

## 50 Disassembly and assembly

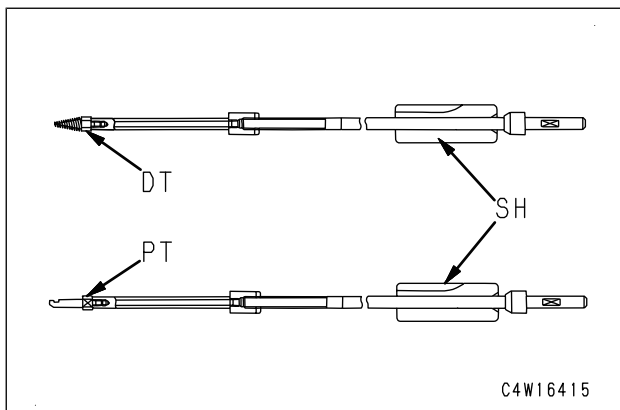
### Engine and cooling system

- 1] Remove the seal part (2) by using tool A12 according to previous section 1) or 2).
- 2] Cut sleeve (7), and remove it by using a chisel and a hammer, or such.
- 3] Select the puller type (PT) for the tip of tool A8.
- 4] Hook tip of tool A8 on metal ring of rear seal, and pull it out by using impact power of slide hammer (SH).

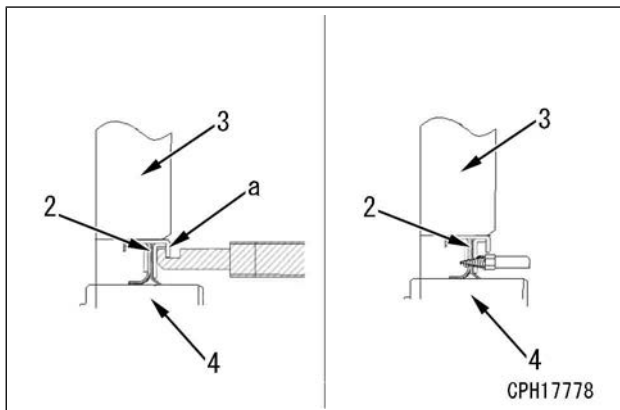
★ Remove all the chips.

★ Be careful not to damage crankshaft (3).

★ Tool A8



★ Left: hook type, right: drill type



### Installation (HM400-A510-720-K-00-A)

- Perform installation in the reverse order to removal.
1. Install the oil seal according to the following procedure.

★ Select the standard seal of spare part according to the following. (standard oil seal) (2a)

- If the wear of the shaft is shiny state (your finger cannot recognize the wear, its depth is less than 10  $\mu\text{m}$ ) and there is no scratch.

(Sleeved oil seal) (2b)

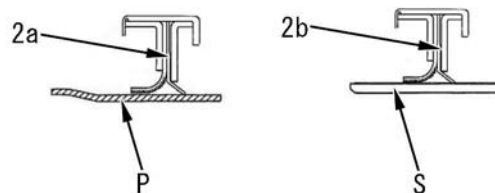
- Cases other than the previous case
- If sleeved oil seal is installed

(2a): (Standard oil seal)

(2b): (Sleeved oil seal)

(P): Inner plastic tube

(S): Sleeve

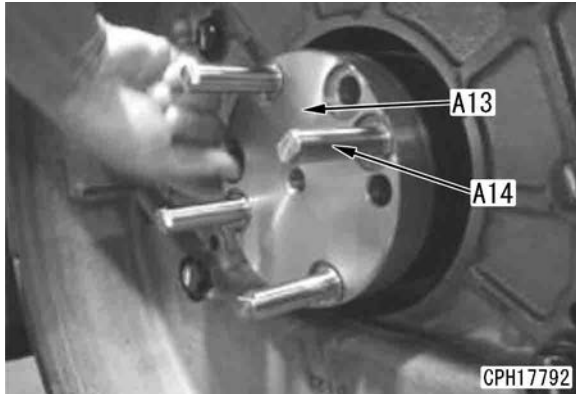


### 1) Installation of standard oil seal

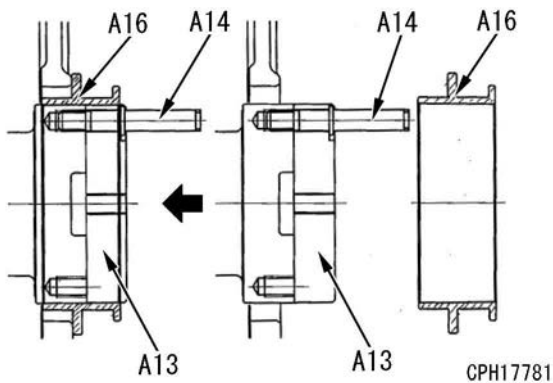
- ★ Before installing the oil seal, remove all of scratches, sharp fins, burrs, rust on the end corner of crank shaft, sliding surface of the crank shaft, and housing.
- ★ When installing the oil seal, do not apply oil or grease to the crankshaft and seal lip. Also, wipe off oil or grease thoroughly from the crankshaft.
- ★ Never remove the inner plastic tube of the standard seal of spare part just before installation.

- 1] Install tool A13 to the rear end of crankshaft, and screw in tool A4 (3 pieces) lightly.

★ At this stage, tool A14 has a little play.

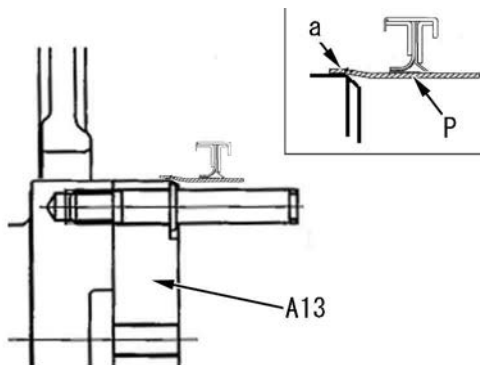


- 2] Insert tool A16 into tool A13, adjust the position of tool A13 so that the centers of crankshaft (4) and tool A13 are aligned, tighten tool A14, and fix them.



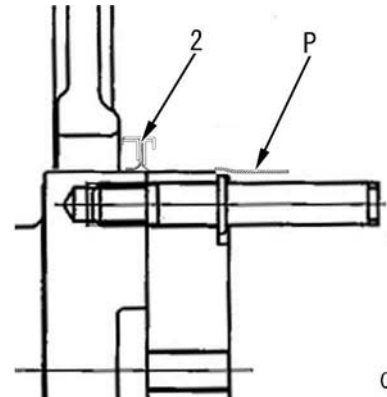
- 3] Remove tool A16, and check that the centers of crankshaft (4) and tool A13 are aligned.  
4] Apply the larger inside diameter side (a) of inner plastic tube (P) to the end of tool A13.

★ Be careful not to take a wrong side.



- 5] Put both of your hands to the metal ring of seal (2), and push in the seal evenly  
6] After pushing in seal (2), remove inner plastic tube (P).

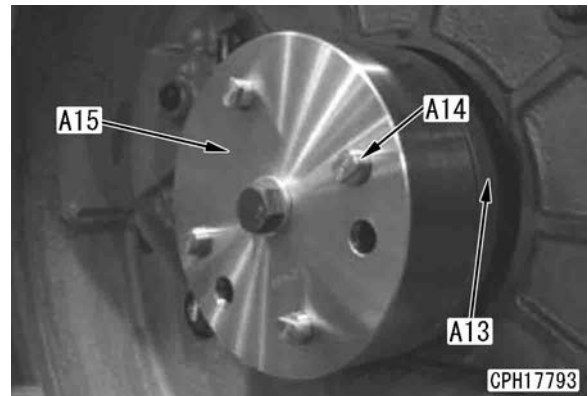
★ Be careful not to damage the seal lip surface when removing inner plastic tube (P).



- 7] Put tool A18 (bolt: stem length 60mm) through to tool A15, and insert tool A17 (spacer) to tool A18.

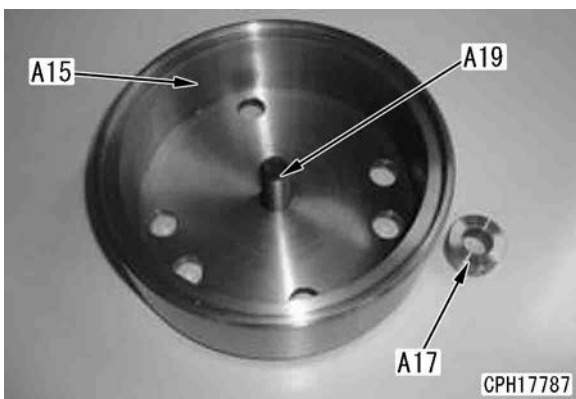
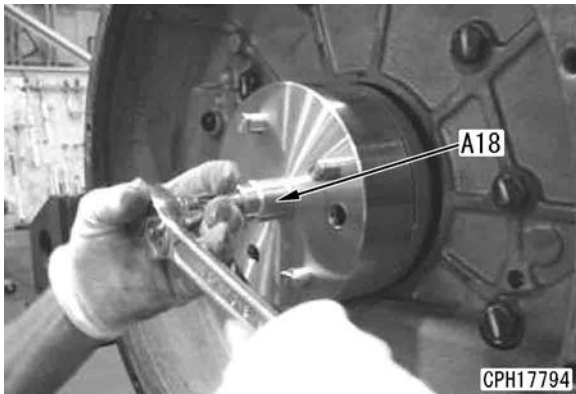


- 8] Put tool A15 on tool A13, and install them guided by tool A14.



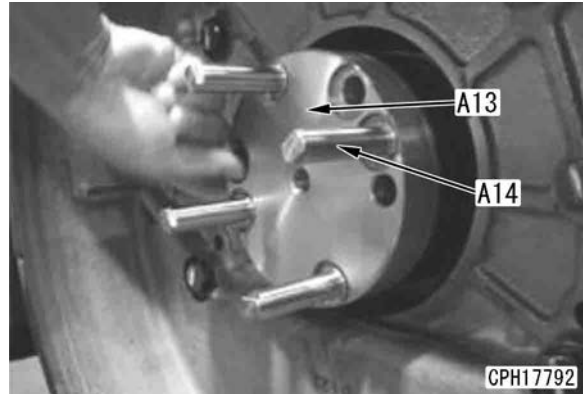
- 9] Tighten tool A18 (bolt: stem length 60mm) fully until it stops, and insert the seal.  
10] Remove tool A15, and remove tool A17 (spacer).  
11] Replace tool A18 (bolt: stem length 60mm) with tool A19 (bolt: stem length 40mm), and install tool A15 again. (Install it without tool A17 (Spacer).)  
12] Tighten tool A19 (bolt: stem length 40mm) fully until it stops, and insert the seal.  
13] After inserting the seal, remove tool A15, tool A14 and tool A13.

- ★ Wipe off the dirt in the sealant applied to periphery of the seal.

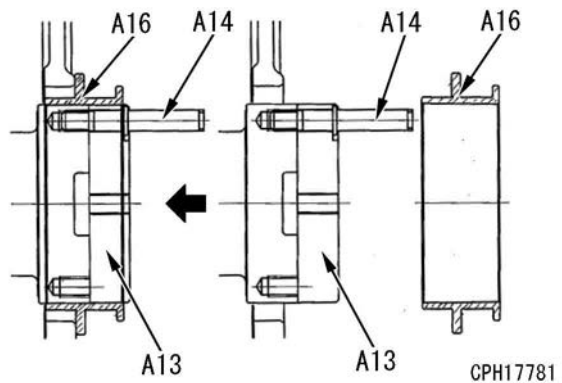


2) Installation of sleeved oil seal


- ★ Before installing the oil seal, remove all of scratches, sharp fins, burrs, rust on the end corner of crank shaft, sliding surface of the crank shaft, and housing.
  - ★ When installing the oil seal, do not apply oil or grease to the crankshaft and between sleeve (S) and seal lip (L). Also, wipe off oil or grease thoroughly from the crankshaft.
  - ★ Handle seal (2) and sleeve (S9) as assembled state, and never remove seal (2) from sleeve (S).
- 1] Install tool A13 to the rear end of crankshaft, and screw in tool A4 (3 pieces) lightly.
    - ★ At this stage, tool A14 has a little play.

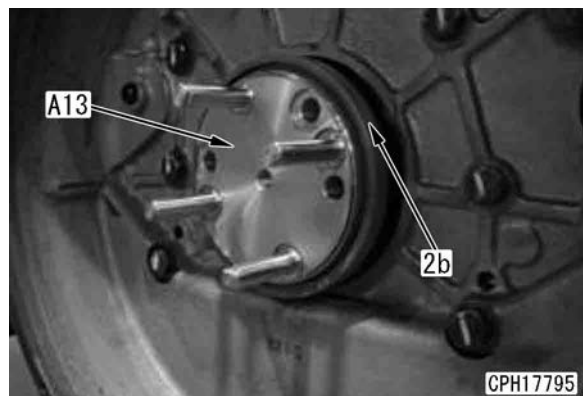


- 2] Insert tool A16 into tool A13, adjust the position of tool A13 so that the centers of crankshaft (4) and tool A13 are aligned, tighten tool A14, and fix them.



- 3] Remove tool A16, and check that the centers of crankshaft and tool A13 are aligned.
- 4] Apply liquid gasket to inside of sleeve of sleeved seal, and insert sleeved seal (4) to tool A13.
  - ★ When inserting the seal, place the side chamfered inside of sleeve to the end of tool A13.

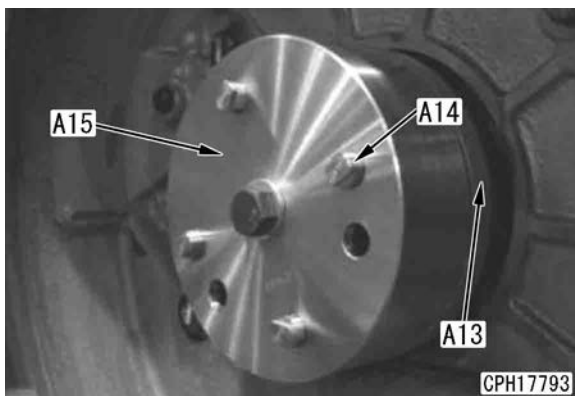
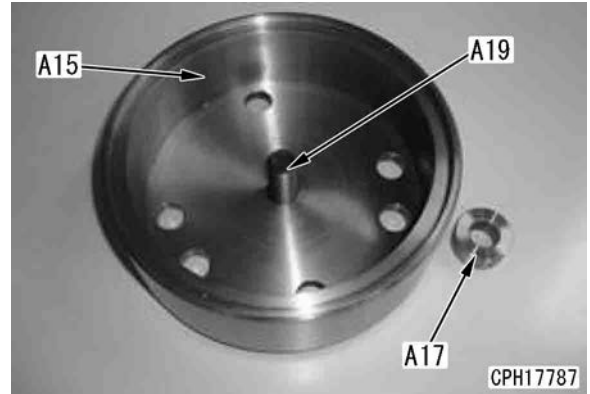
 **Inside the sleeve: Liquid gasket (LG-7)**



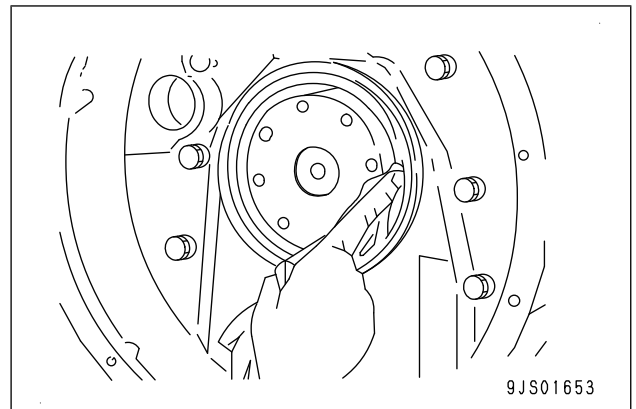
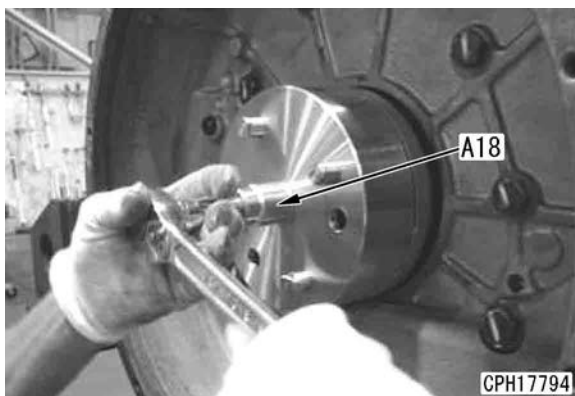
- 5] Attach tool A18 (bolt: stem length 60mm) to tool A15, and insert tool A17 (spacer) to tool A18 (bolt: stem length 60mm).



6] Put tool A15 on tool A13, and install them guided by tool A14.



- 7] Tighten tool A18 (bolt: stem length 60mm) fully until it stops, and insert the seal.
- 8] Remove tool A15, and remove spacer.
- 9] Replace tool A18 (bolt: stem length 60mm) with tool A19 (bolt: stem length 40mm), and install tool A15 again.
- 10] Tighten tool A19 (bolt: stem length 40mm) fully until it stops, and insert the seal.
- 11] After inserting the seal, remove tool A15, tool A14 and tool 13.
- 12] Wipe off the dirt in the sealant applied to periphery of the seal.



2. Install the flywheel according to the following procedure.

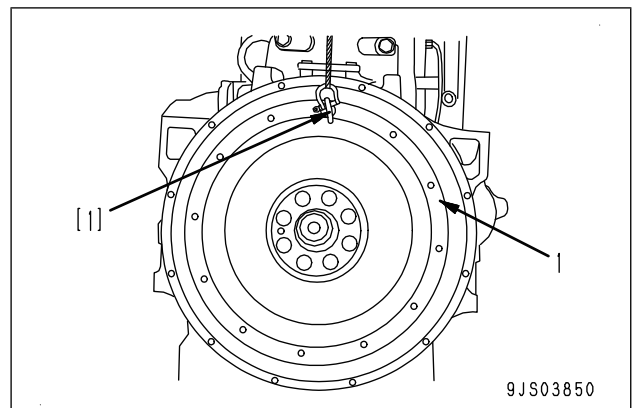
1) By using eyebolt [1], sling and install flywheel (1) to the crankshaft and tighten the bolts.

- ★ Install the flywheel while aligning the dowel pin of the crankshaft with the dowel hole of flywheel.
- ★ Take care that the flywheel does not touch the speed sensor.

 **Threaded part and seat surface of bolt:**

**Engine oil (EO30)**

 **Flywheel:**  
**60 kg**

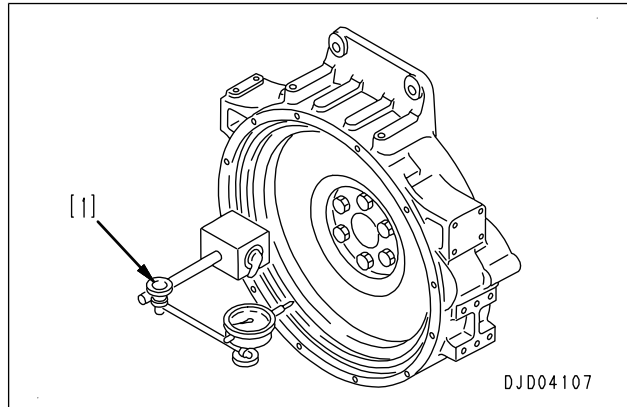
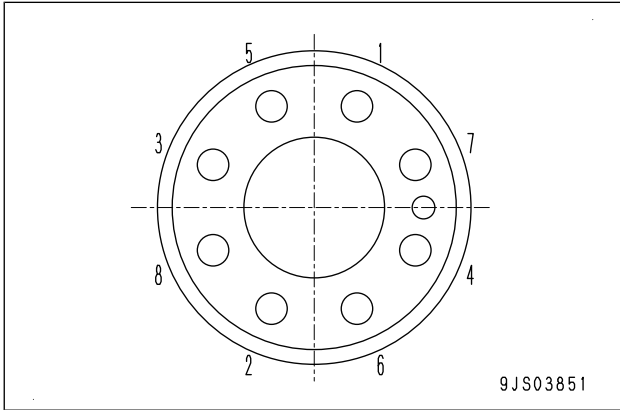


2) Tighten the mounting bolts according to the following procedure.

 **Flywheel mounting bolt**

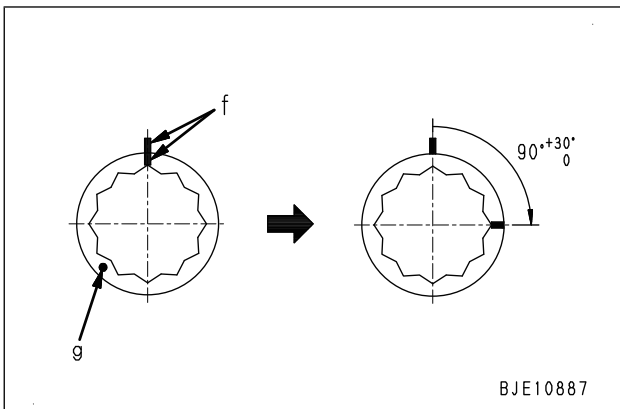
**1st time:  $118 \pm 4.9$  Nm { $12 \pm 0.5$  kgm}**

**2nd time: By using tool A3, tighten the bolts by  $90 \text{ deg.}^\circ$  ( $+30 \text{ deg.}/0$ ) in the order of (1) to (8).**



**3. Install the output shaft assembly. For details, see "Removal and installation of output shaft assembly".**

- ★ When not using tool A3, put mark (f) on the bolts and flywheel with paint, then retighten the bolts by  $90 \text{ deg.}^\circ$  ( $+30 \text{ deg.}/0$ ) in the order of (1) to (8).
- ★ After tightening, put a punch mark (g) on each bolt head to indicate the number of tightening.
- ★ When a new bolt is used, do not put a punch mark on its head.
- ★ The bolt which has 5 punch marks must be replaced without being reused.



**3) After installing the flywheel, measure the facial runout and radial runout by using dial gauge [1].**

- ★ Facial runout: Max. 0.20 mm
- ★ Radial runout: Max. 0.13 mm

## Removal and installation of output shaft assembly (HM400-CB30-924-K-00-A)

★ Special tools

Sym- bol	Part No.	Part name	Necessity	Qty	
A	7	792-420-1120	Flange	■	2
		01050-61225	Bolt	■	8
B	1	790-201-2210	Plate	■	1
		790-201-2740	Spacer	■	1
		791-600-1120	Bolt	■	1
		790-101-2540	Washer	■	1
		01580-01613	Nut	■	1
		01643-31645	Washer	■	2
		790-101-2102	Puller (294 kN {30 ton})	■	1
		790-101-1102	Hydraulic pump	■	1

⚠ In order to prevent serious or death accidents due to falling of the cab, following precautions must be observed when tilting the cab.

- Precautions before starting cab-tilting operation

⚠ Cab-tilting operation must be performed on a flat ground.

⚠ Set the machine to the straight-travel condition to prevent the interference between the cab and body, then fix the front and rear frames by using the articulation lock.

⚠ Set the parking brake switch to "PARKING" position to apply the parking brake.

⚠ Lock the lever by using the dump lever lock knob.

⚠ Chock the wheels to prevent the machine from moving.

⚠ When dismantling the cab, always lock the lock pin at the rear mounting part of cab before starting the work.

⚠ Do not perform the cab-tilting operation when it is strongly windy.

⚠ Before dismantling cab, be sure to lock the lock pin in the rear mount of cab.

- Precautions for cab-tilting operation

⚠ Do not perform the cab-tilting operation when the dump body is loaded.

⚠ Do not place yourself under the cab as long as the cab-tilting operation is continued.

⚠ Fix the cab securely by using the lock bar before tilting up the cab.

⚠ Install the lock bar from the side of the cab without entering into a space below the cab.

⚠ Do not go in or out the cab when tilting up the cab.

⚠ Do not operate the gear shift lever and dump lever when tilting up the cab.

⚠ Do not start the engine when tilting up the cab.

⚠ When you are forced to start the engine for inspection purpose, check that no person is under the cab.

⚠ Do not give a large impact to the machine when tilting up the cab.

⚠ When lowering the cab by using the cab power tilt (optional), do it gradually adjusting the descending speed without decreasing the oil pressure at a breath.

⚠ The lock bar is equipped in the inner left side corner of the engine hood. Be sure to return the bar to the original place after using it.

⚠ Turn the battery disconnect switch to the OFF position and remove the key.

⚠ Loosen the cap of the hydraulic tank gradually to release the pressure remaining inside the hydraulic tank.

⚠ Set the lock bar to the front and rear frames to lock them.

### Removal (HM400-CB30-520-K-00-A)

1. Drain the hydraulic oil.



Hydraulic tank: 167 ℓ

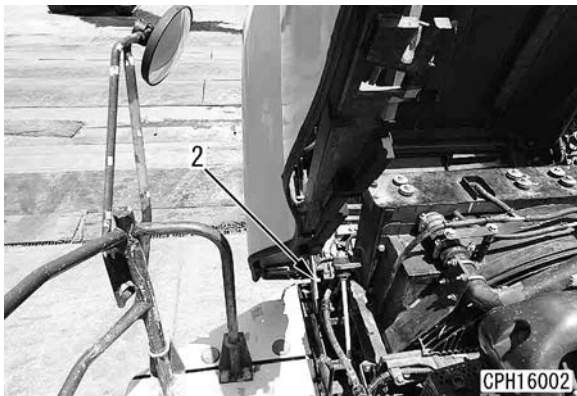
2. Open engine hood (1).

## 50 Disassembly and assembly

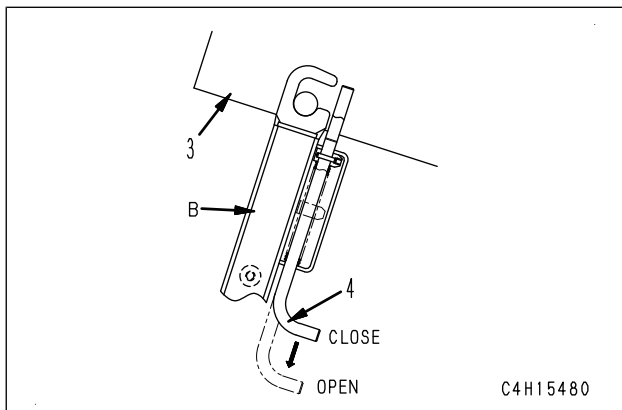
### Engine and cooling system



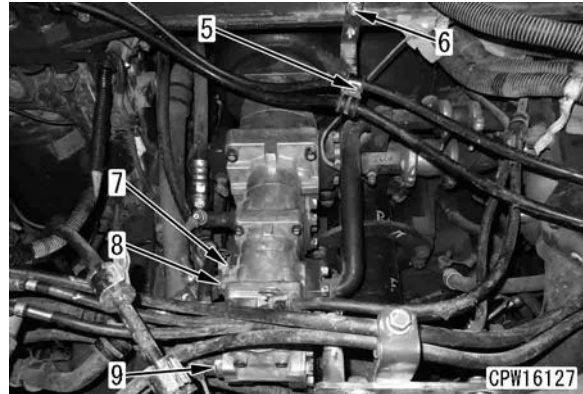
★ Be sure to set lock (2) securely.



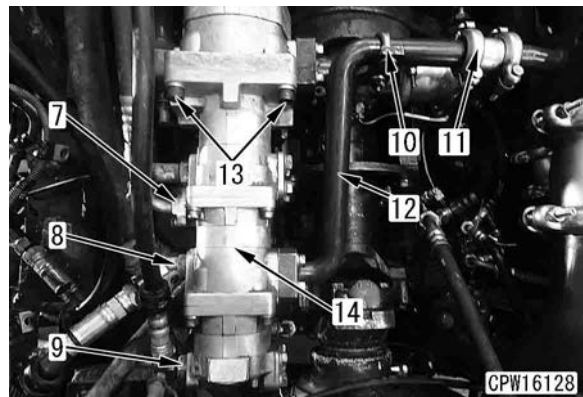
3. Tilt up operator's cab assembly (3). For details, see Testing and adjusting, "Cab tilt up procedure".  
Check that lock lever (4) is in CLOSE position and operator's cab assembly (3) is securely locked with lock bar (B).



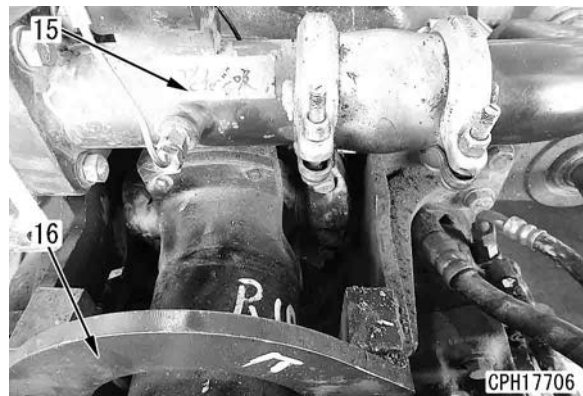
4. Remove clamp (5).  
5. Remove bracket (6).  
6. Disconnect hoses (7), (8), and (9).



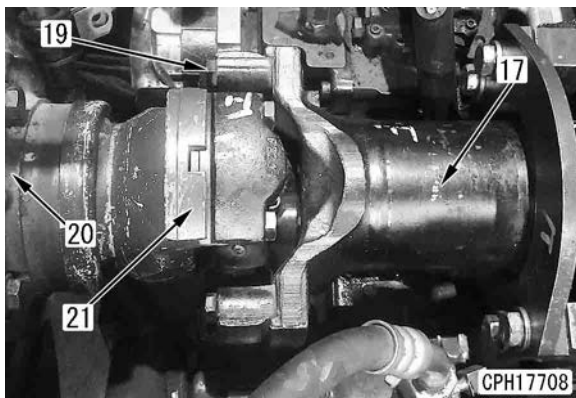
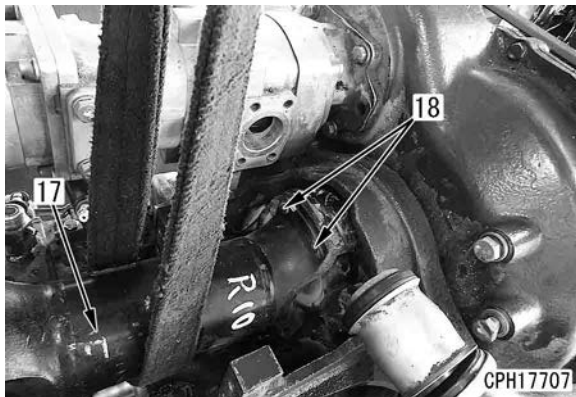
7. Remove clamp (10).  
8. Remove coupling (11).  
9. Remove tube (12).  
10. Remove pump assembly mounting bolts (13) (4 pieces), and remove pump assembly (14).



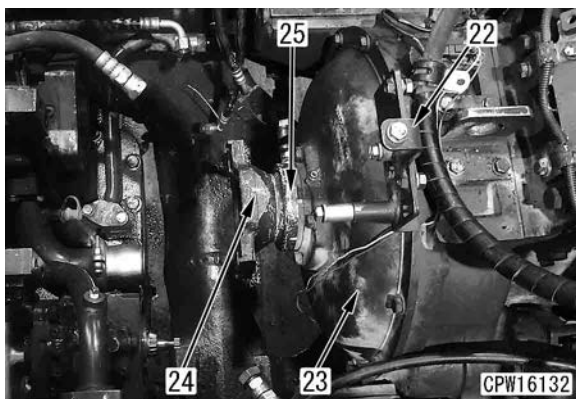
11. Remove tube (15).  
12. Remove guard (16).



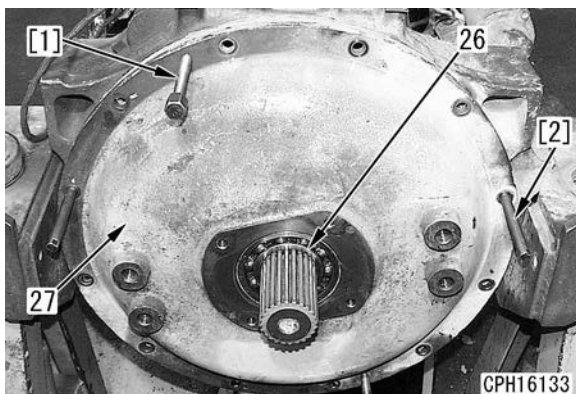
13. Sling drive shaft (17) between the engine and transmission, and remove mounting bolts (18) and (19) (4 pieces each). [\*1]  
14. Remove drive shaft (17) between the engine and transmission. [\*2]  
15. Remove coupling yoke (21) from output shaft assembly (20). [\*3]




16. Remove bracket (22).  
17. Remove coupling (24) and oil seal cage (25) from output shaft assembly (23).

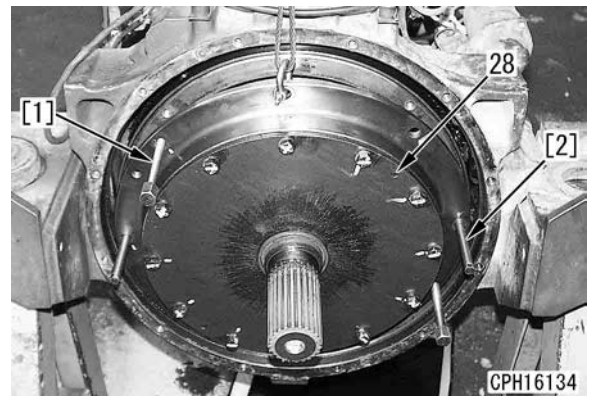


18. Remove snap ring (26), and remove cover (27) by using forcing screw [1] and guide bolt [2]. [\*4]

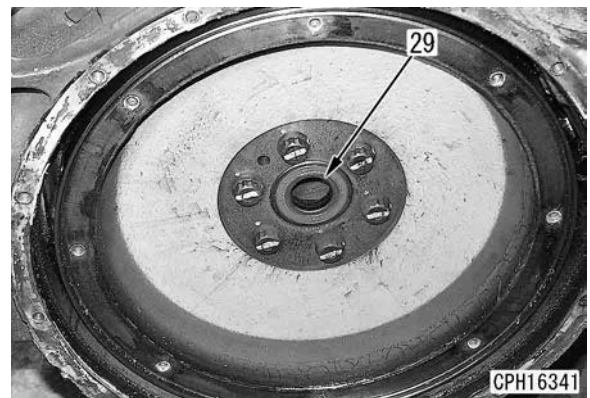


19. Remove output shaft assembly (28) by using forcing screw [1] and guide bolt [2].

 **Output shaft assembly:**  
90 kg

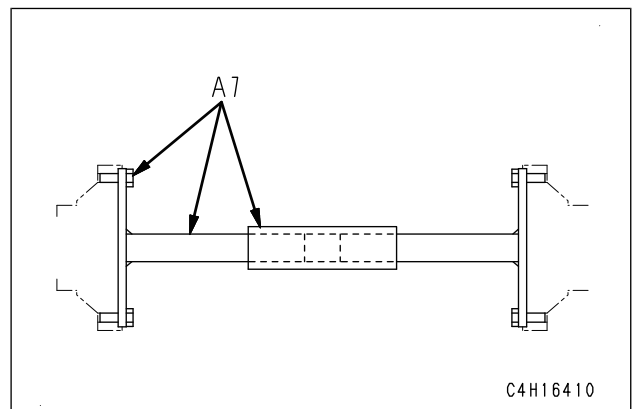


20. Remove bearing (29). [\*5]



**Installation** (HM400-CB30-720-K-00-A)

- Perform installation in the reverse order to removal.  
[\*1] and [\*2]
- When installing drive shaft, check that key slot of spider cap is completely fitted to key slot of the mating yoke, and tighten the bolt.
- ★ Align the center of the engine and torque converter by using tool A7.



 **Mounting bolt for drive shaft between engine and transmission: Loctite (LT-2)**