

Document Title: <b>Power transmission, description</b>	Function Group: <b>400</b>	Information Type: <b>Service Information</b>	Date: <b>2015/9/8 0</b>
Profile: <b>EXC, EC700C LD [GB]</b>			

## **Power transmission, description**

The excavator's power transmission is a generic name of all components that transmit motive force to perform the various functions of the excavator. The mechanical power from the engine transmitted via the pump coupling is converted to hydraulic power by the main pumps. Hydraulic power from the main pump goes to the travel motors, slew motor and hydraulic cylinders via the main control valve, where it is converted back to mechanical power, that actuates the travel action, slew action and attachments. The reduction gears of the planetary mechanisms convert the high speed rotation of the hydraulic motor into low speed, high torque rotating force, at the track unit / sprocket for travel, and at the slew unit / ring gear for slewing. The center passage 360° rotating unit allows high pressure hydraulic flow from the main control valve to the track motors. The unit rotates with the superstructure without twisting hoses therefore oil flow is not obstructed by slewing.

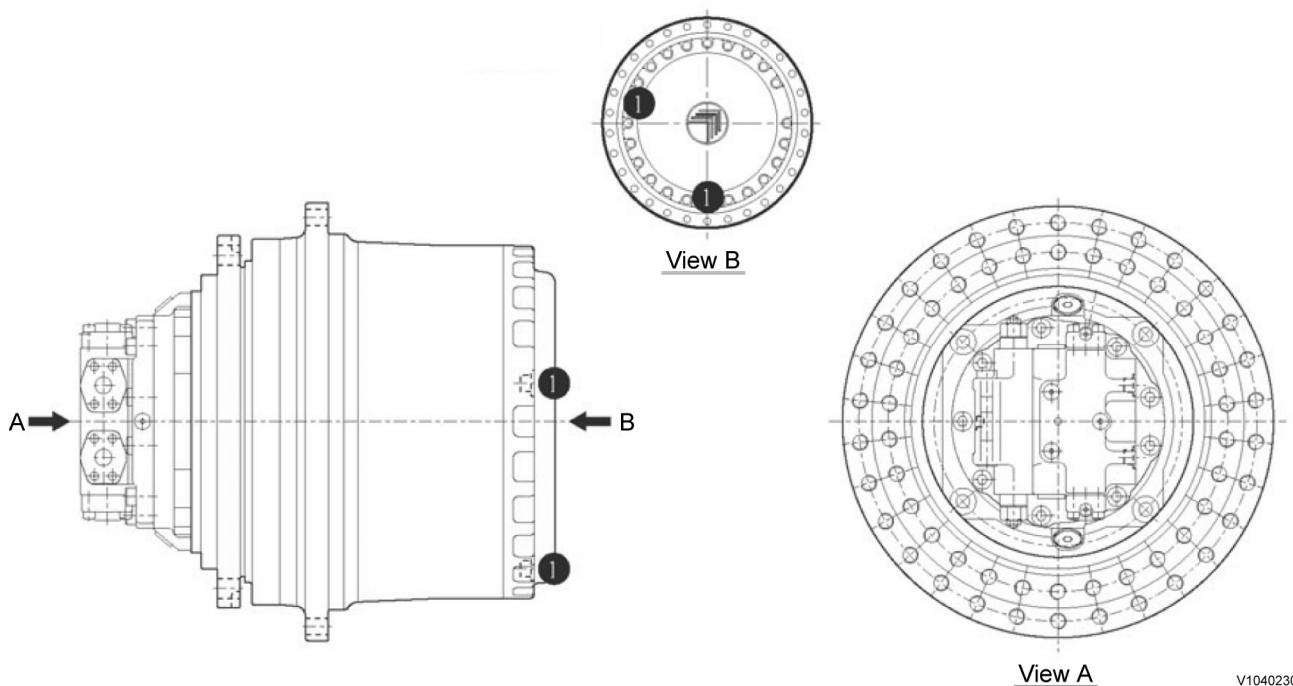
Document Title: <b>Track gearbox, description</b>	Function Group:	Information Type: <b>Service Information</b>	Date: <b>2015/9/8 0</b>
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## Track gearbox, description

The gearboxes of the series described in this manual are designed and built for application as track drive for crawler machines equipped with open loop hydraulic circuit.

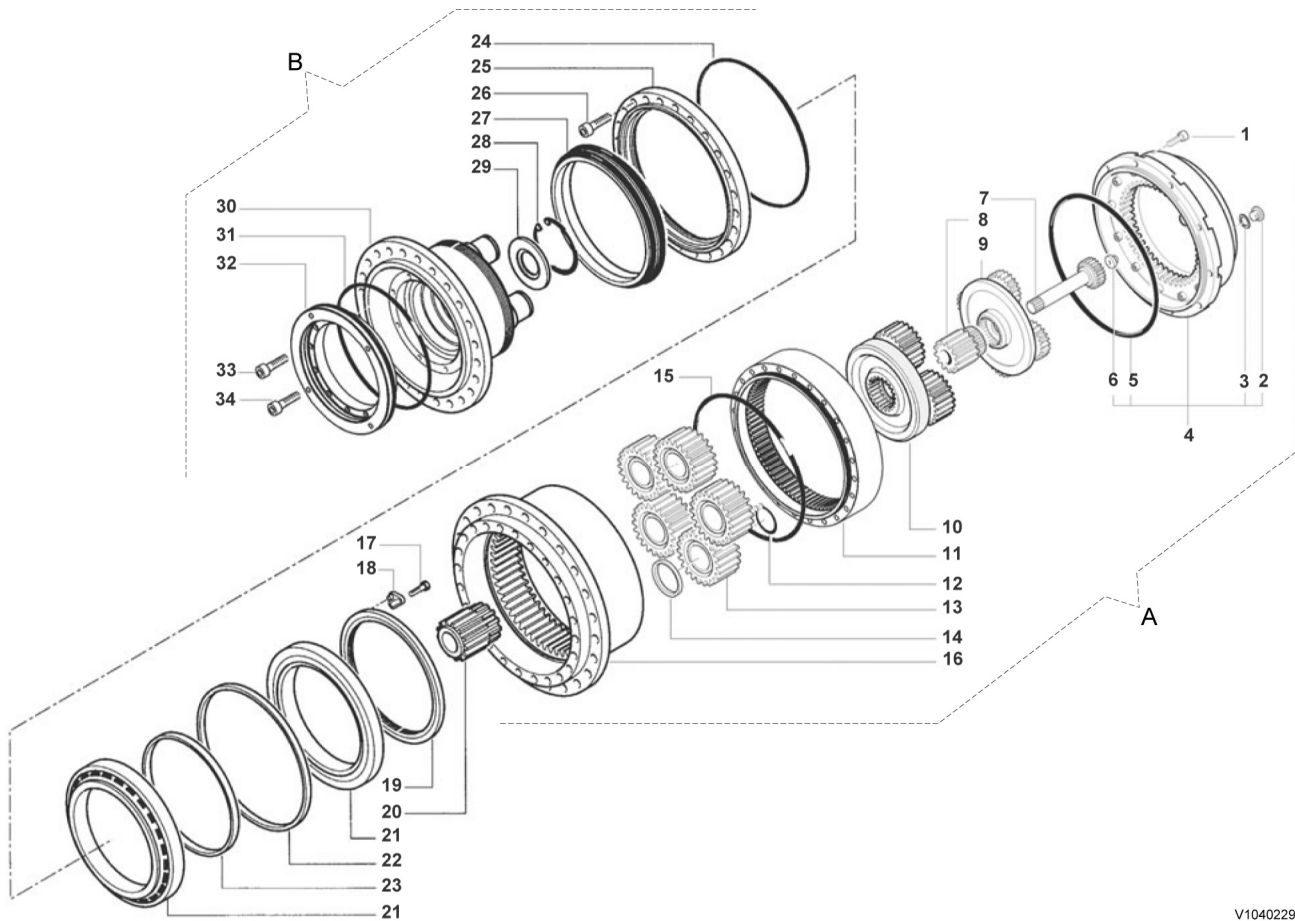
The unit includes planetary gearbox, 3 stages, and rotating housing type.

The illustrations show the main functions and the parts of the gearbox.



**Figure 1**  
**Track gearbox, structure**

1. Filling, draining and level oil plugs



V1040229

**Figure 2**  
**Track gearbox, exploded view**

1	Screw	10	2nd reduction assembly	19	Ring nut	28	Retaining ring
2	Oil breather plug	11	Ring gear	20	Sun gear	29	Discs retainer
3	O-ring	12	Retaining ring	21	Bearing	30	Hub
4	Cover assembly	13	Planetary assembly	22	Spacer	31	O-ring
5	O-ring	14	Spacer	23	Spacer	32	Motor adaptor
6	Pad	15	O-ring	24	O-ring	33	Screw
7	Sun gear	16	Gearbox housing	25	Cover	34	Screw
8	Sun gear	17	Screw	26	Screw	A	Reduction unit
9	1st reduction assembly	18	Back stop	27	Seal	B	Rotating housing

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Document Title: <b>Track gearbox, troubleshooting</b>	Function Group:	Information Type: <b>Service Information</b>	Date: <b>2015/9/8 0</b>
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## Track gearbox, troubleshooting

### Troubleshooting

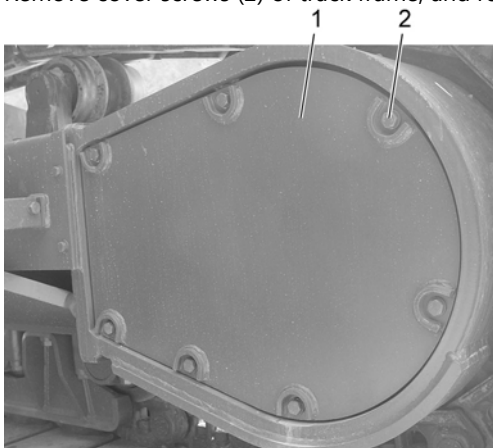
Trouble	Cause	Remedy
External oil leakage from the lifetime seal	<ul style="list-style-type: none"> <li>Lifetime damaged</li> </ul>	<ul style="list-style-type: none"> <li>Replace lifetime seal</li> </ul>
External oil leakage from the end cover	<ul style="list-style-type: none"> <li>O-ring seal damaged</li> </ul>	<ul style="list-style-type: none"> <li>Replace O-ring seals</li> </ul>
External oil leakage from the plugs of the cover	<ul style="list-style-type: none"> <li>Plug seal damaged</li> <li>Plugs or screws loose</li> </ul>	<ul style="list-style-type: none"> <li>Replace plug seal</li> <li>Tighten the plugs/screws</li> </ul>
Too much hydraulic noise (during the slowing down of the motor speed)	<ul style="list-style-type: none"> <li>Hydraulic circuit malfunctioning</li> </ul>	<ul style="list-style-type: none"> <li>Check the pressure to the motor ports is <math>\geq 0.3</math> MPa (3.1 kgf/cm<sup>2</sup>) (43.5 psi) (3.0 bar)</li> <li>Verify hydraulic circuit</li> </ul>
Too much noise inside the track gearbox (motor)	<ul style="list-style-type: none"> <li>Internal damage</li> </ul>	<ul style="list-style-type: none"> <li>Check the gearbox</li> </ul>
Overheating	<ul style="list-style-type: none"> <li>Insufficient oil level</li> <li>Hydraulic oil too warm</li> </ul>	<ul style="list-style-type: none"> <li>Check the oil level and refill if necessary</li> <li>Check the hydraulic circuit</li> </ul>
Sprocket locked	<ul style="list-style-type: none"> <li>Mechanical components damaged</li> </ul>	<ul style="list-style-type: none"> <li>Replace damaged parts</li> </ul>

Document Title: <b>Track gearbox, removing</b>	Function Group:	Information Type: <b>Service Information</b>	Date: <b>2015/9/8 0</b>
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## Track gearbox, removing

### Op nbr 431-113

1. Park the machine in the service position A. See [091 Service positions](#).
2. Remove the track chain. See [7753 Track chain assembly, removing](#).
3. Remove cover screws (2) of track frame, and remove cover (1).



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**Figure 1**  
**Removal, cover**

4. Disconnect hydraulic hoses and pipe (D) at track motor (A).

**NOTE!**

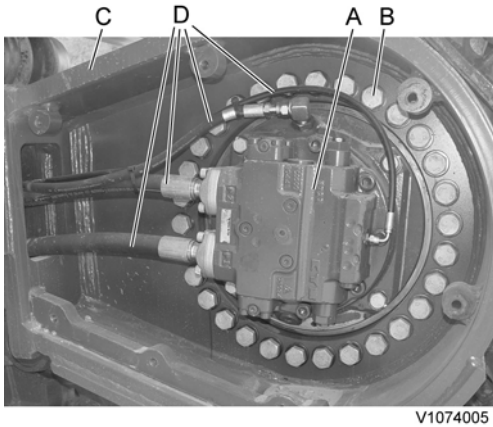
When the engine is running, the hydraulic line is under high pressure.

Stop the engine, and remove the residual pressure inside the hydraulic line by operating the control lever smoothly for 3~4 times with the ignition switch at "ON" position. Turn the ignition key to "OFF" position.

Prepare container for collecting hydraulic oil.

**NOTICE**

**Plug all pipes, hoses and connections when removing.**



**Figure 2**  
**Removal, hydraulic hoses and screws**

- Remove track gearbox mounting screws (B) from undercarriage frame (C).



**When the last bolt has been removed, the cover plate falls down.**

- Pass a wire rope around the gearbox, and lift it. Remove the track motor as an assembly. Then, using screws in the threaded holes of the undercarriage, force out the gearbox.



**The parts are heavy. Take appropriate safety cautions when handling them.**

**NOTE!**

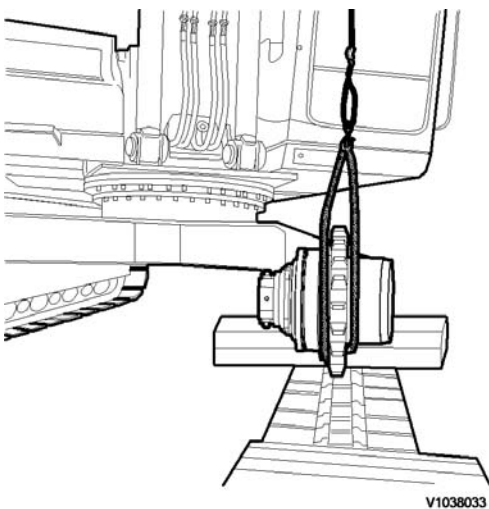
Lift the gearbox as close to the sprocket as possible to maintain balance.

**NOTE!**

The gearbox mounting screws may be used in the threaded frame holes.

**NOTE!**

Putting match-marks on the track frame and track gearbox will facilitate reassembly.



**Figure 3**  
**Removal, track gearbox**

- Remove the sprocket. See Sprocket, removal.



**The parts are heavy. Take appropriate safety cautions when handling them.**

Document Title: <b>Track gearbox, installing</b>	Function Group:	Information Type: <b>Service Information</b>	Date: <b>2015/9/8 0</b>
Profile: <b>EXC, EC700C LD [GB]</b>			

## Track gearbox, installing

Op nbr 431-114

1. Install the sprocket. See Sprocket, installation.



**WARNING**

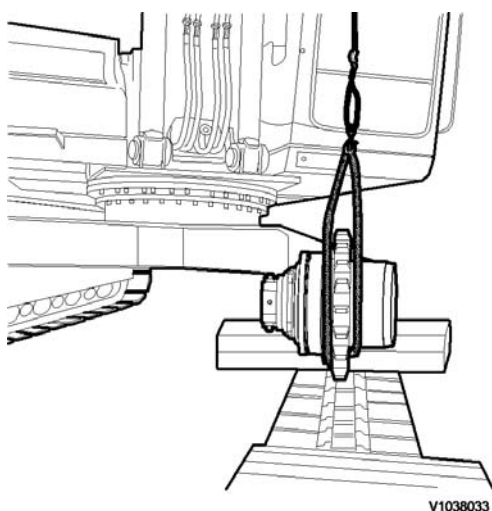
The parts are heavy. Take appropriate safety cautions when handling them.

2. Pass a wire rope around the track gearbox, lift and install the track gearbox to the undercarriage frame.



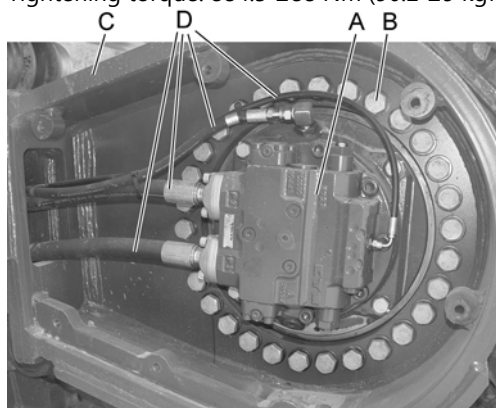
**WARNING**

The parts are heavy. Take appropriate safety cautions when handling them.



**Figure 1**  
**Installation, track gearbox**

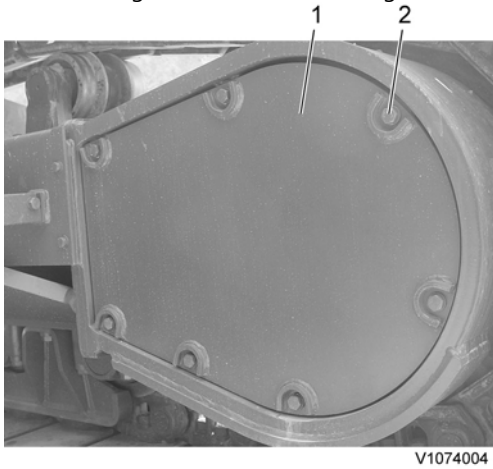
3. Apply loctite #277 to track gearbox mounting screws (B). Install track gearbox mounting screws (B) to undercarriage frame (C) and tighten them to the specified torque.  
Tightening torque: 884.5 ±88 Nm (90.2 ±9 kgfm) (651 ±64 lbf ft)



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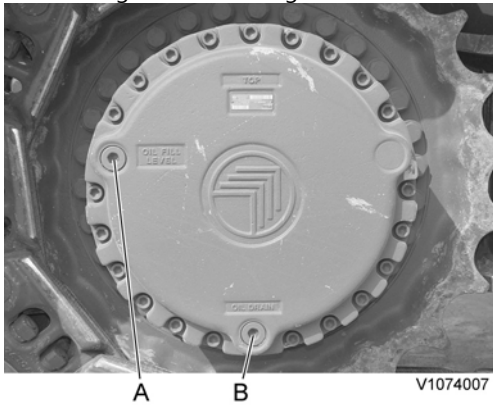
**Figure 2**  
**Tightening, screws**

4. Install hydraulic hoses and pipe (D) at track motor (A).
5. Install track gearbox cover (1) and tighten cover screws (2) to the specified torque.



**Figure 3**  
**Installation, track gearbox cover**

6. Check the gear oil level of gearbox. If necessary, replace or refill the oil.



**Figure 4**  
**Checking, gearbox oil level**

- A. Fill and level port (plug)
- B. Drain port (plug)

Document Title: <b>Track gearbox, maintenance standard</b>	Function Group:	Information Type: <b>Service Information</b>	Date: <b>2015/9/8 0</b>
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## Track gearbox, maintenance standard

The parts are precision finished and must be handled carefully.

Keep the parts of the planetary carrier (s) together, do not mix the bearings, gears, pins and thrust washers.

### Seals

Replace the seals and O-ring, although they appear not damaged.

### Part replacement criteria

1. Replace all parts that appear damaged or are not within the allowable value.
2. Replace some parts in sets, i.e. gears, bearings, pins and thrust washers.

### Inspection, tightening screw

Inspection	Frequency	Action
Tightening screws	After the first 50 operating hours	Screws tightening torque check

### Remove air in the track motor before operating.

1. Check that the gearbox axis is horizontal. Rotate the gearbox housing until the drain plug is on the bottom of the vertical axis of the end cover.  
The gearbox is supplied with oil plugs (draining, filling and level) equipped with an hole that allows the air to bleed.  
**NOTE!**  
Remove the oil plugs with care. When the gearbox is warm, the air inside can be pressurized and this can cause their strongly expulsion towards the worker.
2. Loose with caution the plugs (2~3 rounds) counterclockwise.
3. Clean the plug to be sure that the air bleed hole is not obstructed.
4. Wait a few seconds to allow the pressurized air to bleed from the gearbox.
5. Remove the plugs and let the oil flow in a large enough container; in order to facilitate the draining must be oil still warm.
6. Wait a few minutes until all the oil is drained and then proceed to screw on the plugs.
7. Proceed with the oil fill-up following the procedures given.

### NOTE!

Never mix mineral oils with synthetic oils and vice versa.

Do not dispose of the oil in the natural environment but be careful to eliminate it in compliance with the relative rules and regulations that govern locally.

Tightening torque plug. See track gearbox, description.

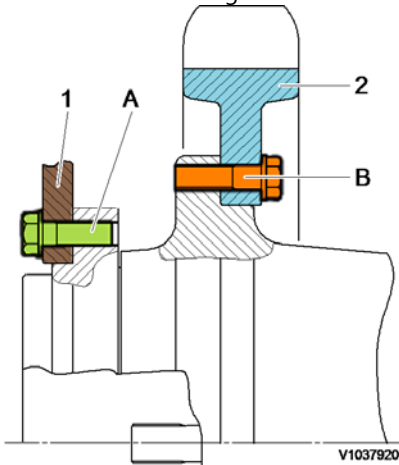
Document Title: <b>Track gearbox, precautions for operation</b>	Function Group:	Information Type: <b>Service Information</b>	Date: <b>2015/9/8 0</b>
Profile: <b>EXC, EC700C LD [GB]</b>			

## Track gearbox, precautions for operation

### Installation

Op nbr 00000

1. Check that the mating mount surfaces are clean.



**Figure 1**  
**Installation, track gearbox**

- A. Track frame mounted screw
  - B. Sprocket mounted screw
- 1. Track frame
  - 2. Sprocket

2. Check that the motor is positioned correctly in the frame.
3. If the gearbox to frame fit is tight, draw the assembly into the frame evenly with the mounting screws.
4. Tighten the screws in a crisscross pattern in several stages to the specified torque.
5. Apply these same precautions when mounting the sprocket.

### Tightening torque, unit: N m (kgf m) (lbf ft)

	Quantity	Thread size	Tightening torque
Reduction screw (A)	30	M24	990 (101) (733)
Sprocket screw (B)	30	M24	720 (533) (73.4)

**NOTE!**

The screws must be 10.9 strength classification or above.

## Lubrication oil

The gearbox is lubricated by oil splash in oil bath, the suggested oil type is SAE 80W/90 or SAE 85W/140 corresponding to: MIL-L-2105C API GL5

During the running the oil must not always exceed the temperature of 85 ~ 90 °C (185 ~ 194 °F) (intermittent)

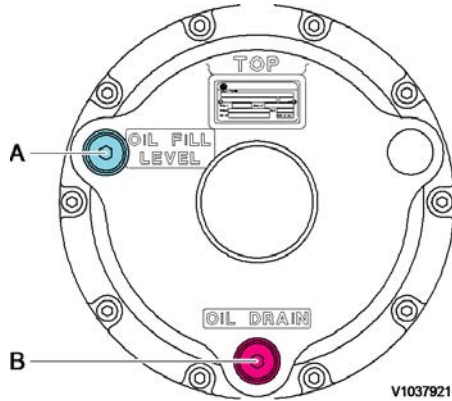
## Oil filling

### NOTE!

The gearbox is supplied without oil. It has filling, draining and oil level plugs.

Before putting the gearbox into operation, it is necessary to fill it with oil.

- Check that the gearbox axis is horizontal. Rotate the gearbox housing until the drain plug (B) is on the bottom on the vertical axis of the end cover.



**Figure 2**

### Position, oil fill and drain port

- A. Fill and level port (plug)
- B. Drain port (plug)

- Unscrew the fill and level oil plug (A).
- Fill from the hole until the lubricant oil flows out.
- Start the track drive after having filled the housing of the motor with hydraulic oil up to drain hole.
- Bleed air from every part of the hydraulic and add oil in the tank if necessary.
- Tighten the fill and level oil plug (A) and then run the gearbox. After a few minutes, stop and check the oil level.
- If necessary, refill with lubricant oil.

**Approximate oil capacity: 20 liters ± 10% (5.3 US gal ± 10%)**

## Gear oil check

- Oil level check: every 250 operating hours

## Gear oil replacement

- First (initial) oil replacement: at 500 operating hours
- Subsequent oil replacement: every 2000 operating hours

### NOTE!

Regardless of the operating hours the gear oil must be replaced at least once a year.

### NOTE!

Do not mix different types, classifications or brands of oil!

### NOTE!

Drain the gear oil while it is still warm to flush out any contaminants.

## Gear oil replacement procedure

- Rotate the gearbox until the drain plug and the fill plug are on the vertical axis.

- Remove the 2 plugs in the end cover and drain the oil into a suitable container.
- Ensure that the O-ring on each plug is not damaged, then install the plugs and torque to specification.
- Refill the gearbox through the fill port until oil exits from the level check port.

#### **Operating checks**

- Check the oil level prior to operating the track function.
- Check for oil leakage on the gearbox assembly.
- Check for loose mounting screws.
- Check for abnormal sound or vibration while rotating.
- Check for any abnormal temperature increase after operating for a short time.

#### **WARNING**

**The temperature of the case is high just after running. Use a thermometer to measure. Do not touch directly by hand to prevent a burn injury.**

#### **NOTE!**

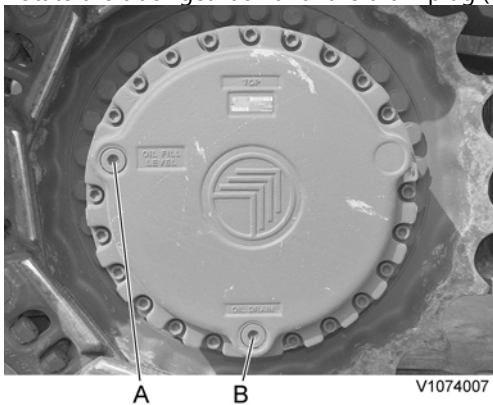
The temperature of the case must be lower than 90 °C (194 °F), during continuous operation.

Document Title: <b>Track gearbox, replacing cover</b>	Function Group:	Information Type: <b>Service Information</b>	Date: <b>2015/9/8 0</b>
Profile: <b>EXC, EC700C LD [GB]</b>			

## Track gearbox, replacing cover

Op nbr 431-117

1. Park the machine in the service position.  
Rotate the track gearbox until the drain plug (B) and level plug (A) are on the vertical axis.

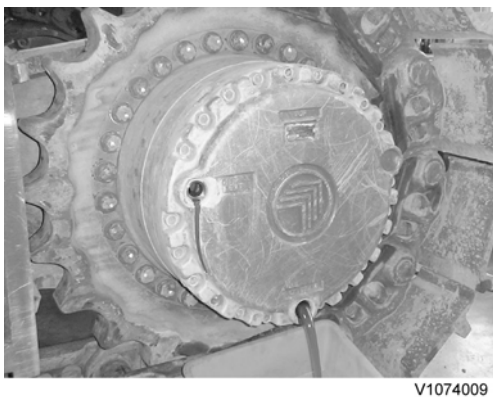


**Figure 1**  
**Service position**

2. Remove the 2 plugs the cover and drain the oil into a suitable container.

**NOTE!**

Prepare container for collecting track gearbox oil: 13 litres (3.44 US gal), see Operator's manual.



**Figure 2**  
**Drain, track gearbox oil**

3. Remove track gearbox cover mounting screws (C).



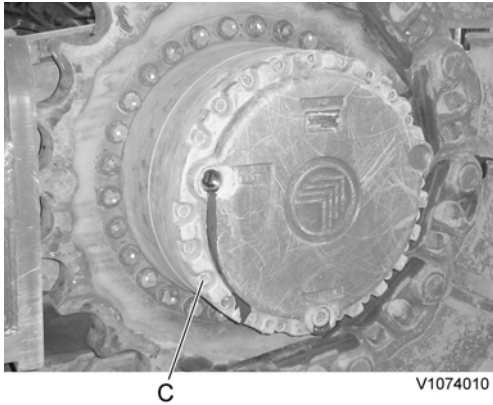
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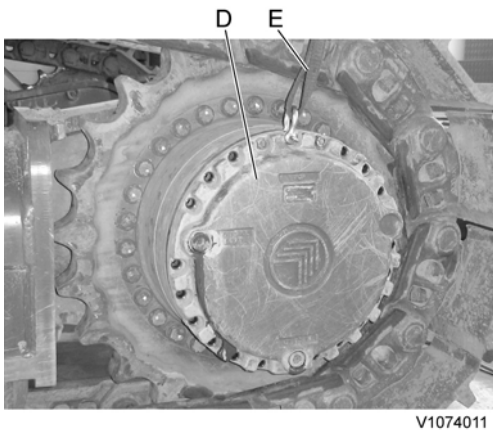


**Figure 3**  
**Removal, track gearbox mounting screws**

4. Hold the track gearbox cover (D) with hoist (E).  
Remove track gearbox cover (D) from track gearbox.

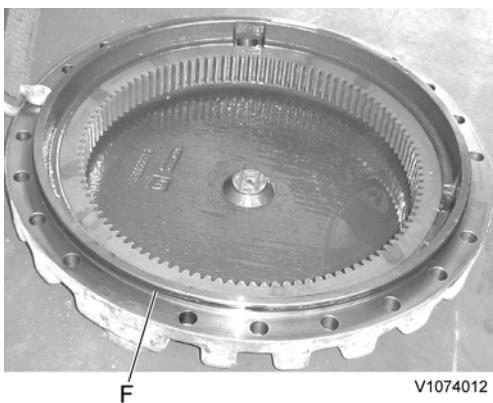


**The parts are heavy. Take appropriate safety cautions when handling them.**



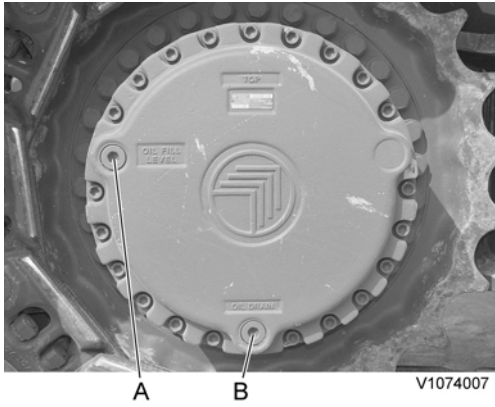
**Figure 4**  
**Removal, track gearbox cover**

5. Install the new track gearbox cover to the track gearbox.  
**NOTE!**  
Do not reuse removed O-ring (F).



**Figure 5**  
**Exchange, O-ring**

6. Install drain plug (B) and tighten it to the specified torque.



**Figure 6**  
**Installation, drain plug**

7. Fill the oil through the level port until oil exits from the level check port.
8. Install the level check plug and tighten it to the specified torque.

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