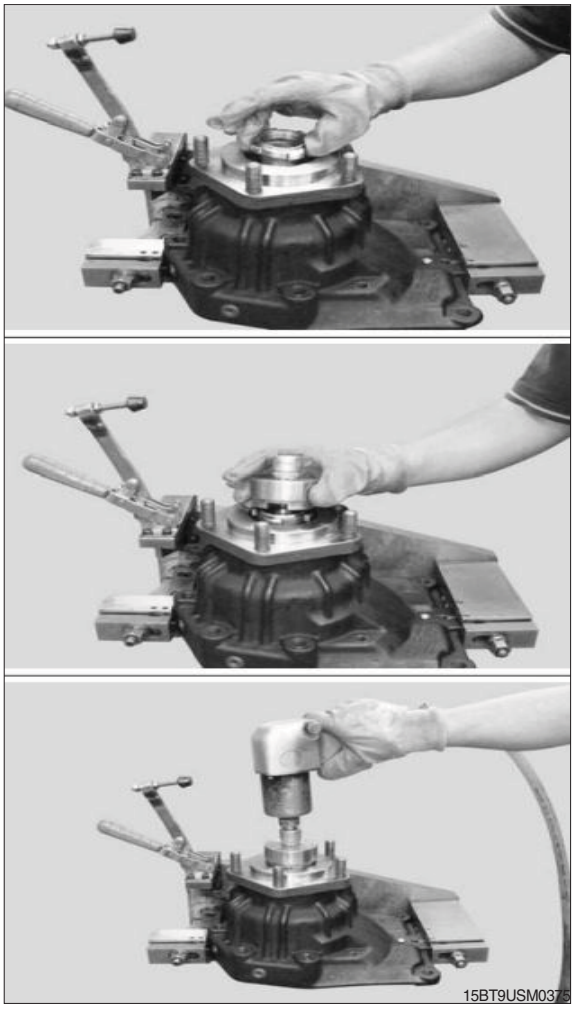


(26) Manually check the wheel shaft for ease of movement in the housing.
It shall be possible to turn the wheel shaft easily by hand.

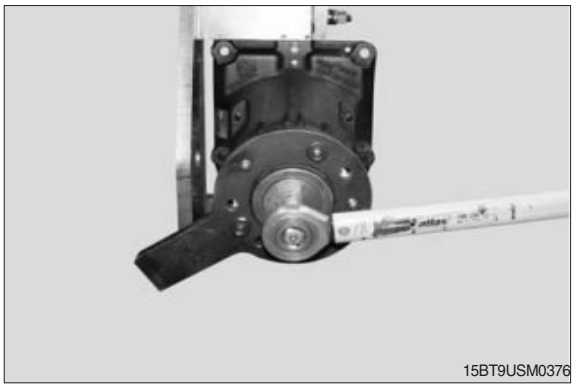


Grooved nut

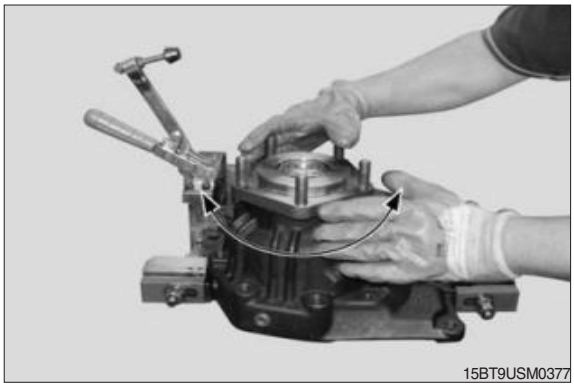
(27) Fit the grooved nut to the wheel shaft.
Fit tool to the grooved nut.
Slightly tighten the grooved nut with compressed-air screwdriver.



(28) Fit tool to the wheel shaft and lock in place with the screws Tighten the grooved nut to a tightening torque of 535 Nm.

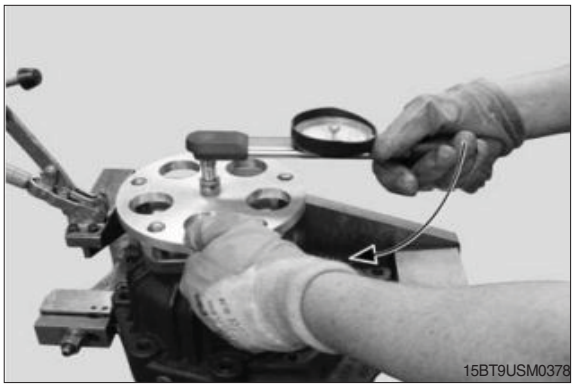


(29) Remove tool from the wheel shaft and check the wheel shaft for freedom of movement.
The wheel shaft shall be easy to turn in the housing.



Wheel shaft drag torque

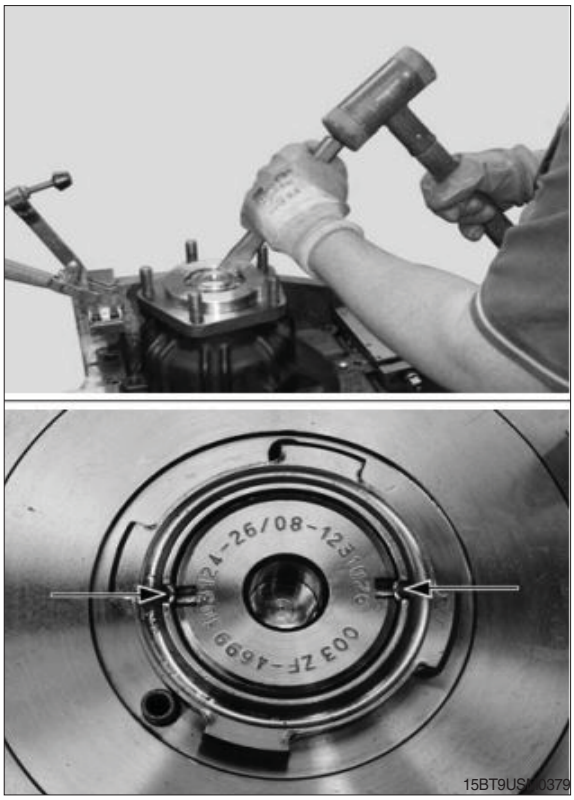
(30) Check the drag torque on the wheel shaft.
① Attach tool 11 to the wheel shaft.
② Attach the torque wrench with transition piece.
③ Turn the wheel shaft with the torque wrench.
④ Read off the drag torque from the torque wrench.



The drag torque shall be between 3 and 7 Nm. If it is, continue with the work.
If it is not: Correct the spacers as follows:
Drag torque too high : The spacers chosen are too thick→Remove parts back to the work and redetermine the correct spacer thicknesses.
Drag torque too low : The spacers chosen are too thin → Remove parts back to work step 5 and redetermine the correct spacer thicknesses.

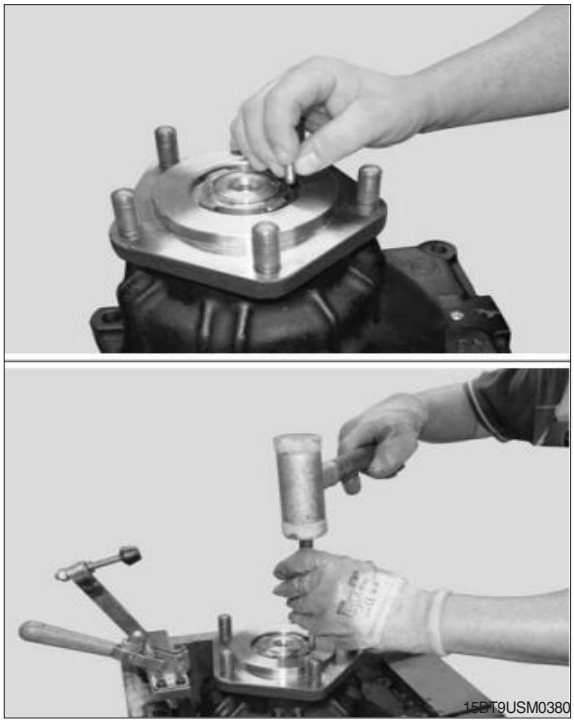
(31) Drive the collar of the grooved nut by means of a chisel (edge of the chisel must be a radius of approx. 2.0 mm) into the recesses of the planet carrier.

※ Use a chisel with a rounded edge only. A sharp edge may can damage the shoulder of the slotted nut.



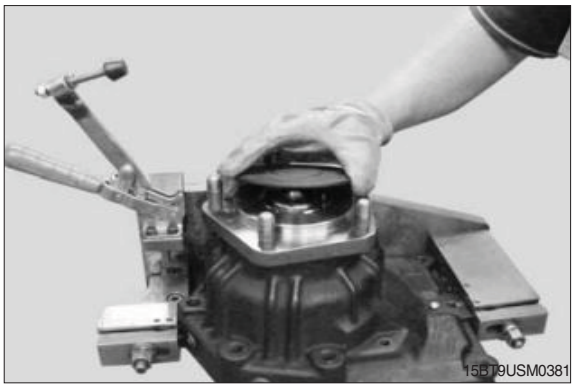
Cylinderical pin

(32) Insert the cylindrical pin into the wheel shaft and drive it in.
The taper on the cylindrical pin shall point downwards.



Protective cap

(33) Fit the protective cap to the wheel shaft and tap it lightly until it snaps into place.

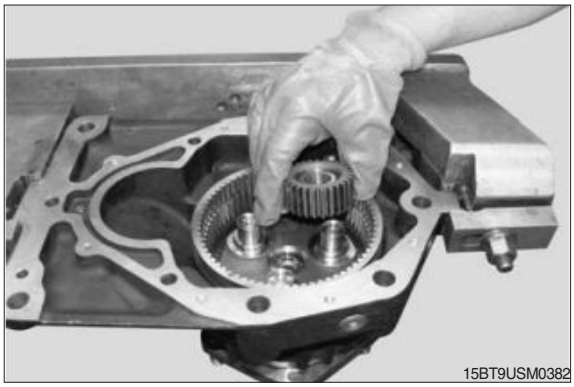


Planetary gears

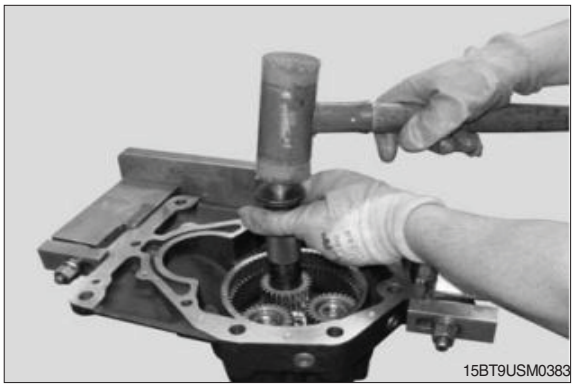
(34) Version with 3 planet gears

Place a planet gear with pre-assembled cylindrical roller bearing straight onto one of the pins of the planet carrier.

Do not tilt the planet gear. Face upwards the identification mark of the planet gear.

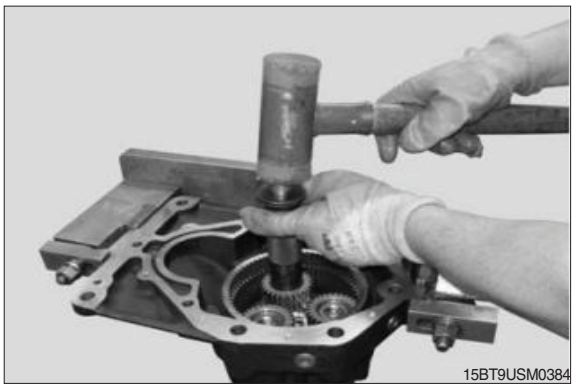


(35) Drive in the planet gear including the cylindrical roller bearing until reaching the limit stop. Use a hammer and a striking mandrel. Drive in the remaining two pre-assembled planet gears by using the same method. Note the correct meshing of the teeth of both planet gears and ring gear.



(36) Apply a pining by using tool to lock the planet gears.

The pining is done correcly as soon as the axial play of the planet gear's cylindrical roller bearings on the bolts has dissappeared completely.



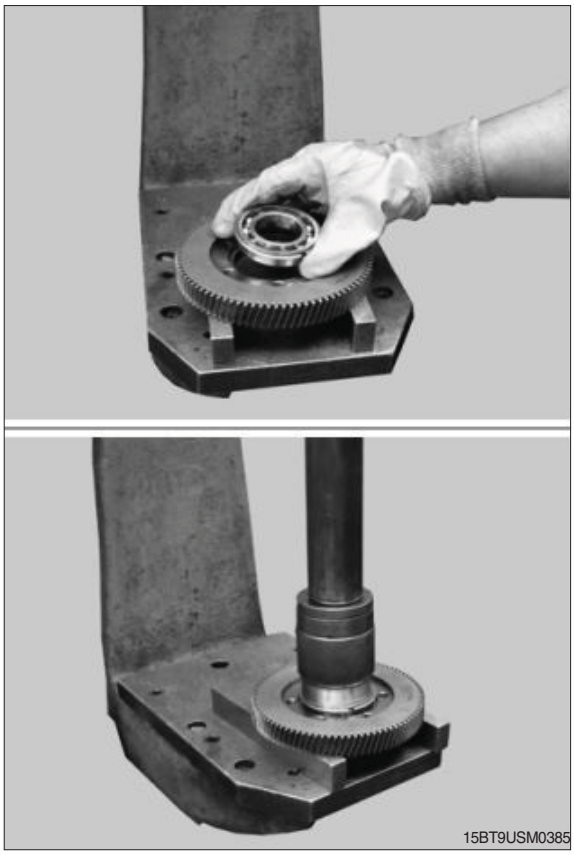
2) Housing cover reassembly

Grooved ball roller bearing

(1) Press the grooved ball roller bearing into the spur gear using the hand lever press.
The punch of the hand lever press, tool and brake piston shall be positioned vertically to each other without deflection.

Manually check the grooved ball roller bearing ment in the spur gear.
It shall be possible to turn the grooved ball roller bearing easily by hand.

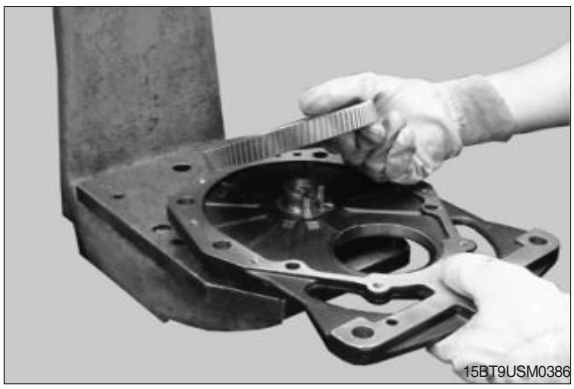
if it is easy to turn, continue with the work.
If it is not: Check the bearing for any damage which may have occurred during the press fitting procedure. If damage is found, remove the bearing and replace with a new one.



Spur gear

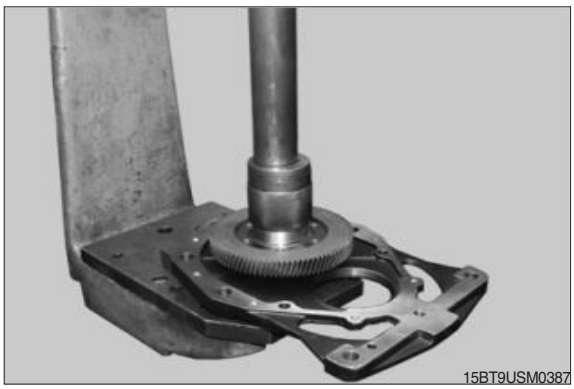
(2) Place the housing cover on a suitable support piece on the hand lever press, with the mating surface facing upwards.

The housing cover shall be empty.

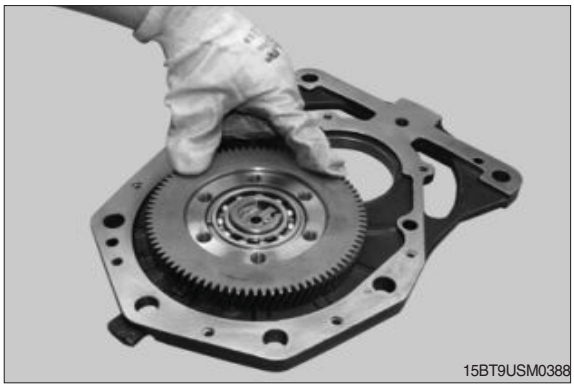


(3) Press the spur gear onto the housing cover.

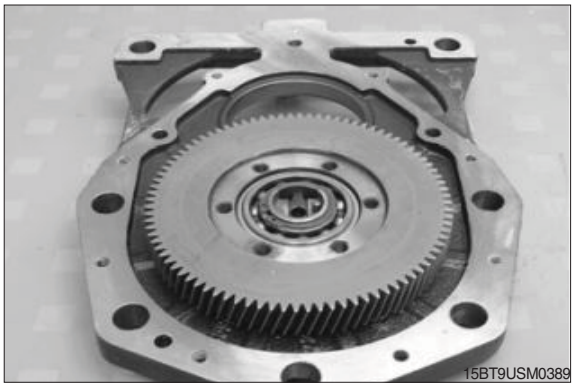
The side of the spur being worked on shall face upwards.
The punch of the hand lever press and input pinion shall be positioned vertically to each other without deflection.



(4) Manually check the spur gear for smooth running
The input pinion shall be easy to turn.
If it is, continue with the work.
If it is not : Check the bearing for any damage which may have occurred during the press fitting procedure.
If damage is found, remove the bearing and replace with a new one.

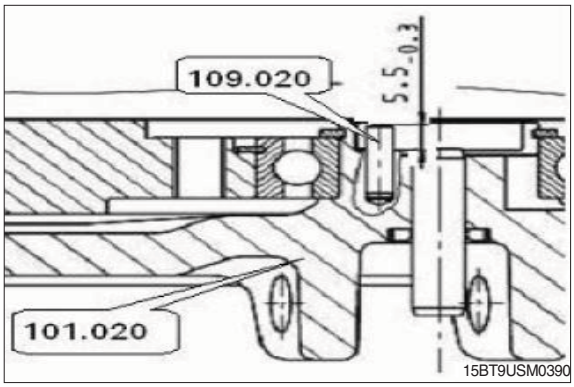


(5) Remove the housing cover from the hand lever press and place it in the assembly fixture with the mating surface facing upwards.



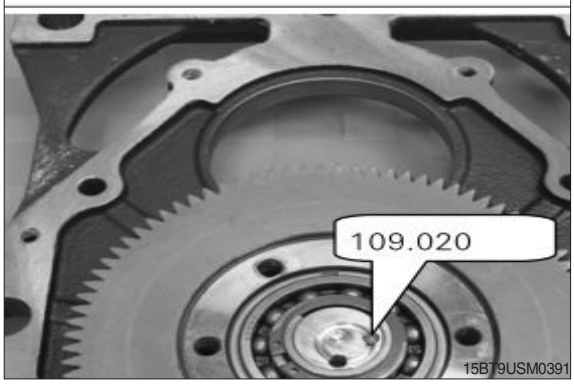
Axial bearing

(6) Check the heigh of the cylindrical pin (109.020) for a value of 5,5mm -0.3. If the measured value is found different from the given specification please remove the cylindrical pin (109.020) by using pliers and replace it by a new one installed at the correct mounting height.

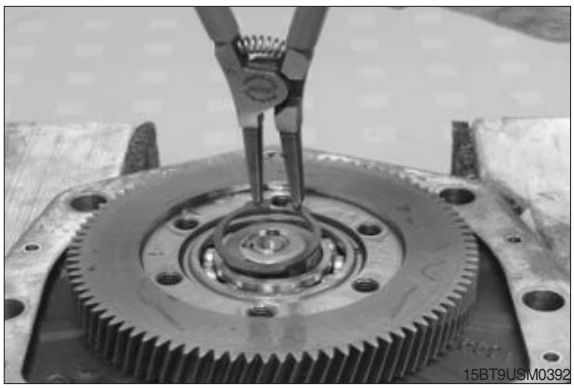


(7) Insert the axial bearing in the housing cover by hand.
The lubrication groove of the axial bearing shall face upwards.

Please assure proper position of the axial bearing related to the cylindrical pin.



(8) Insert the spur gear retaining ring.

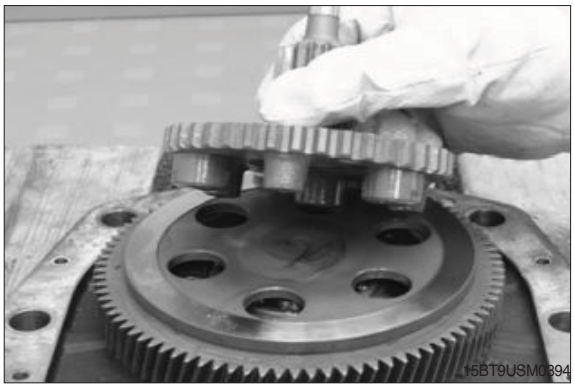


Inner disc carrier

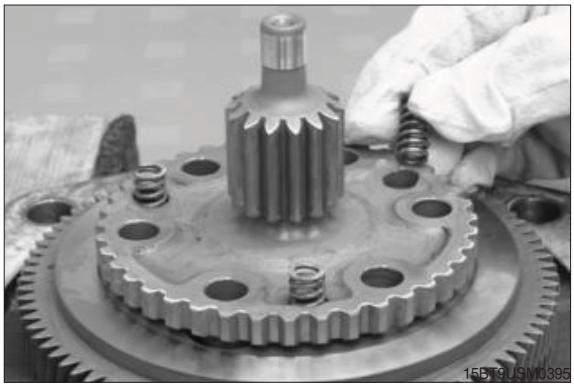
(9) Place the pressure plate on the spur gear by hand.

The bulge in the pressure plate shall be at the top. The holes in the pressure plate and the spur gear shall be positioned on top of each other.

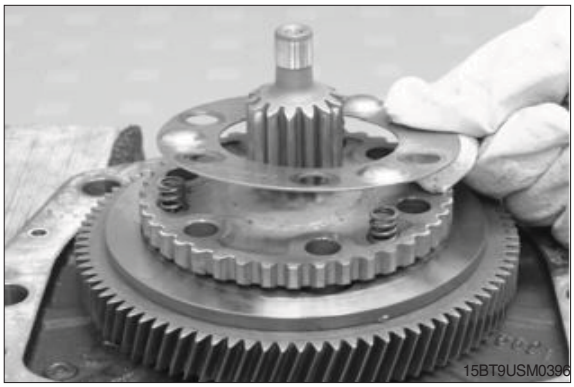
(10) Fit the inner disc carrier onto the spur gear) by hand.
The inner disc carrier fits onto the spur gear in one position only. Find out by trial and error the position in which the inner disc carrier needs to be set in relation to the spur gear.



(11) Insert the 3 pressure springs 1.6 x 8.0 x 21.5 into the inner disc carrier by hand.

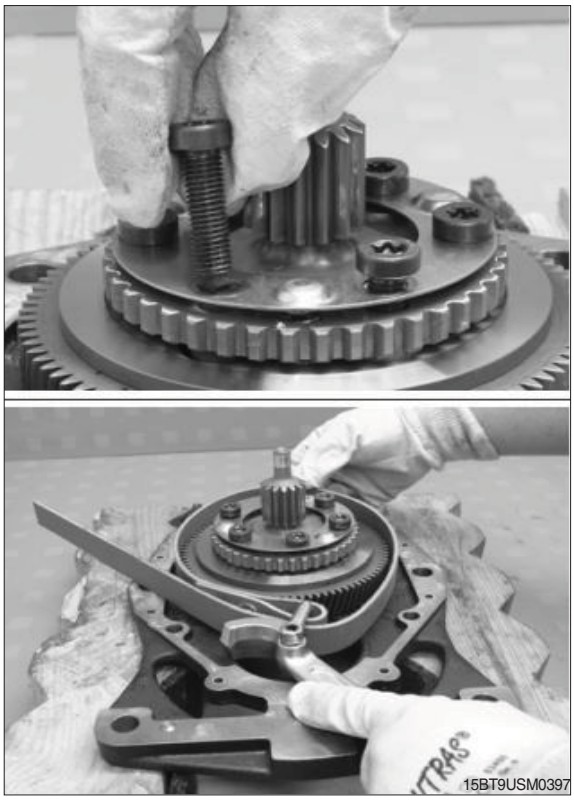


(12) Place the fixing plate over the pressure spring by hand. The springs shall be firmly seated in the recesses in the retaining ring.



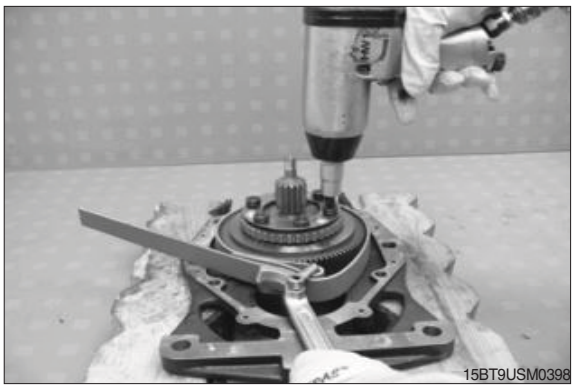
(13) Insert the 6 Torx bolts into the fixing plate and screw them down into the spur gear tighten them by hand.

Place the cover assembly onto a suitable support (e.g. 2 pcs. of wooden strips) and assure an even and stable rest. Place the strap around the spur gear and tighten it by using the wrench lever. Spur gear must be free from grease and oil residue.



(14) Hold the spur gear tight using the strap wrench. Tighten the 6 Torx bolts to a tightening torque of 70Nm using an adjustable compressed-air screwdriver.

The bolts shall be tightened in a crosswise pattern.



Disc set

(15) Place the disc set – consisting of 3 driven discs, 4 drive discs and 1 pressure disc– into the internal gear.

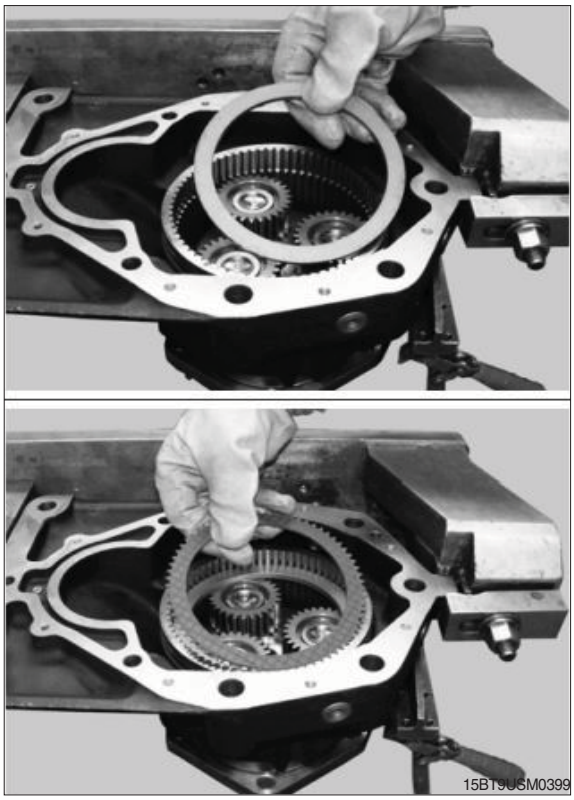
① Insert the pressure disc.

② Insert a drive disc.

③ Insert a driven disc.

④ Insert drive and driven discs alternately.

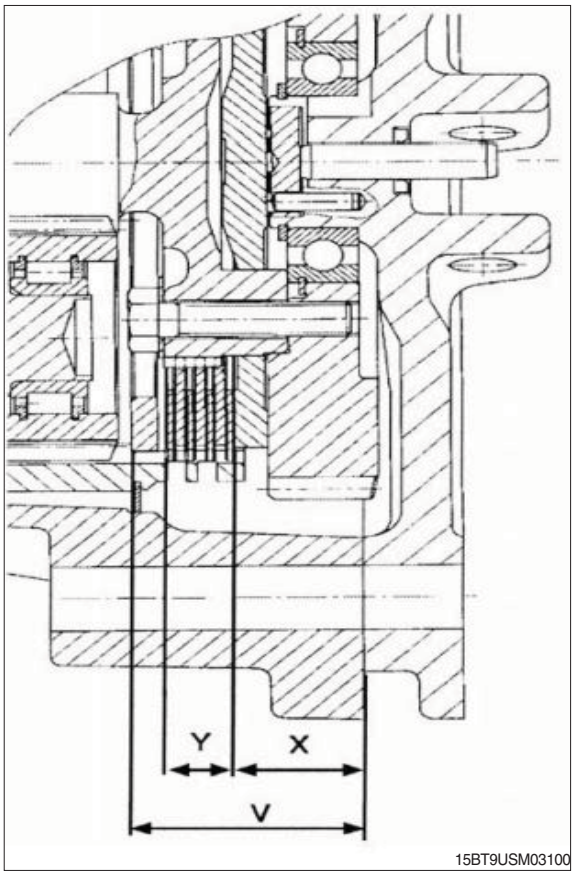
Insert the driven discs so that the side on which the teeth are rounded off faces upwards. The driven discs are completely even in circumference direction. They are non-sinusoidal. You do not need to bring them in a specific order prior installation.



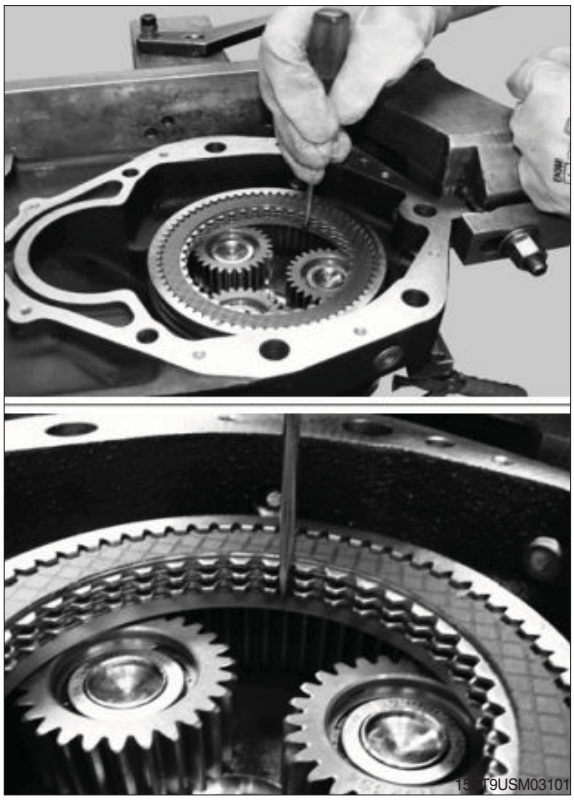
(16) Determining the thickness of the pressure disc
W=X+Y, Z=V-W

Z [mm] Pressure disc thickness
5.58 to 6.10 4.8 mm thick
6.11 to 6.70 5.3 mm thick
6.71 to 7.22 5.8 mm thick

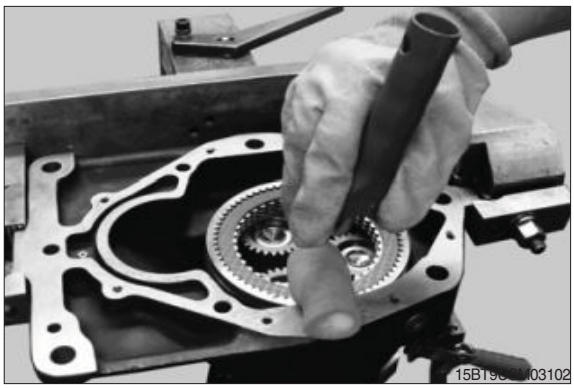
"X" is the distance between the plane face of the cover and plane face of the pressure disc.
"Y" is the thickness of the disc set when it is compressed.
"W" is a reference dimension calculated by adding X and Y.
"V" is the distance between the plane face of the housing and the contact surface of the pressure disc in the internal gear.
"Z" is a reference dimension calculated by subtracting V and W.



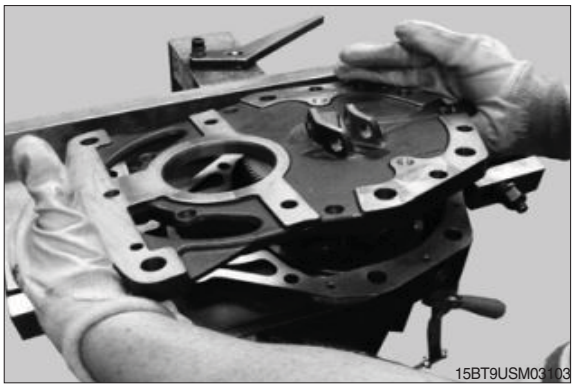
(17) Arrange the driven discs.
The teeth on all driven discs shall be positioned precisely in line with each other.



(18) Coat the mating surface of the housing and the housing cover with Loctite 574.



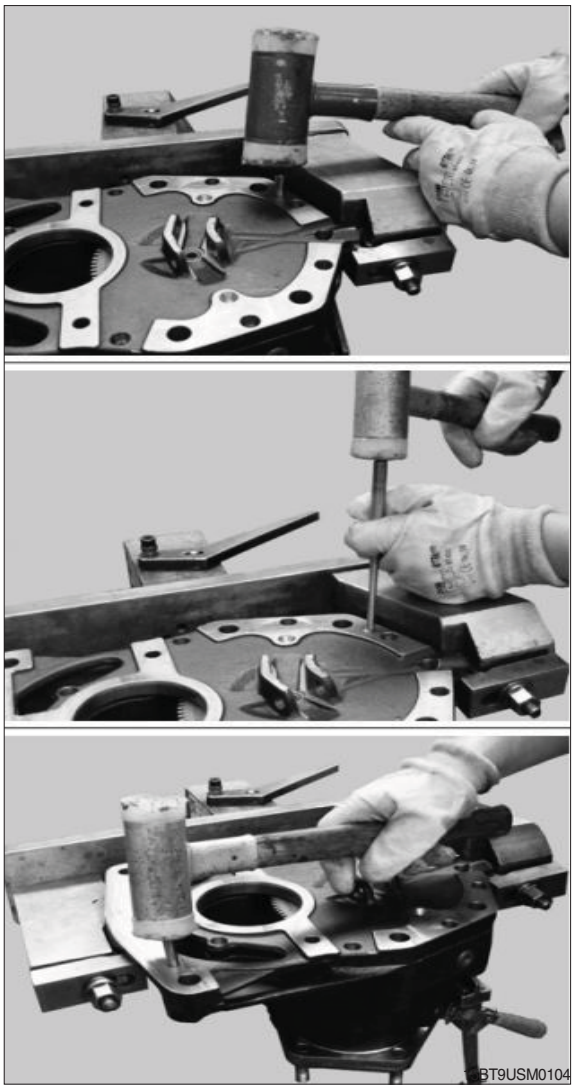
(19) Fit the housing cover to the housing by hand.
Care shall be taken to ensure that the guide of the inner disc carrier comes to rest in the needle sleeve.



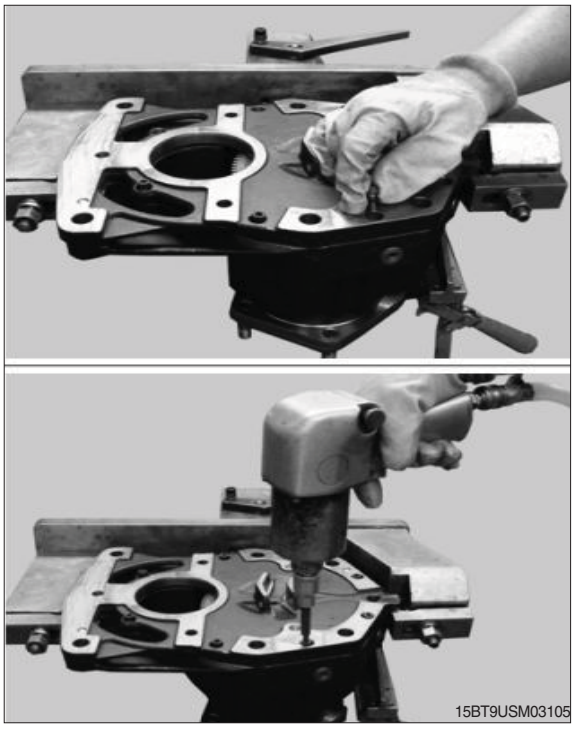
Cylinder pin

(20) Drive the cylindrical pin into the housing.

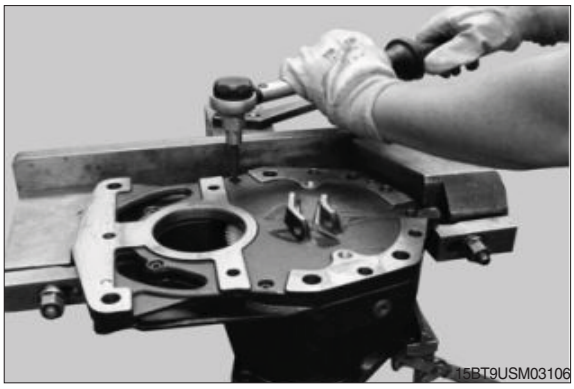
The cylindrical pins shall be driven in so that they are flush with the surface.



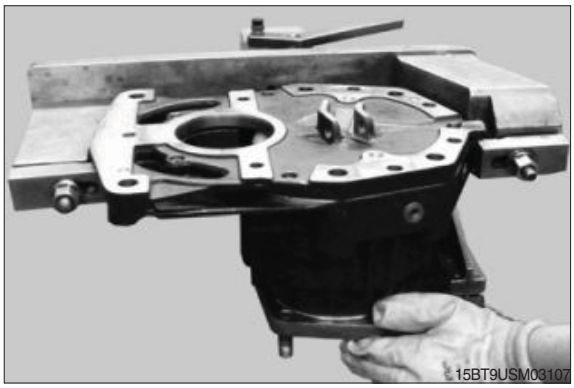
(21) Screw the 8 Allen bolts into the housing cover by hand and slightly tighten with a compressed air screwdriver.



(22) Tighten the 8 Allen bolts to a tightening torque of 9.5 Nm.



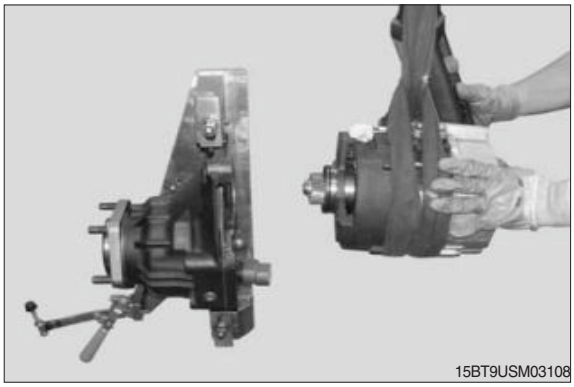
(23) Manually check the wheel shaft for smooth running.
It shall be possible to move the wheel shaft easily by hand.



3) Motor reassembly

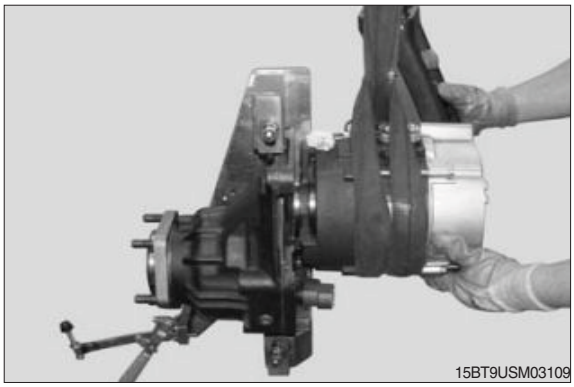
Motor

(1) Fasten the motor to suitable lifting gear using approved attachment equipment.



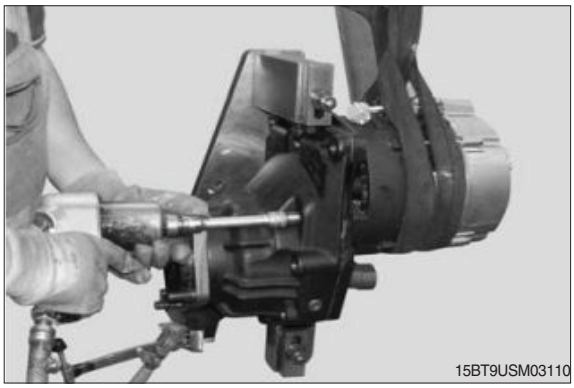
(2) Position the motor in front of the drive unit and manually mesh the motor pinion with the spur gear pinion.

When meshing the motor pinion with the spur gear, make sure that both sets of teeth are not tilted or damaged.
The motor connections shall be at the top in the installation position.



(3) Fasten the motor to the drive unit with the 3 Allen bolts.

Screw in the shorter Allen bolt at the top of the drive unit and each of the two other bolts into the right hand and left-hand side of the drive unit.



(4) Firmly tighten the 3 Allen bolts to a tightening torque of 23Nm.