SECTION 3 POWER TRAIN SYSTEM

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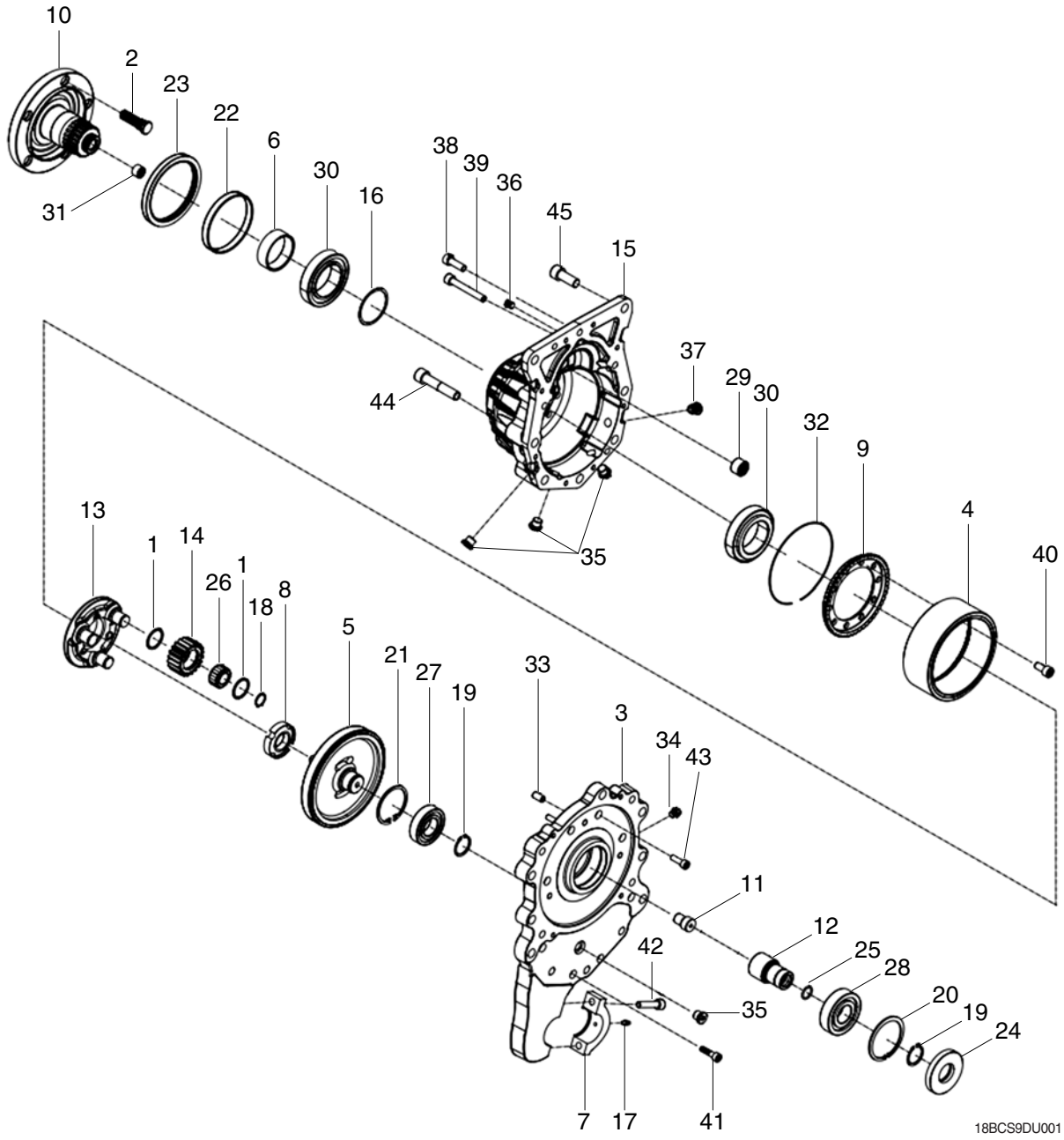
SECTION 3 POWER TRAIN SYSTEM

GROUP 1 STRUCTURE AND OPERATION

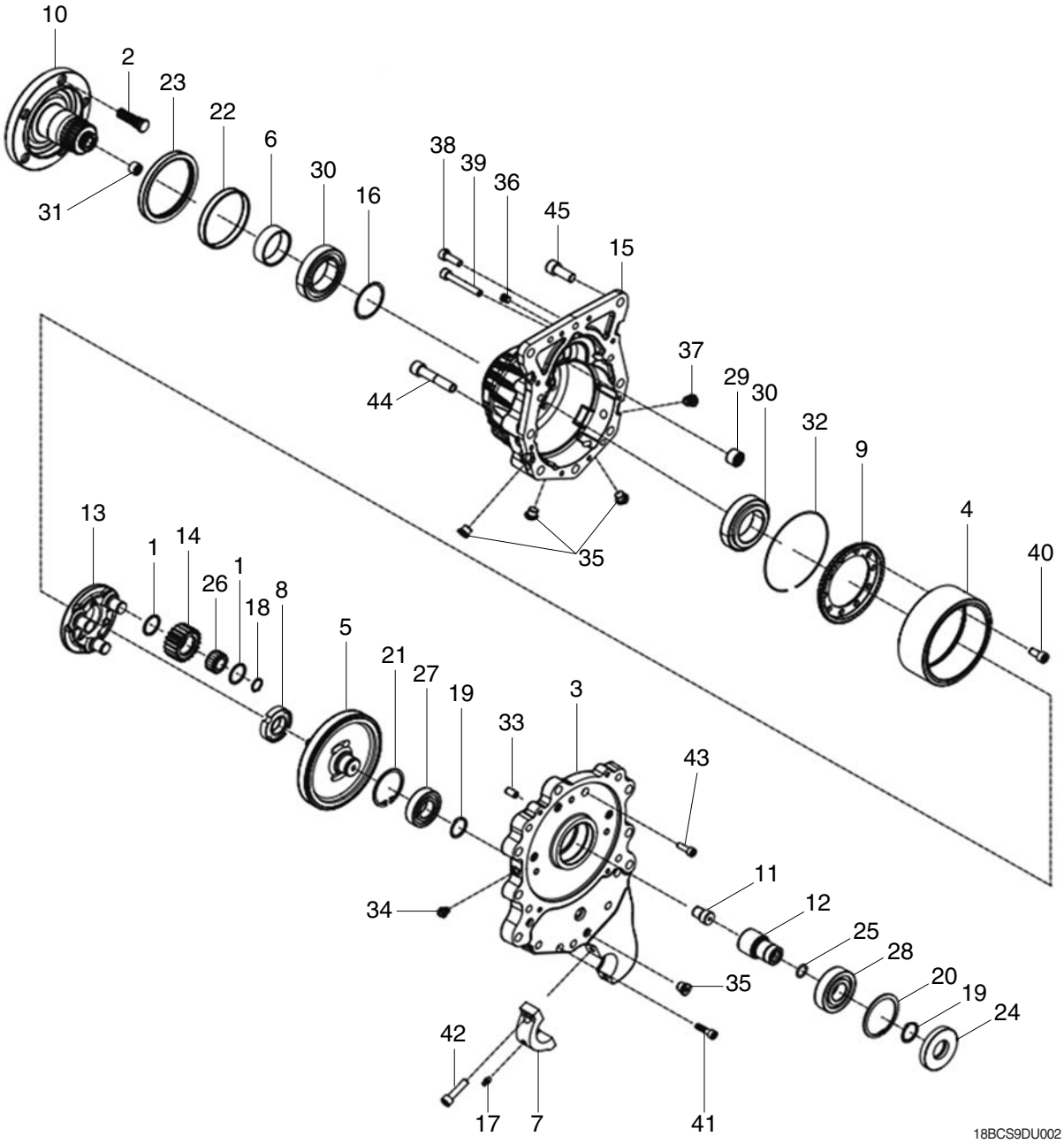
1. DRIVE UNIT

1) STRUCTURE - LH



1	Elastic ring	13	Planetary carrier	25	O-ring	37	Magnetic plug
2	Wheel hub bolt	14	Planet gear	26	Roller bearing	38	Screw
3	Gearbox cover - LH	15	Gearbox housing	27	Ball bearing	39	Screw
4	Planetary ring gear	16	Spacer	28	Ball bearing	40	Screw
5	Spur gear	17	Grease nipple	29	Needle roller bearing	41	Screw
6	Spacer	18	Snap ring - shaft	30	Roller bearing	42	Screw
7	Cover flange - LH	19	Snap ring - shaft	31	Needle roller cage	43	Screw
8	Locking nut	20	Snap ring - hole	32	Elastic ring	44	Screw
9	Ring gear carrier disc	21	Snap ring - hole	33	Dowel pin	45	Screw
10	Wheel hub	22	Seal	34	Breather plug		
11	Pinion pin	23	Shaft seal	35	Plug		
12	Pinion	24	Seal	36	Plug		

STRUCTURE - RH



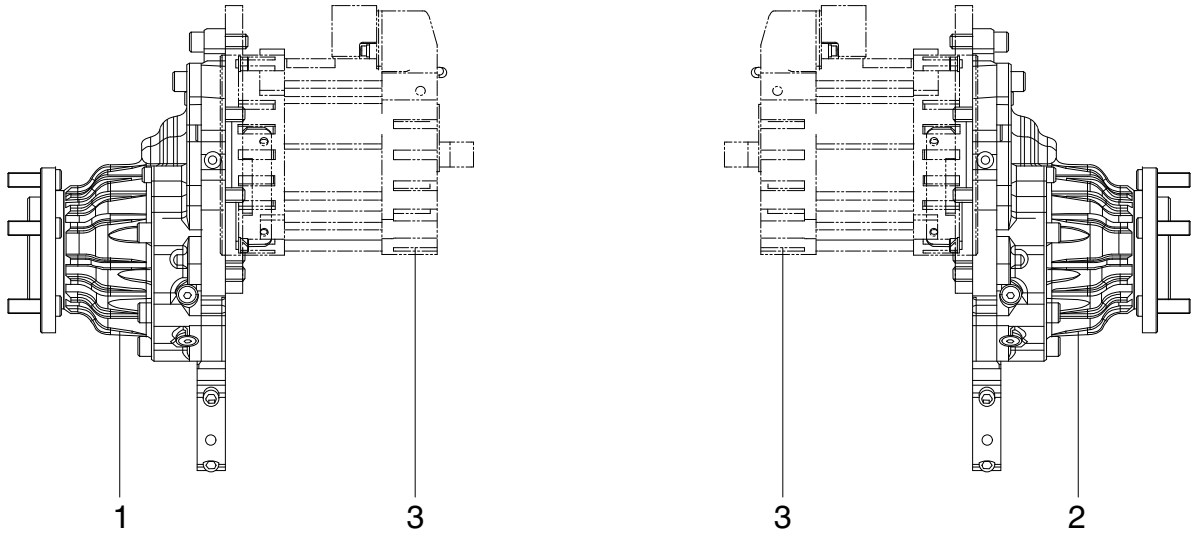
1	Elastic ring	13	Planetary carrier	25	O-ring	37	Magnetic plug
2	Wheel hub bolt	14	Planet gear	26	Roller bearing	38	Screw
3	Gearbox cover - RH	15	Gearbox housing	27	Ball bearing	39	Screw
4	Planetary ring gear	16	Spacer	28	Ball bearing	40	Screw
5	Spur gear	17	Grease nipple	29	Needle roller bearing	41	Screw
6	Spacer	18	Snap ring - shaft	30	Roller bearing	42	Screw
7	Cover flange - RH	19	Snap ring - shaft	31	Needle roller cage	43	Screw
8	Locking nut	20	Snap ring - hole	32	Elastic ring	44	Screw
9	Ring gear carrier disc	21	Snap ring - hole	33	Dowel pin	45	Screw
10	Wheel hub	22	Seal	34	Breather plug		
11	Pinion pin	23	Shaft seal	35	Plug		
12	Pinion	24	Seal	36	Plug		

2. SPECIFICATION

Item	Unit	Specification
Gear ratio	-	27.1
Oil quantity	ℓ	0.45 × 2EA

3. OPERATION

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.



18BCS9DU003

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

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.

GROUP 2 TROUBLESHOOTING

Problem	Cause	Remedy
1. Consecutive noise in the housing	· Lack of oil	· Refill the oil
	· Incorrect contact between planetary gear and driving gear	· Disassemble, check and readjusting
	· Damage, wear planetary gear and driving gear	· Replace damaged or wear gear
	· Loosened or worn wheel hub bearing	· Disassemble, check and readjusting or replace the components
2. Abnormal noise during rotation	· Excessive back lash the driving gear and planetary gear	· Replace the driving gear and the planetary gear
	· Damage, worn of the gear	· Replace the gear
	· Damage, worn of the bearing	· Disassemble, check and readjusting or replace the bearing
3. Oil leakage	· Overfill to the specified level	· Readjust oil level
	· Pluged air breather	· Clean or replace the air breather
	· Damage, worn, poor assembly for oil seal of wheel hub	· Replace oil seal
	· Poor assembly of the drain plug	· Disassemble, check and readjusting
	· Damage O-ring for motor connection	· Replace the O-ring
4. No rotation of the drive wheel	· Breakage, deformation the shaft	· Replace the shaft
	· Damage, breakgae the gear	· Replace the gear
	· Damage, breakgae the bearing	· Replace the bearing
5. Brake No operation the brake	· Damage, deformation the friction disc or plate	· Disassemble, check, replace
No smooth operation the brake pedal	· Damage, deformation the friction disc of the brake	· Disassemble, check, replace
No release the brake	· Defect the brake disc assembly	· Disassemble, check, replace
Frequent refilling the brake oil	· Leakage from the piston seal	· Disassemble the piston seal and replace it
Available braking when depressing the brake pedal with maximum	· Excessive clearance of the discs due to wear of the friction disc for operation	· Adjust the stroke of the brake pedal · Disassemble the brake pack, check and replace it · Readjust the stroke of the piston

GROUP 3 DISASSEMBLY AND ASSEMBLY

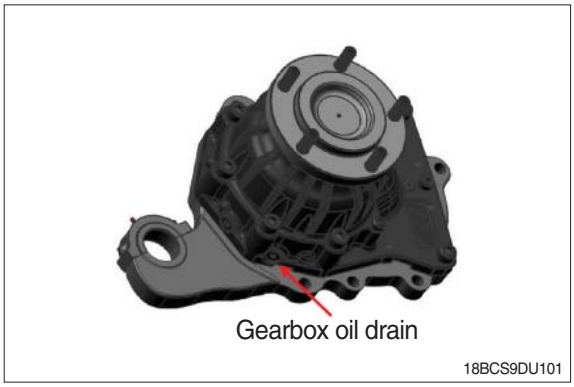
1. DISASSEMBLY

※ During assembly and disassembly activities use caution and proper safety equipment, in observance of the rules provided by safety laws.

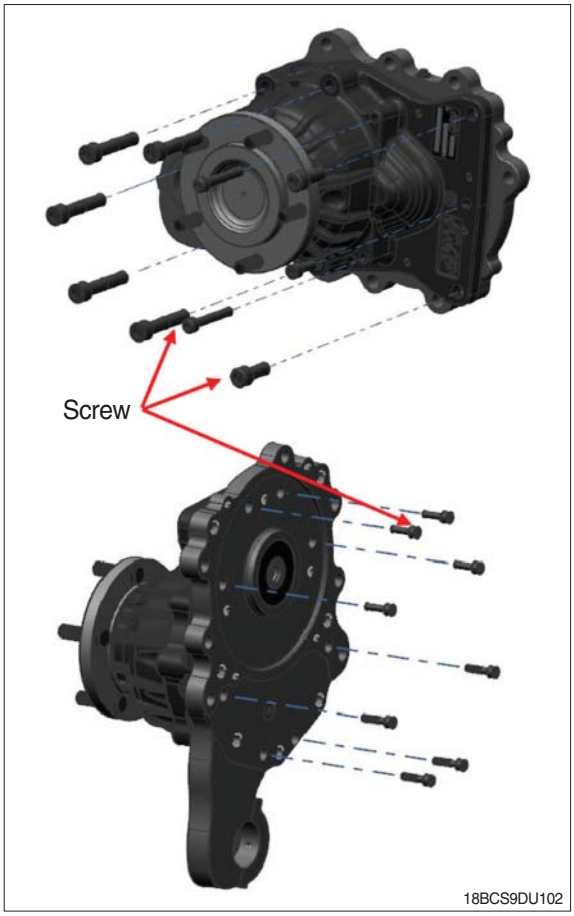
1) GEARBOX DISASSEMBLY

(1) Remove the oil from gearbox.

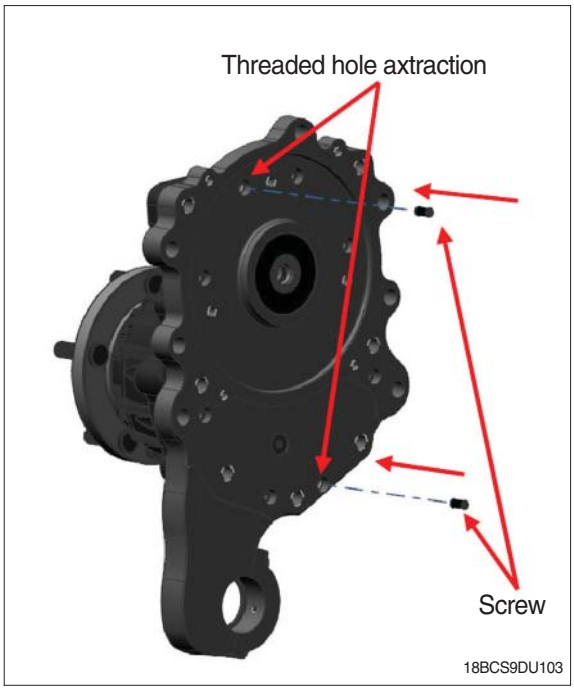
※ Respect the environment.
Do not dispose into the environment.



(2) Using the appropriate wrench remove the screws.

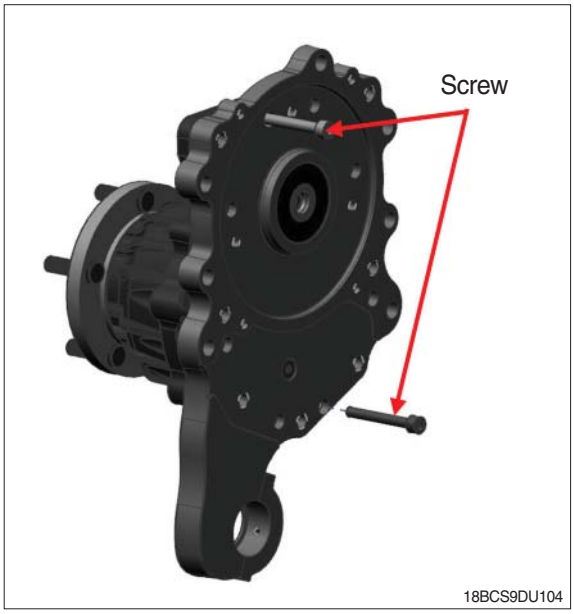


(3) Insert 2 grub screws in the threaded hole extraction of the cover.



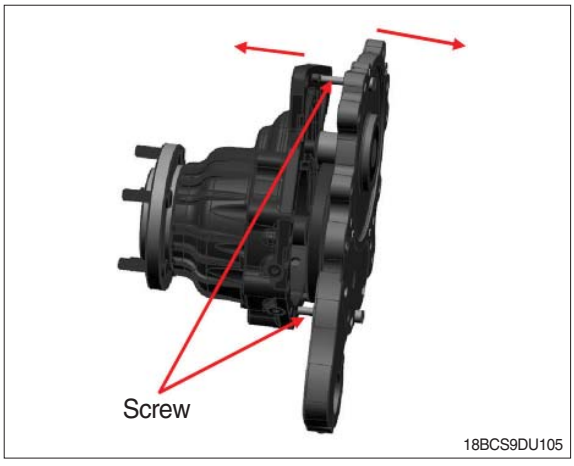
(4) Insert 2 screws in the threaded hole extraction of the cover.

※ Pay attention not to damage components.
※ Compulsory requirement.



(5) Tighten the screws and so remove the gearbox cover.

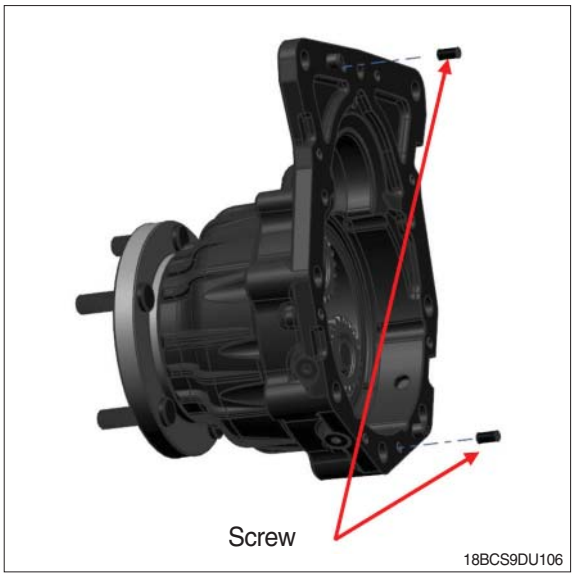
⚠ **Watch your step, your back and your hands : the component is heavy, move it carefully.**



(6) Remove the grub screws from the housing.

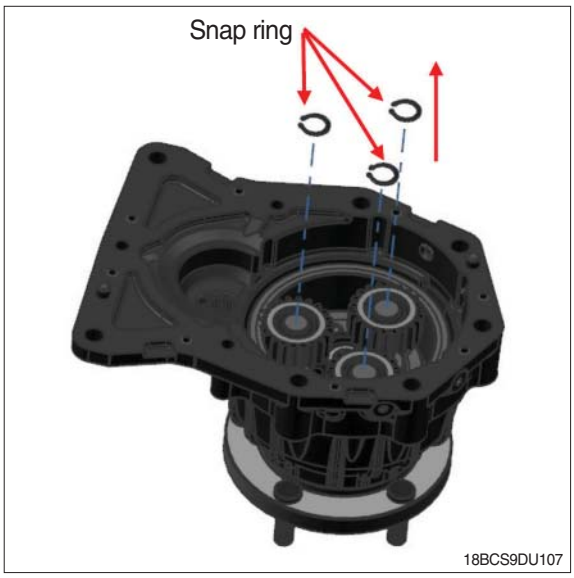
※ Pay attention not to damage components.

※ Compulsory requirement.



(7) Using the appropriate pliers remove the snap rings of the planetary carrier.

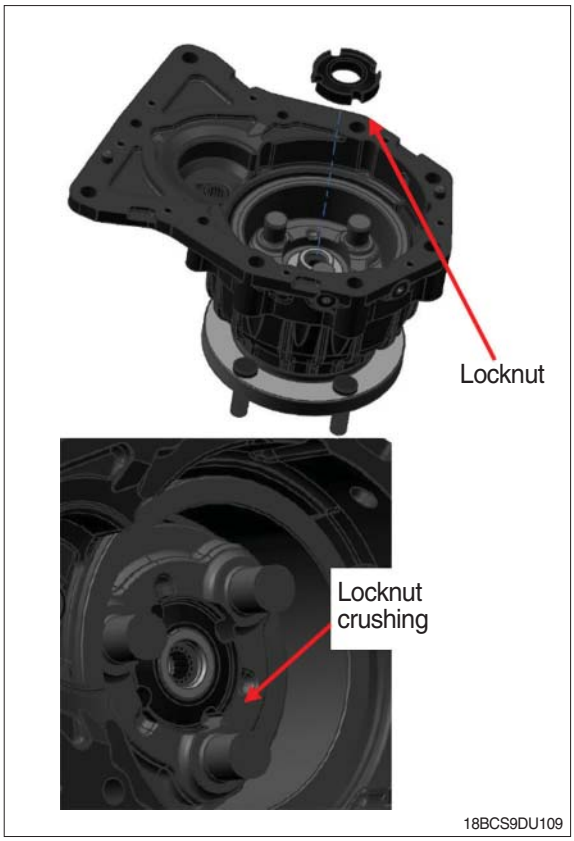
※ Pay attention not to damage components.



(8) Using the extractor remove the assembled planet gears.

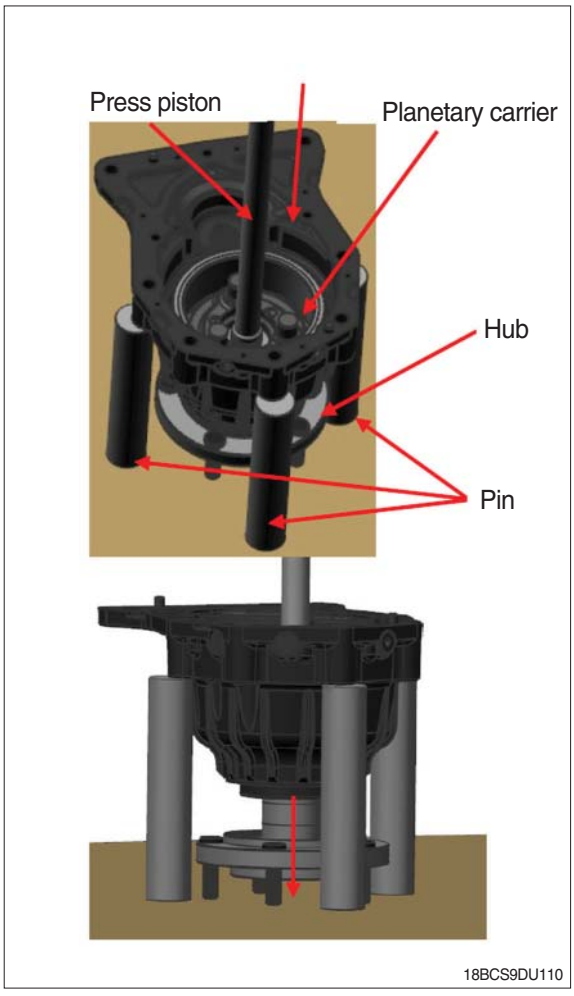
(9) Using the appropriate wrench remove the locknut.

※ The crushing must be cut out before to removing the locknut.
※ Pay attention not to damage components.
※ Compulsory requirement.

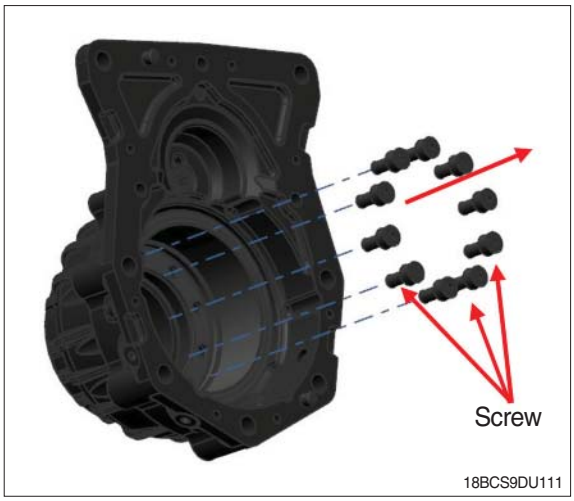


(10) Place the gearbox on 3 pins and using the press push the hub and so remove it.

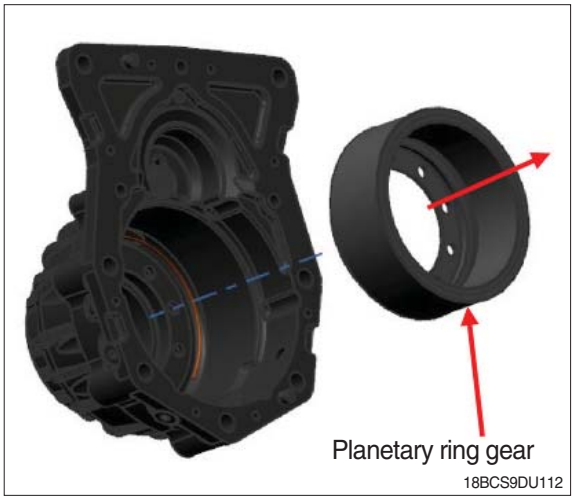
※ Pay attention not to damage components.
※ Compulsory requirement.
⚠ **Crush hazard : keep hands clear.**



(11) Using the appropriate wrench remove the screws of the planetary ring gear.

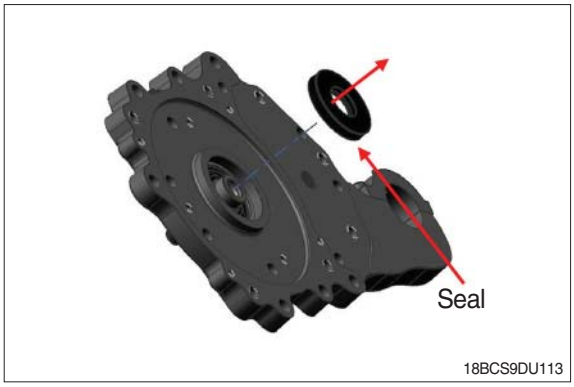


(12) Then remove the planetary ring gear.

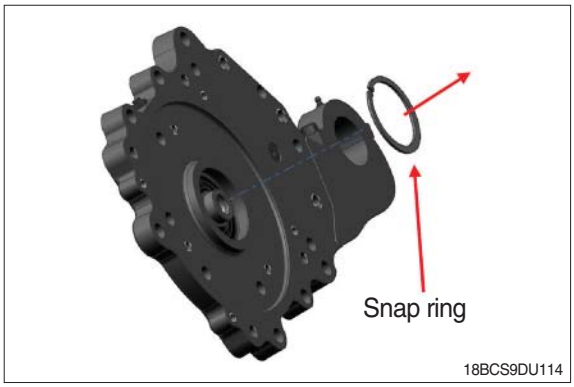


2) COVER DISASSEMBLY

(1) Remove the input shaft seal.

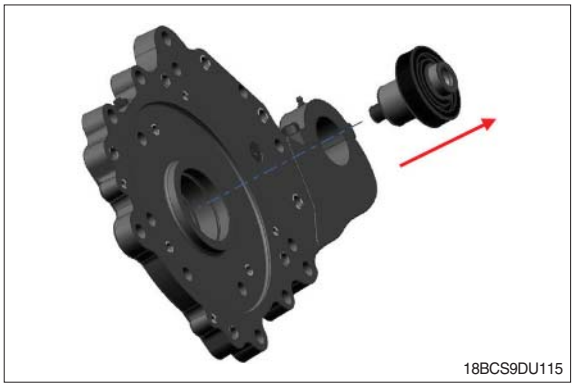


(2) Using the appropriate pliers remove the snap ring.



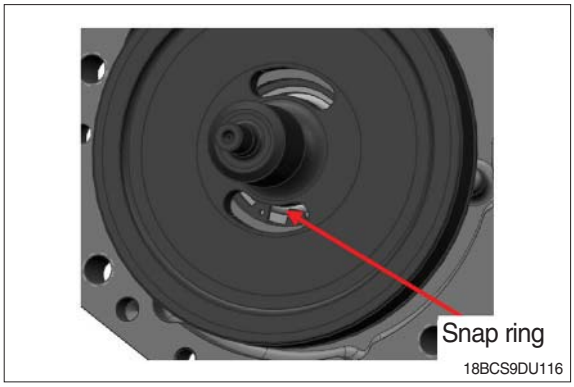
(3) Remove the input shaft assy. Use the press if necessary.

⚠ **Crush hazard : keep hands clear.**



(4) Using the appropriate pliers, release the snap ring of the sun gear.

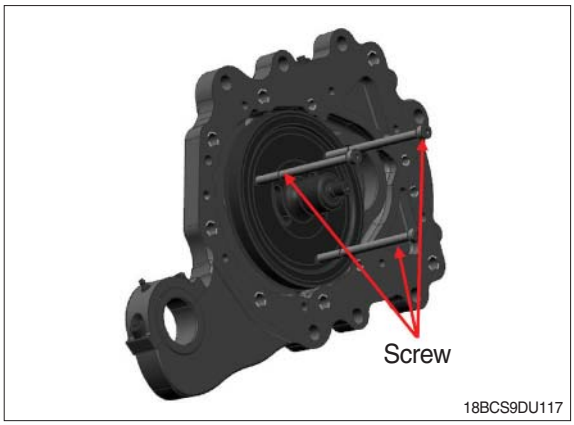
※ Pay attention not to damage components.



(5) Insert 3 M8 screws in the threaded holes of the sun gear.

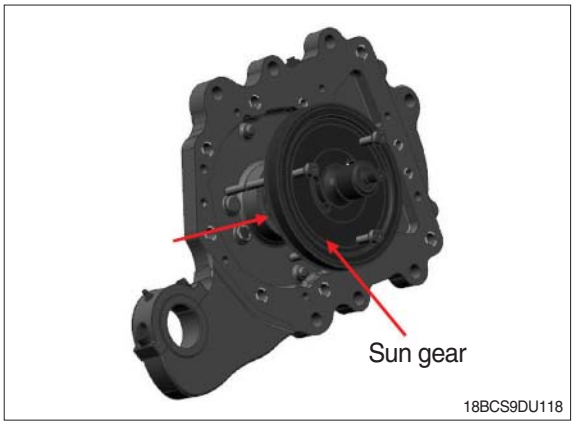
※ Pay attention not to damage components.

※ Compulsory requirement.



(6) For remove the sun gear tighten the screws.

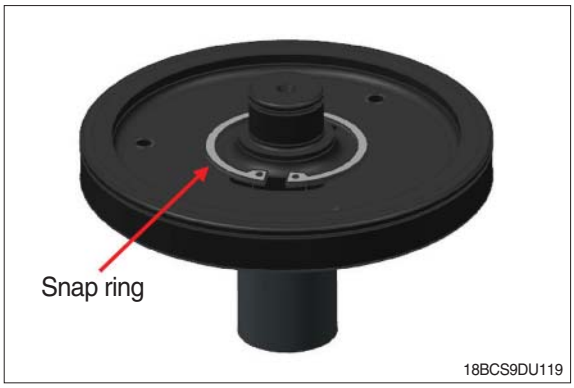
※ Pay attention not to damage components.



2. DISASSEMBLY

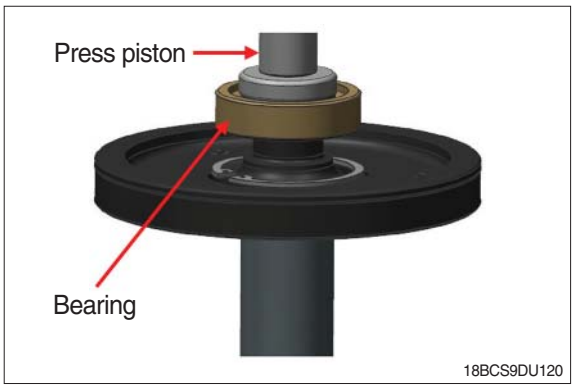
1) COVER DISASSEMBLY

(1) Place the spur gear on the tool and place on it the snap ring.

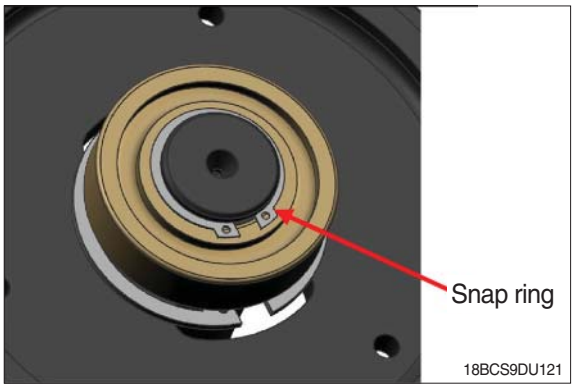


(2) Place the bearing on the sun gear and using the press insert it.

⚠ **Crush hazard : keep hands clear.**

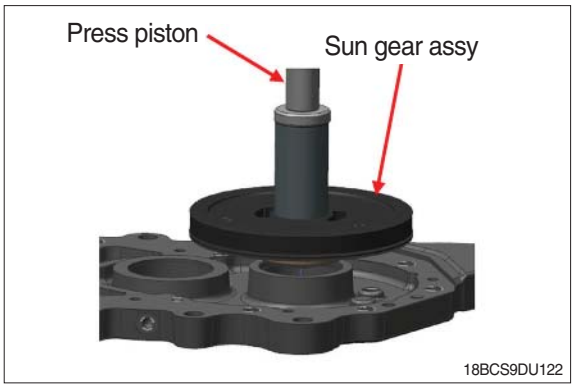


(3) Using the appropriate pliers insert the snap ring and so to block the bearing.

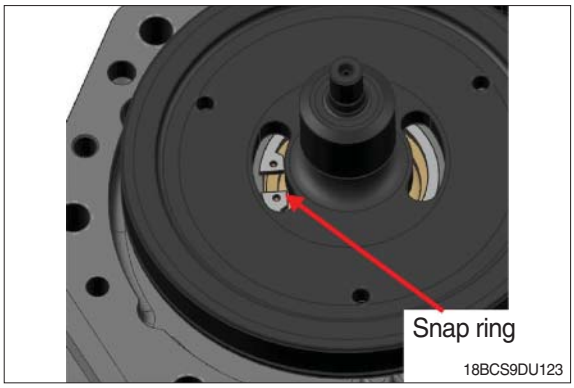


(4) Place the sun gear assy on the cover and insert it by press.

⚠ **Crush hazard : keep hands clear.**



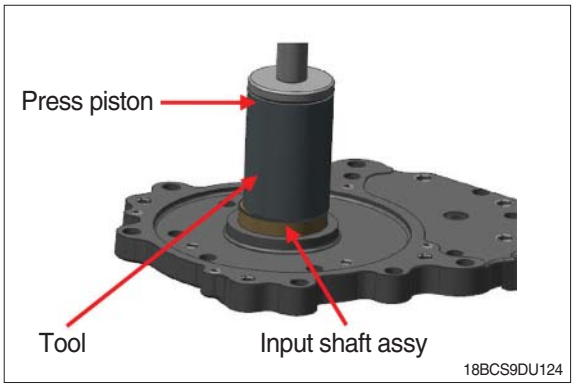
(5) Using the appropriate pliers insert the snap ring and so block the sun gear.



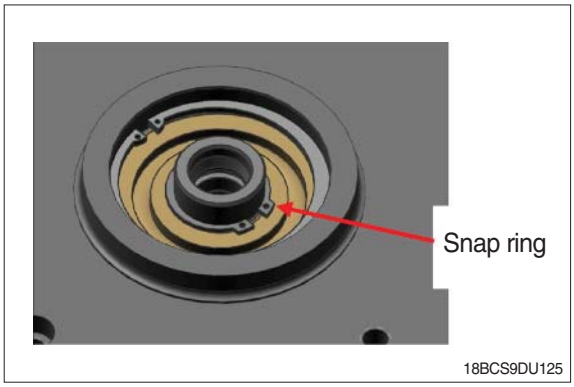
(6) Place the input shaft assy on the gearbox cover and insert it using the press.

※ Use the tool for this operation.

⚠ Crush hazard : keep hands clear.



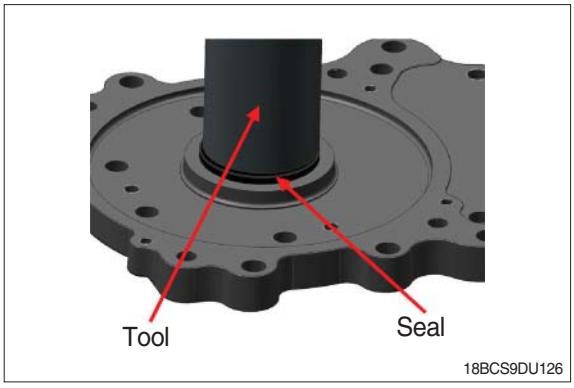
(7) Insert the snap ring using the appropriate pliers.



(8) Place the seal on seat cover and using the appropriate tool, insert it.

※ Use the rubber hammer for this operation.

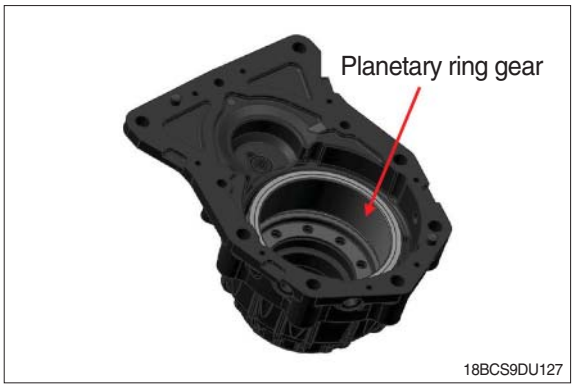
※ Pay attention not to damage components.



2) GEARBOX ASSEMBLY

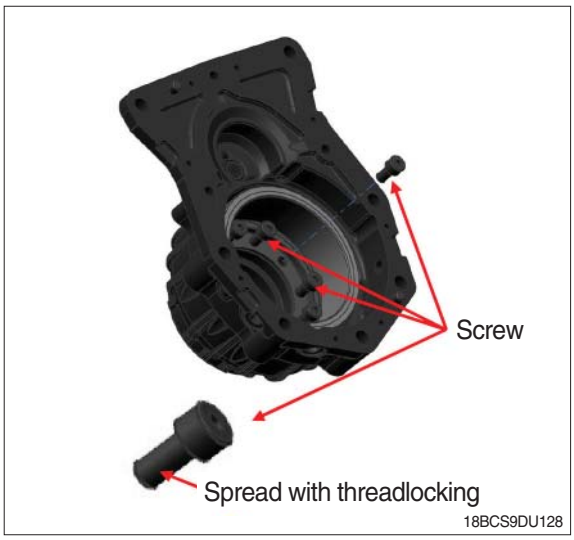
(1) Insert the planetary ring gear in the gearbox housing.

※ Pay attention not to damage components.
※ Compulsory requirement.



(2) Spread with medium threadlocker the screws and place them in the appropriate seat.

※ Pay attention not to damage components.
※ Sealing/locking fluid application.



(3) Tighten the screws with a torque of 7.1 kgf · m (51.4 lbf · ft).

※ Tighten the screws in a criss-cross pattern.
※ Tightening with torque wrench.

(4) Place the housing on the hub.

⚠ Watch your step, your back and your hands : the component is heavy, move it carefully.

(5) Place the bearing in the hub and using the press insert it.

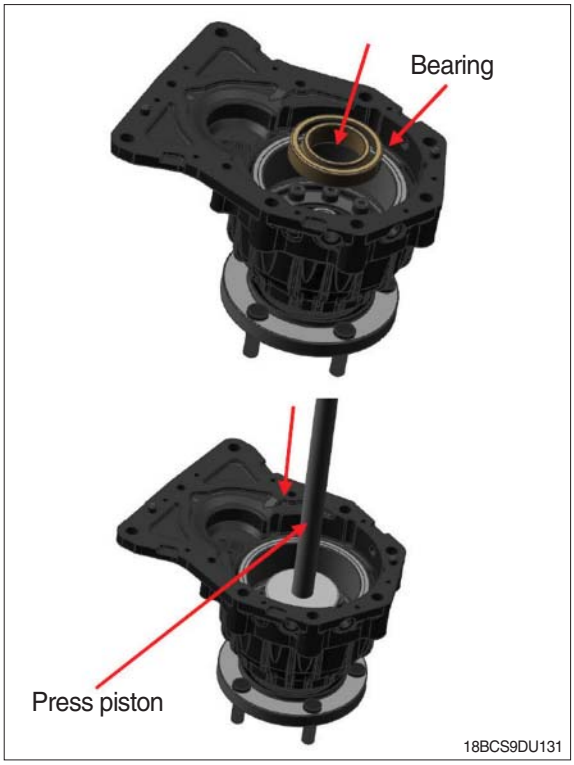
※ The bearing must be heated for this operation (about 80 ˚C).

※ Use an appropriate tool to push the bearing.

※ Pay attention not to damage components.

※ Compulsory requirement.

⚠ **Crush hazard : keep hands clear.**



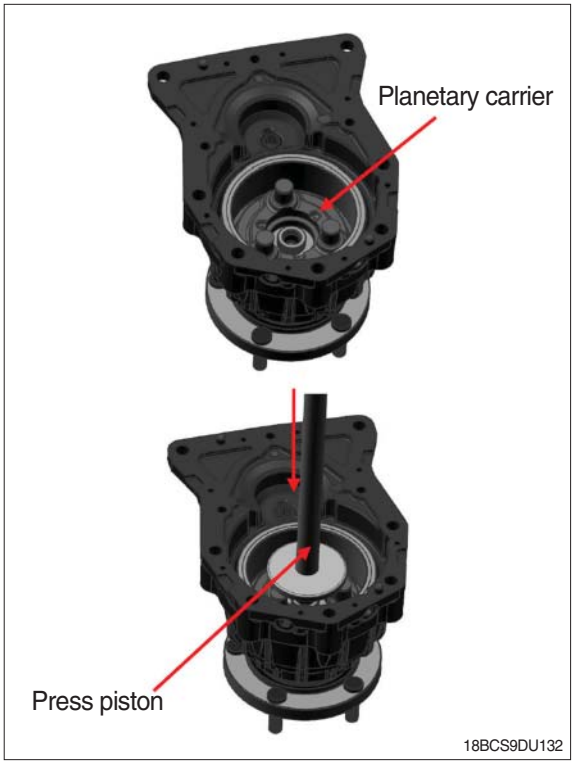
(6) Place the planetary carrier on the hub.

※ The planetary carrier must be heated (about 70 ˚C) for this operation.

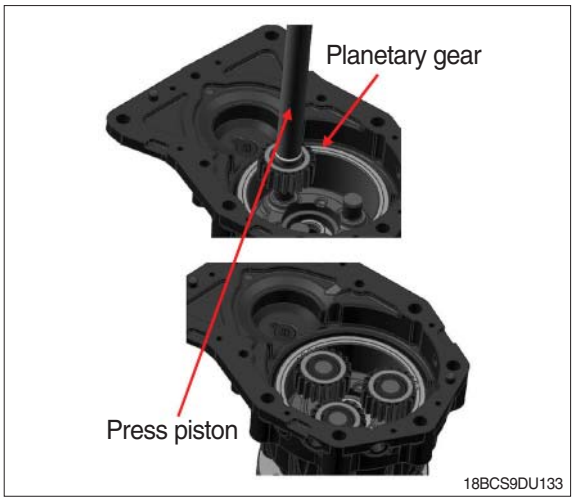
※ Use an appropriate tool to push the planetary carrier.

⚠ **Watch your step, your back and your hands : the component is heavy, move it carefully.**

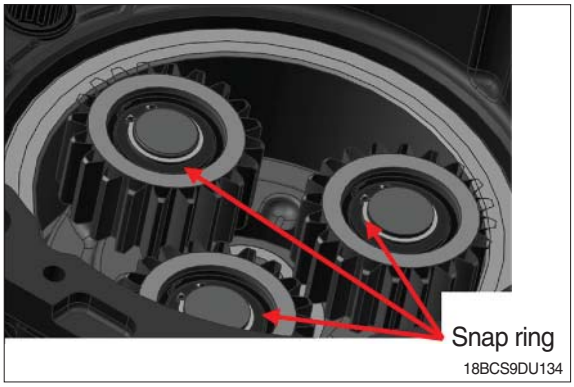
⚠ **Crush hazard: keep hands clear.**



(7) Place a planet gear assy on a planetary gear pin and, using the press, insert it. Repeat the operation for all planet gears assy.

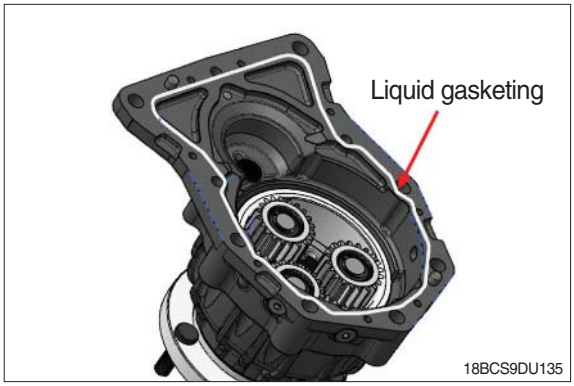


(8) Using the appropriate pliers insert the snap rings on the planet gears.



(9) Spread with liquid gasketing the housing.

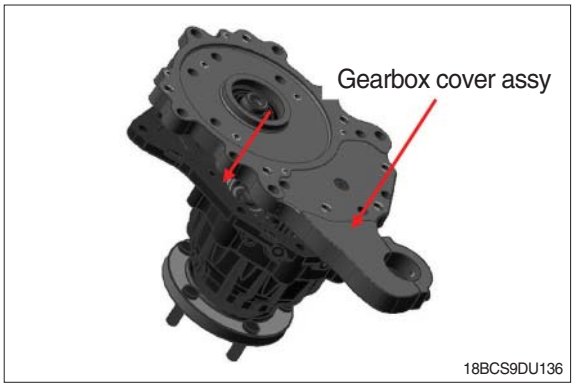
※ Sealing/locking fluid application.



(10) Place the gearbox cover assy and insert it on the gearbox. Use the rubber hammer if necessary.

⚠ Watch your step, your back and your hands : the component is heavy, move it carefully.

※ Pay attention not to damage components.



(11) Insert the screws and tighten them using the following torque :
M8 : 3.6 kgf · m (26.0 lbf · ft)
M10 : 7.1 kgf · m (51.4 lbf · ft)
M14 : 24.0 kgf · m (174 lbf · ft)

※ Spread with medium threadlocker the screws.
※ Tightening with torque wrench.
※ Sealing/locking fluid application.