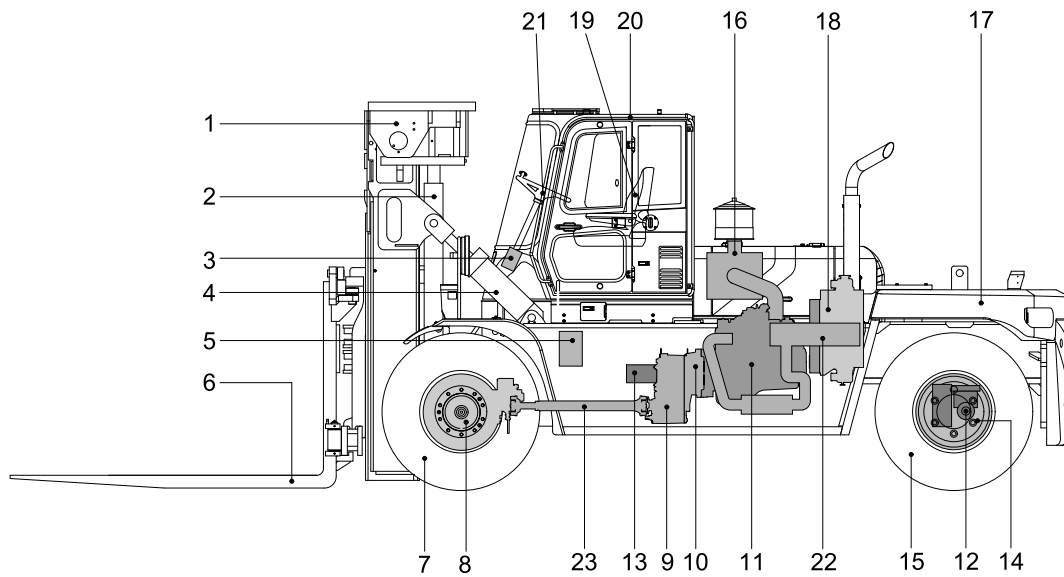


SECTION 2 REMOVAL & INSTALLATION OF UNIT

| | | |
|---------|--|-----|
| Group 1 | Structure | 2-1 |
| Group 2 | Removal and installation of unit | 2-2 |

SECTION 2 REMOVAL & INSTALLATION OF UNIT

GROUP 1 STRUCTURE



300D9QM21

- | | | |
|----------------------|----------------------|--------------------|
| 1 Mast | 9 Transmission | 17 Counterweight |
| 2 Lift cylinder | 10 Torque converter | 18 Radiator |
| 3 Steering unit | 11 Engine | 19 Seat |
| 4 Tilt cylinder | 12 Steering cylinder | 20 Cabin |
| 5 Main control valve | 13 Hydraulic pump | 21 Steering wheel |
| 6 Fork | 14 Steering axle | 22 Muffler |
| 7 Front wheel | 15 Rear wheel | 23 Propeller shaft |
| 8 Drive axle | 16 Air cleaner | |

GROUP 2 REMOVAL AND INSTALLATION OF UNIT

Remove and install following units as explained in the flow chart.

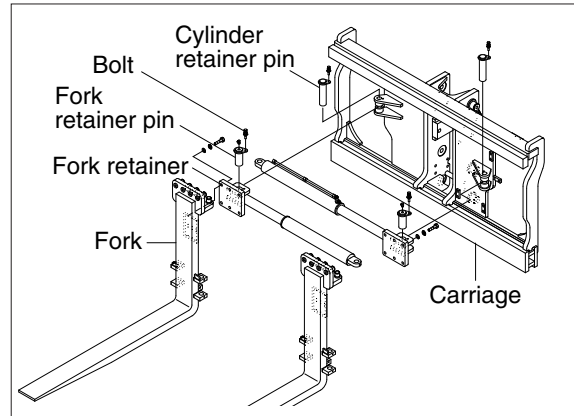
1. MAST

1) REMOVAL



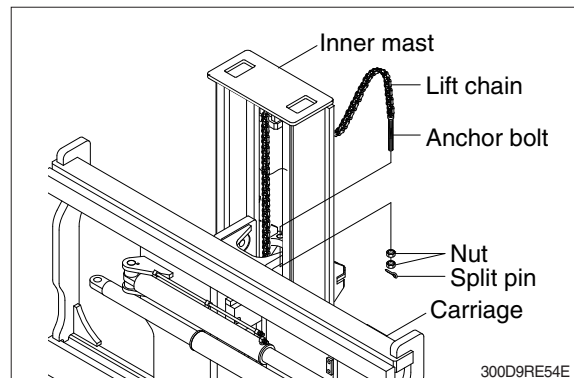
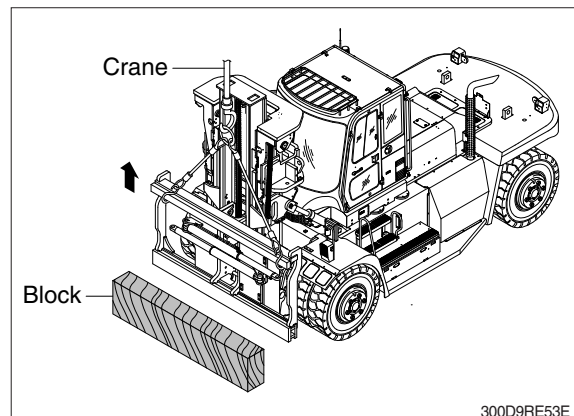
(1) Forks

- ① Lower the fork carriage until the forks are approximately 25 mm (1 in) from the floor.
- ② Loosen the bolt and take out the fork retainer pin and release the fork retainer. Remove the cylinders at a time out of carriage assembly.
- ③ Remove only one fork at a time.
 - ※ On larger forks it may be necessary to use a block of wood.
 - ※ Remove all wiring harness for the head light and work light etc.

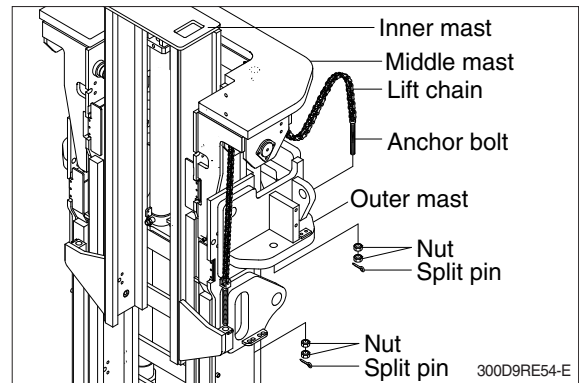


(2) Carriage

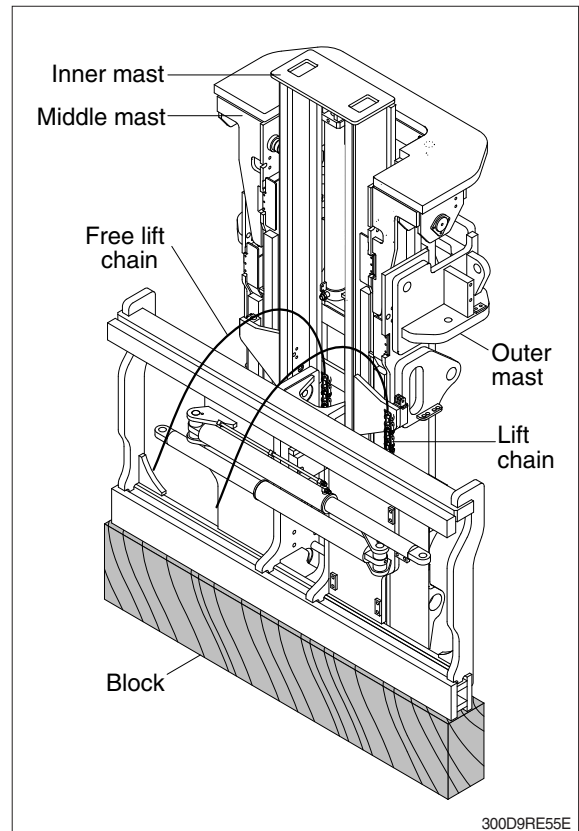
- ① With the mast vertical, raise the carriage high enough to place blocks under the load forks. This is done to create slack in the load chains when the carriage is lowered. Lower the carriage all the way down to the floor. Make sure the carriage is level, this will prevent any binding when the mast is raised.
- ② While supporting lift chains, remove the split pin and nuts from the anchor bolt at the free lift chain side.



- ③ While supporting lift chains, remove the split pin and nuts from the anchor bolt at the lift chain side.



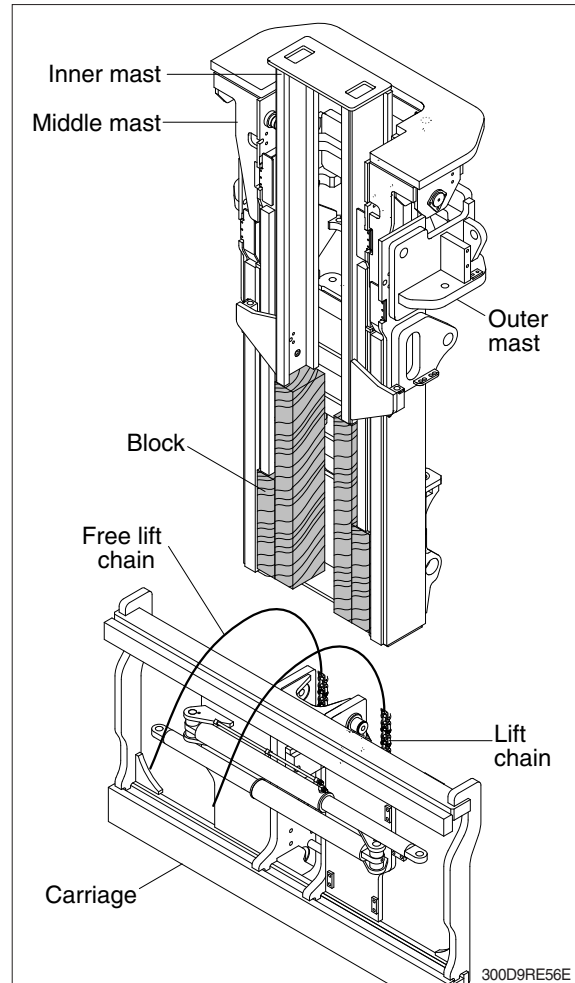
- ④ Pull the chains out of the sheaves and drape them over the front of the carriage.



- ⑤ Slowly raise inner mast upright until mast clears top of fork carriage. Move carriage to work area and lower the mast.

▲ Make sure that carriage remains on floor and does not bind while mast is being raised.

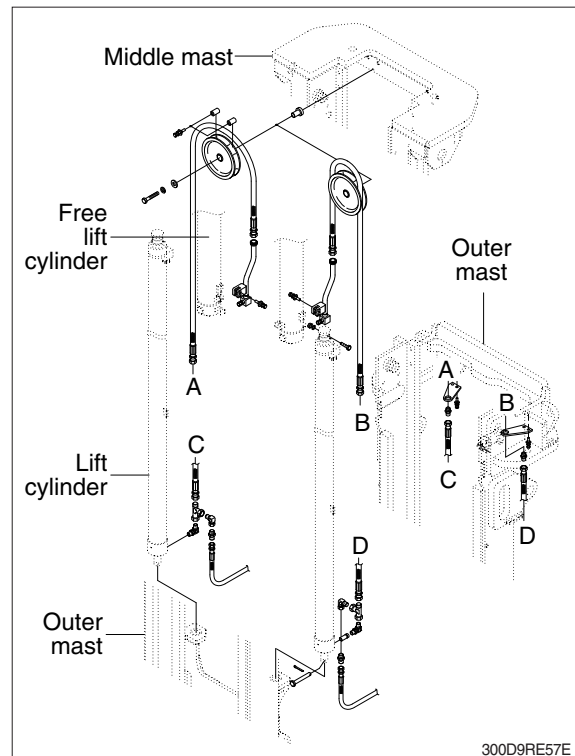
- ⑥ Inspect all parts for wear or damage.
Replace all worn or damaged parts.



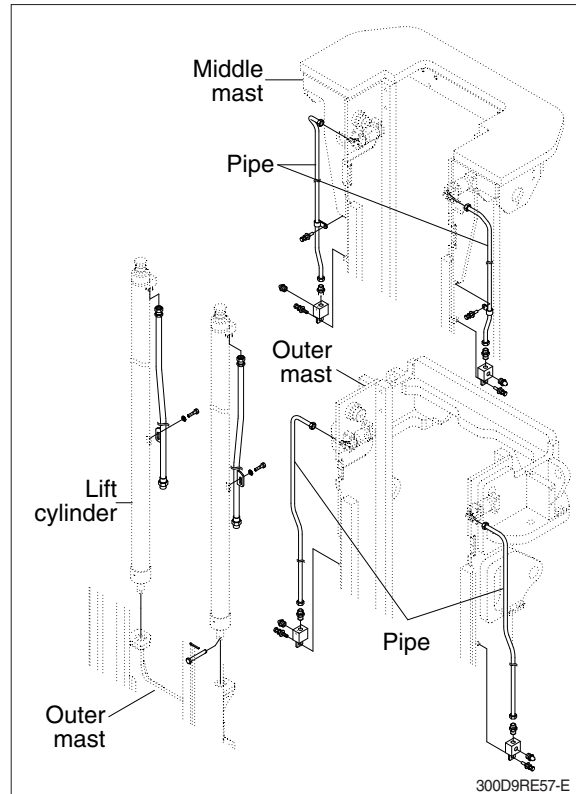
(3) Piping

- ① Remove the main hose attached to the work attachment.
- ② Remove the hoses from the work attachment.
- ③ Remove the lowering safety valve.

※ Put blind plugs in the piping immediately after removing pipes.
This prevents the hydraulic oil from flowing out and also prevents dust and dirt from getting in.



- ④ Remove the return pipes.
- ⑤ Remove the lubrication pipes.

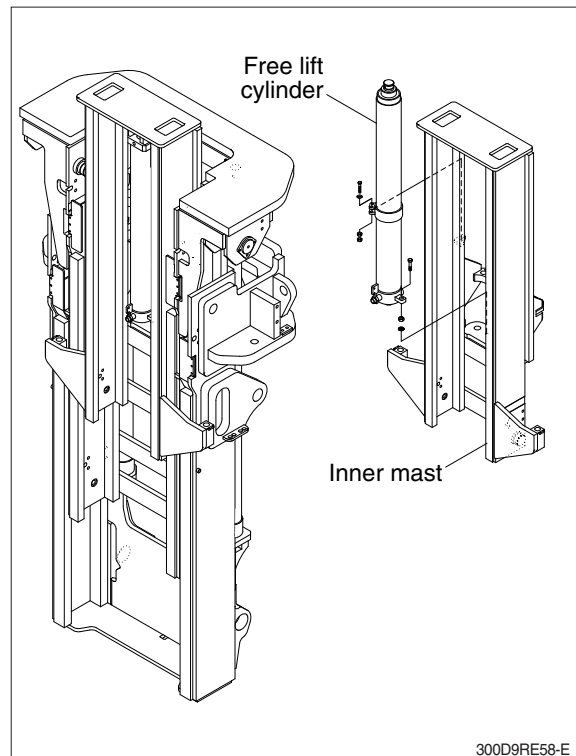


(4) Free lift cylinder

- ① Loosen hexagon bolt securing free lift cylinders to inner mast and remove the clamp.
- ② Bind the free lift cylinder with overhead hoist rope and pull up so that the rope has no slack or binding.

▲ Make sure the free lift cylinder be tightened firmly for safety.

- ③ Loosen and remove hexagon bolt, nut and spring washer securing free lift cylinder to inner mast.
- ④ Using an overhead hoist, draw out free lift cylinders carefully and put down on the work floor.

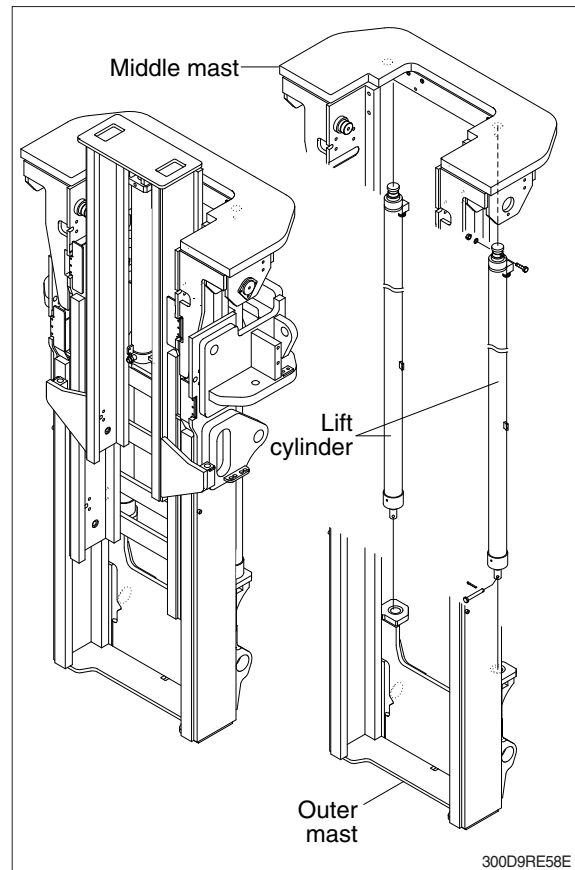


(5) Lift cylinder

- ① Loosen hexagon bolt and washer securing lift cylinders to middle mast.
- ② Bind the lift cylinder with overhead hoist rope and pull up so that the rope has no slack or binding.

▲ Make sure the lift cylinder be tightened firmly for safety.

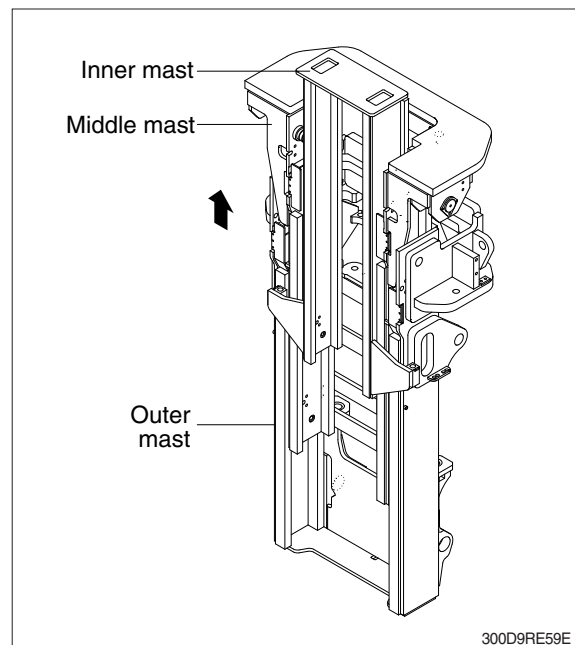
- ③ Remove split pin and clevis pin securing lift cylinders to outer mast.
- ④ Using an overhead hoist, slowly raise the inner mast high enough to clear lift cylinders.
- ⑤ Using an overhead hoist, draw out lift cylinders carefully and put down on the work floor.



(6) Inner and middle mast

- ① Using an overhead hoist raise the inner mast straight and carefully draw out of middle mast section.
- ② Using an overhead hoist raise the middle mast straight and carefully draw out of outer mast section.

▲ Be careful the mast not to swing or fall.



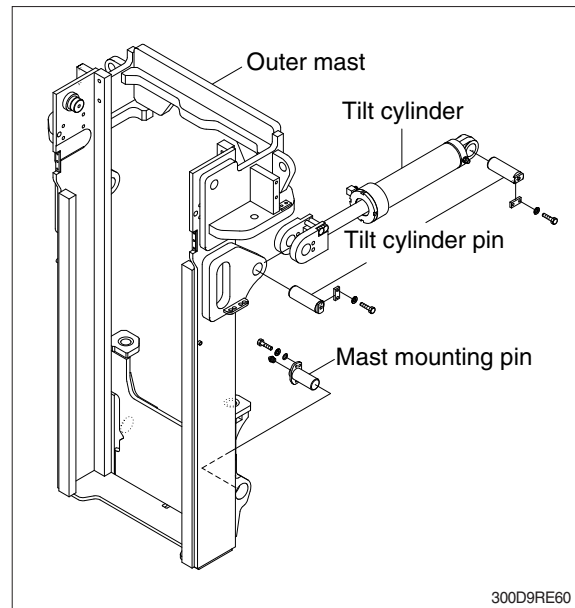
(7) Tilt cylinder pin

- ① Remove the grease nipple fitted at tilt cylinder pin.
- ② Remove the bolt, spring washer and lock plate securing the tilt cylinder pin.
- ③ Remove tilt cylinder pin.

(8) Mast mounting pin

- ① Attach a crane to the stay at the top of the outer mast, and raise it.
- ② Remove the grease nipple fitted at mast mounting pin.
- ③ Remove the bolt and washer securing the mast mounting pin.
- ④ Remove the mounting pins from drive axle, then slowly raise outer mast.

※ This operation is carried out under the machine, so use a pit, or if there is no pit, jack up the machine and loosen with an impact wrench.



2) INSTALLATION

After assembling mast components totally without piping connections, install mast assembly to the equipment.

※ Installation procedure for each of mast component is the reverse of the removal procedure.

(1) Mast support pin

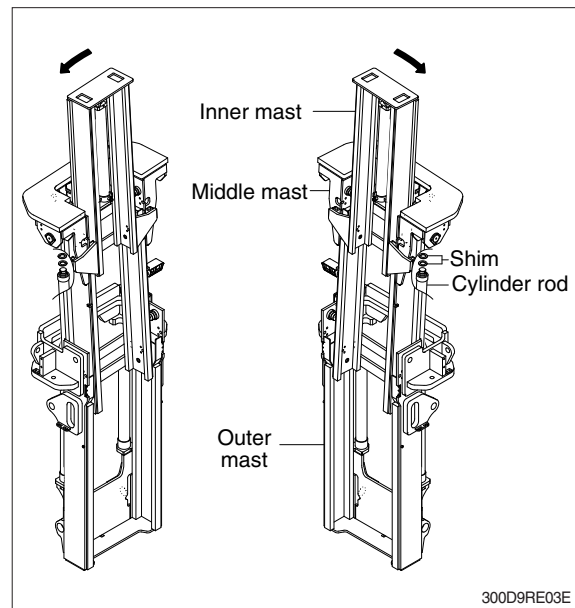
Check the mast support pins for wear, then install pins into the mast and main frame.

(2) Tilt cylinder pin

Hold the mast with a crane, operate the tilt control lever and align the holes, then knock the pin.

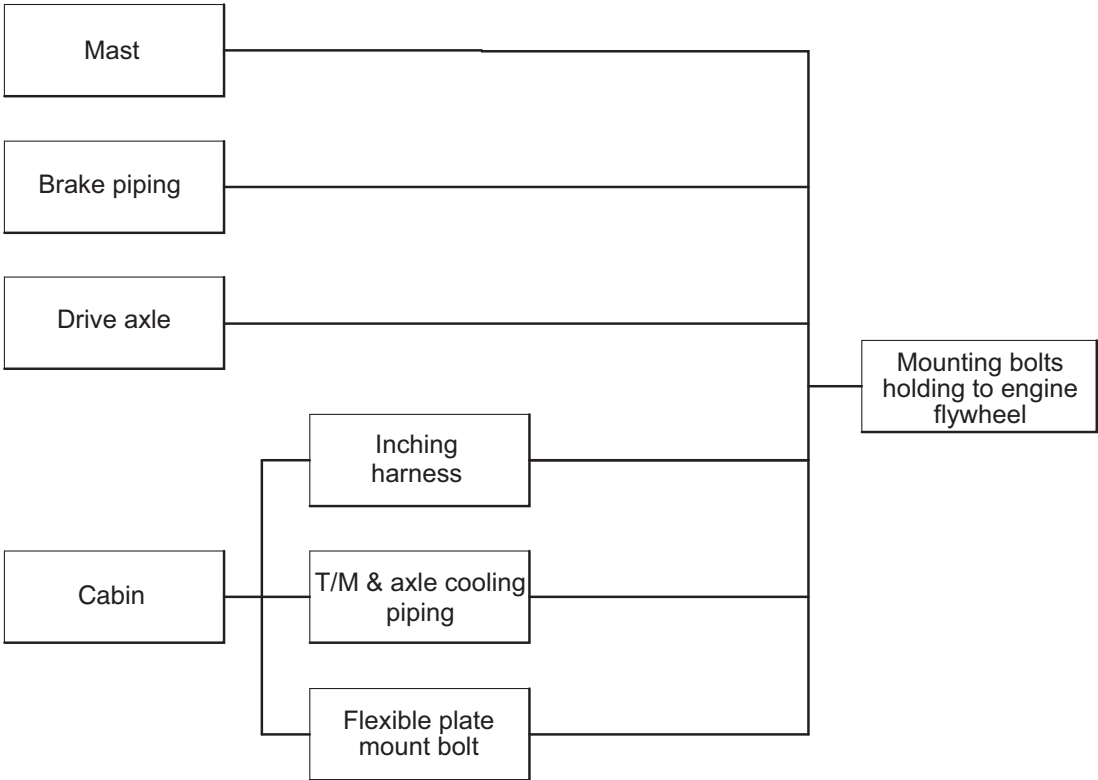
(3) Lift cylinder installation and adjustment

- ① Assemble the lift cylinder at the outer mast, fit the clevis pin and split pin. If the cylinder assembly has been replaced, adjust as follows so that the left and right cylinders are synchronized at the maximum lifting height.
 - ② Assemble the cylinder rod to the middle mast, and check the left-to-right play of the mast at the maximum lifting height.
- ※ If play is to LEFT, install adjustment shim to LEFT cylinder.
- ※ If play is to RIGHT, install adjustment shim to RIGHT cylinder.
- Shim thickness : 1.0 mm (0.04 in)



2. POWER TRAIN ASSEMBLY

1) REMOVAL



250D9RE04

(1) Mast

Refer to section on mast (Page 2-2)

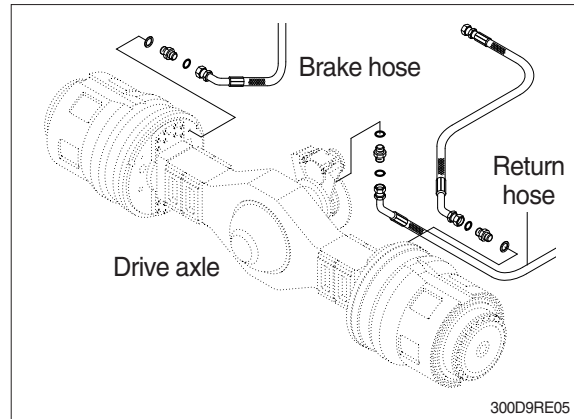
(2) Brake piping

Disconnect the brake hydraulic pipes from the brake housing of drive axle assy.

When disconnecting the brake hydraulic hoses, take care that oil should not be spilt on the floor.

If someone slips due to oil spillage, it can cause to do him severe injuries.

In case of spilling out of the oil on the floor, wipe it off immediately in order to prevent someone from unexpected accident.



(3) Drive axle

※ Before removing the drive axle unit, drain all of the oil from the axle.

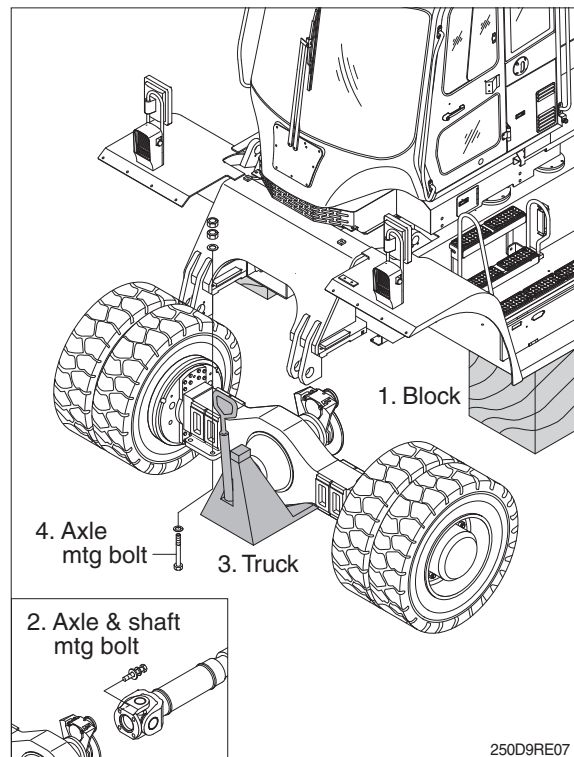
① Jack up the machine and then put the block under the frame.

※ If there is a pit, use the pit for safety.

② Loosen hexagonal bolts connecting drive axle to the drive shaft.

③ Prepare the truck under the drive axle unit to support it.

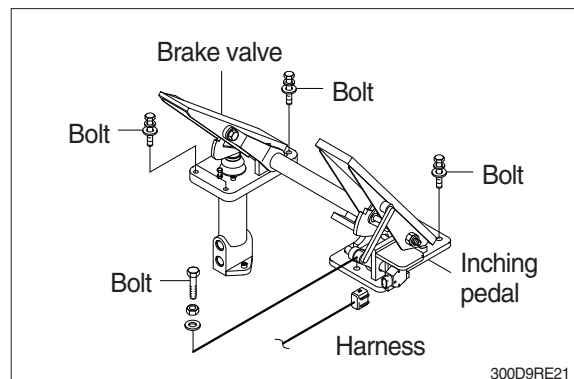
④ Remove mounting bolts fixing the axle to the frame and then carefully draw the truck out of the vehicle with the drive axle unit.



(4) Inching linkage

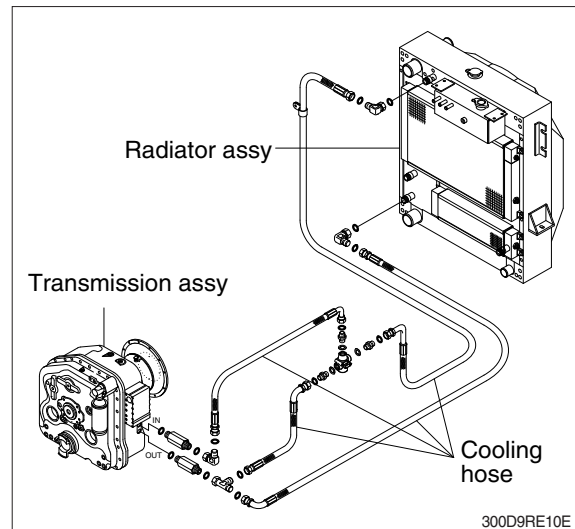
① Remove bolt and screw fixing the inching linkage assembly.

② Disconnect harness cable from the inching pedal assembly.



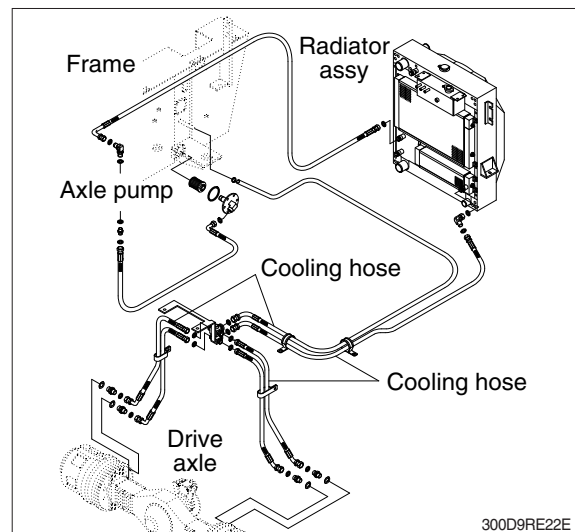
(5) Transmission and axle cooling piping

- ① Disconnect cooling hose and connector from the transmission.
- ※ Make sure that the coolant has been drained from the line.



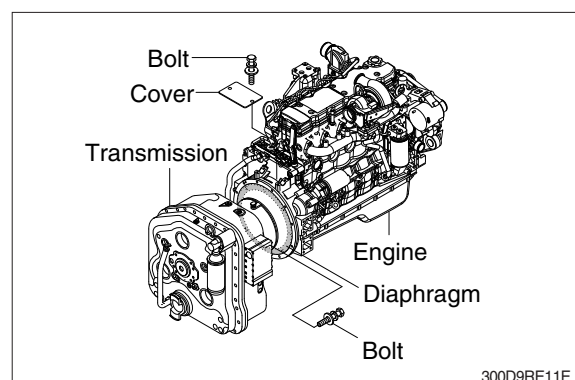
- ② Disconnect axle cooling hose and connector from the axle.
- ※ Make sure that the axle cooling oil has been drained from the line.

▲ When disconnecting the oil cooling hoses, take care that oil should not be spilt on the floor.
If someone slips due to oil spillage, it can cause to do him severe injuries.
In case of spilling out of the oil on the floor, wipe away immediately it in order to prevent someone from unexpected accident.



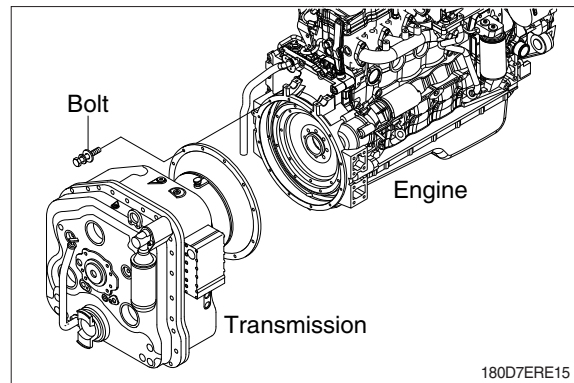
(6) Flexible plate

- ① Remove the cover on the right side of flywheel housing housing then remove 4 pieces of the mounting bolts installed to the engine flywheel.
To rotate the flywheel, rotate the crank shaft at the end of the engine.



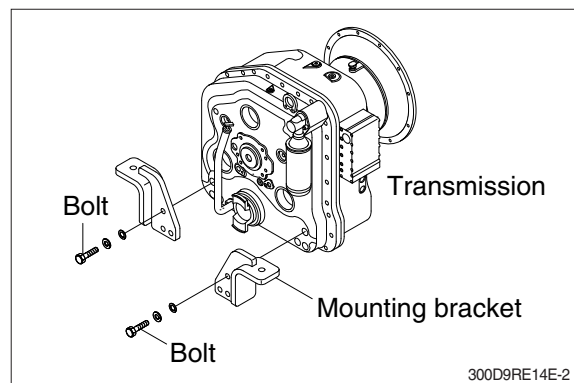
(7) Mounting bolts holding to flywheel housing

- ① Remove the transmission assembly from engine by loosening 12 pieces of the mounting bolts.

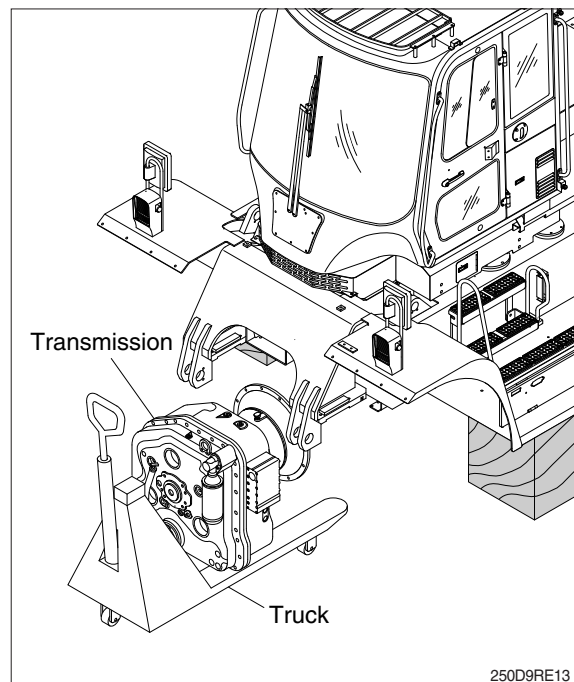


(8) Transmission mounting bolt

- ① Loosen the mounting bolt (6 EA) securing the transmission assembly to the bracket.



- ② Using a moving truck slowly pull out transmission assembly to the front.

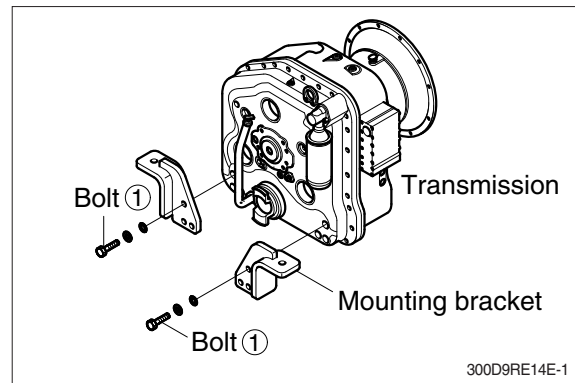


2) INSTALLATION

Installation is the reverse order to removal, but be careful of the following points.

(1) Transmission bracket mounting bolts (①)

- Tightening torque : 49.2~66.9 kgf · m
(336~484 lbf · ft)

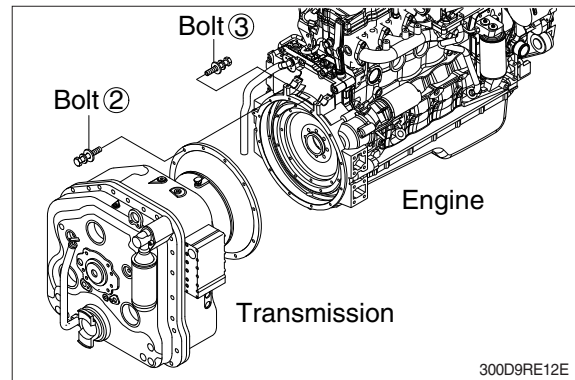


(2) Flywheel housing mounting bolts (②)

- Tightening torque : 5.5~8.3 kgf · m
(39.8~60.0 lbf · ft)

(3) Diaphragm mounting bolt (③)

- Tightening torque : 3.9~5.1 kgf · m
(28.2~36.9 lbf · ft)



(4) Drive shaft mounting bolt (④)

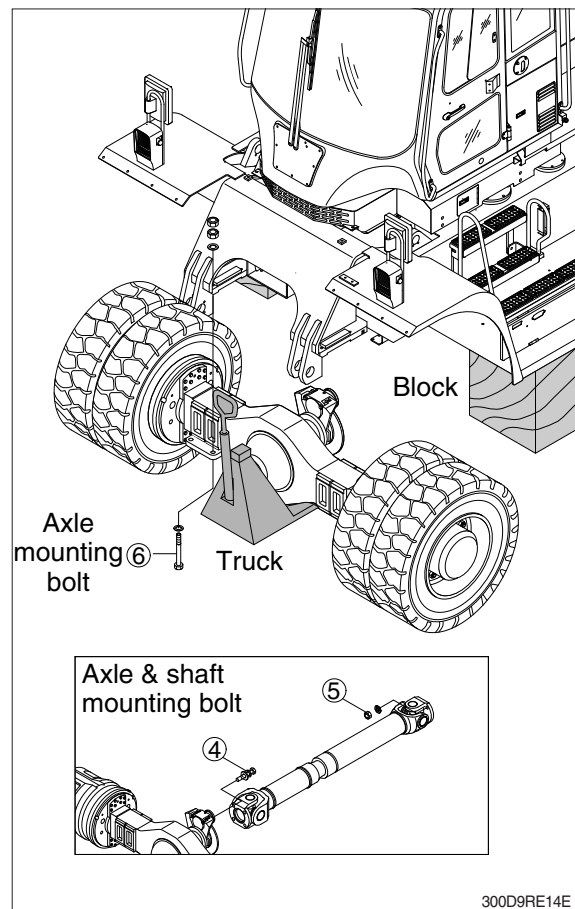
- Tightening torque : 9.8~15.8 kgf · m
(70.9~107 lbf · ft)

(5) Drive shaft mounting nut (⑤)

- Tightening torque : 13~17 kgf · m
(94~123 lbf · ft)

(6) Drive axle mounting bolt (⑥)

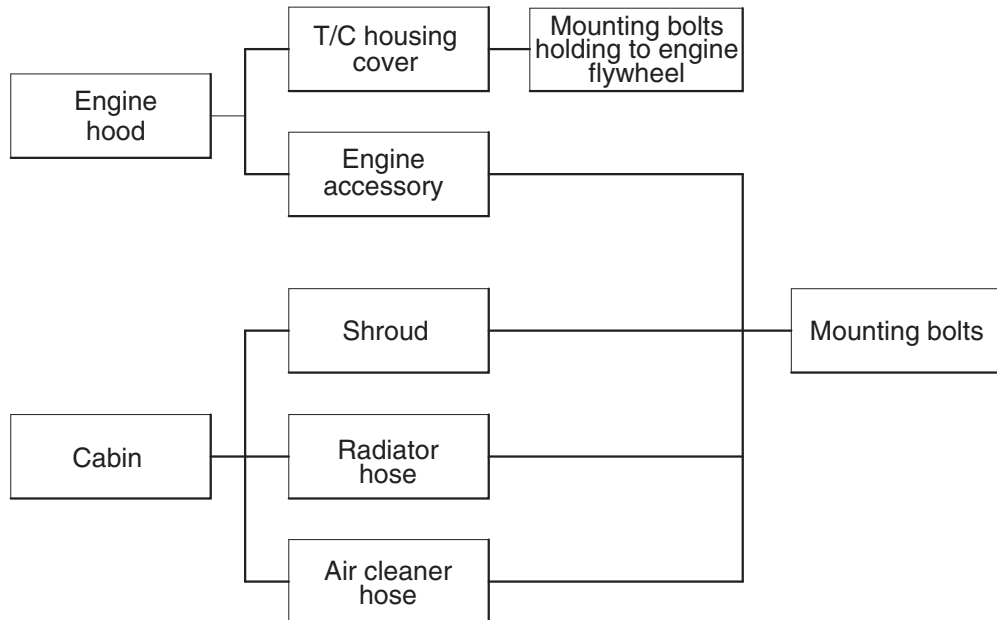
- Tightening torque : 105~125 kgf · m
(757~903 lbf · ft)



3. ENGINE

Remove the torque converter, transmission and front axle inside the frame, then remove the engine assembly

1) REMOVAL



250D9RE25

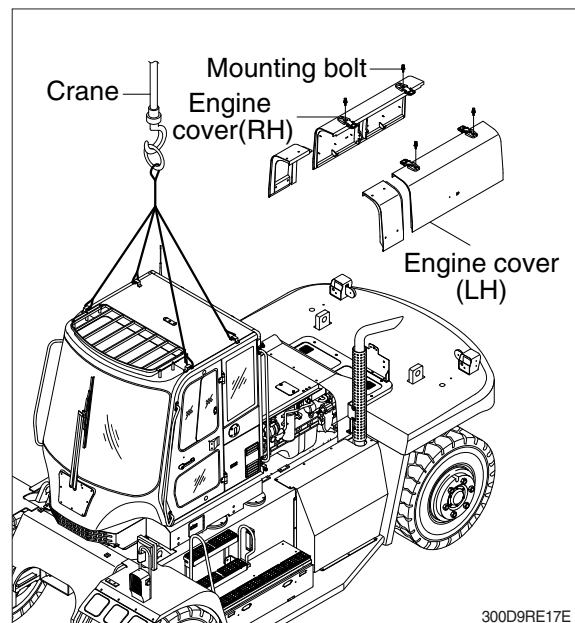
(1) Engine hood

① Cabin

- First, tilt the cabin
 - ※ Refer to page 7-17 of operator's manual for operating description.
- After remove the wiring for rear combination lamp, work lamp, head lamp and flasher lamp on the stay of the cabin and then raise it with a crane.
- Finally remove cabin for tilt option cylinder, pin and latch assy.

② Engine cover (LH, RH)

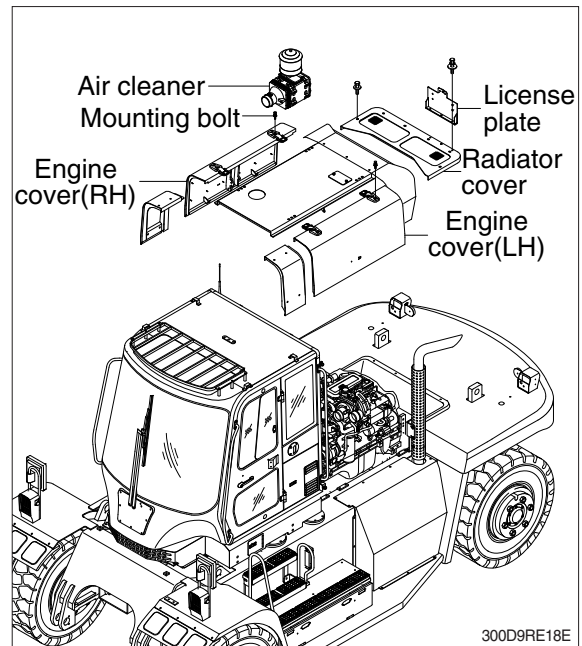
Remove engine cover by loosening the mounting bolts.



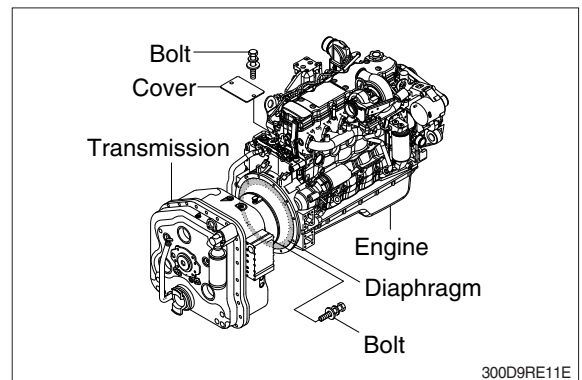
300D9RE17E

② **Engine cover (center)**

- a. Pull upside the precleaner by loosening the clamp and seal in the air intake hole of air cleaner.
- b. Remove engine cover and radiator cover upward.



- (2) Torque converter housing cover and mounting bolts. See page 2-13.



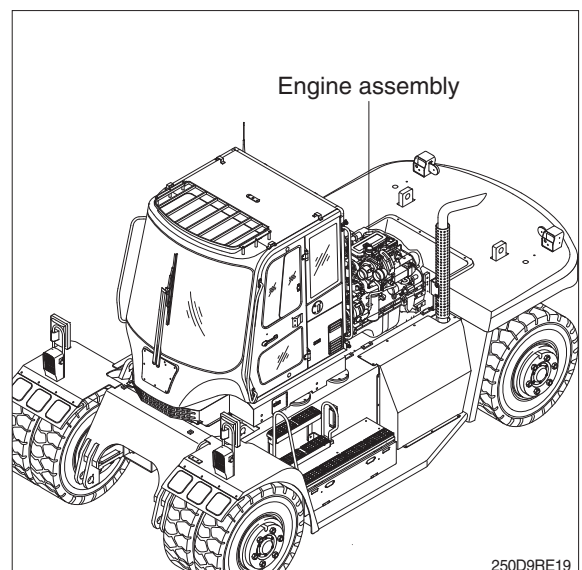
(3) **Engine accessory**

Remove all wiring harnesses, cables and hoses around the engine, dashboard and frame.

- ① Wiring harness to alternator and starter.
- ② Wiring harness for oil pressure and engine water temperature gauges.
- ③ Cables for meters, buttons and accelerator pedal.
- ④ Hoses to fuel tank and air cleaner.
- ⑤ Exhaust pipe.

(4) **Radiator hose**

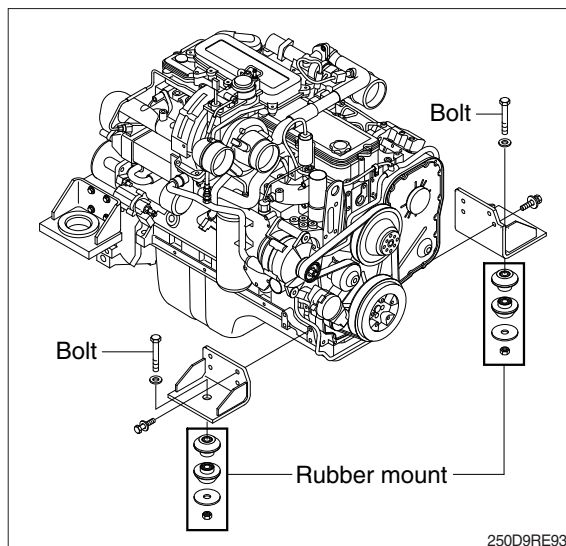
Open the drain valve of the radiator and drain the cooling water, then remove the radiator hose.



(5) Engine mounting bracket

Attach a crane to the engine hook and raise, then remove mounting bolts. Raise the engine slightly, slide towards the radiator, then lift up.

- ※ When sliding the engine, be careful of the collision of engine and radiator.

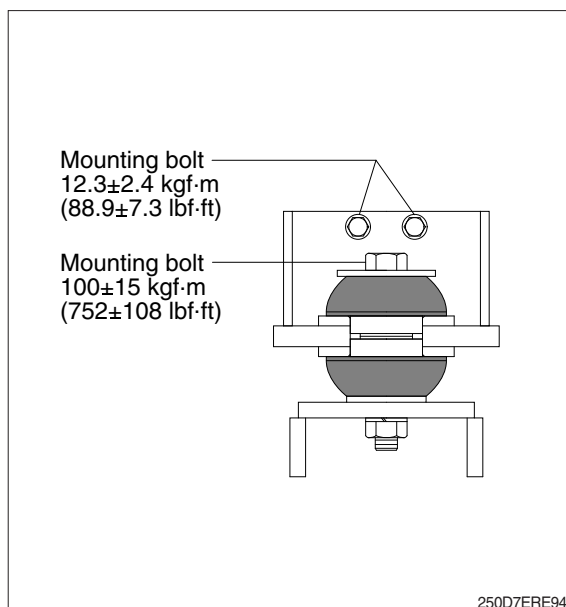


2) INSTALLATION

Installation is the reverse order to removal, but be careful of the following points.

- (1) Tighten the engine mounting bolts and nuts.
- (2) Tighten the engine mounting bracket bolts.

- ※ Do not remove the bolts unless necessary. Loctite is coated over the threads of bolt. So, once the bolts were removed, coat them with loctite(#277) when installing.
- ※ Before installing the bolts, loctite in the holes should be removed by a tap



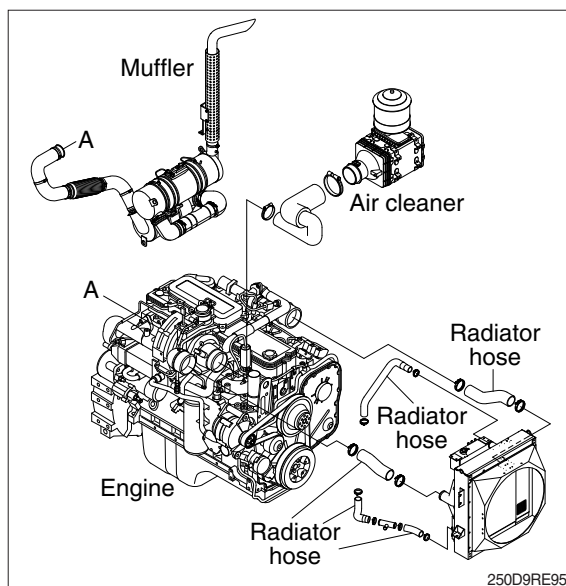
- (3) Tightening torque of mounting bolt installed to torque converter housing.
 - See page 2-13, 2)INSTALLATION.

(4) Radiator hoses

- Distance to insert hose : 80 mm (31 in)

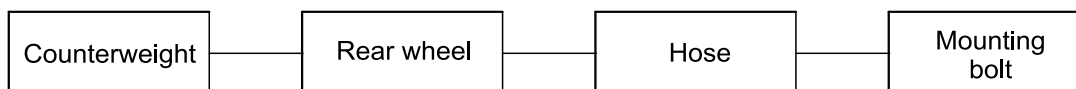
(5) Air cleaner hose

Insert the air cleaner hose securely and fit a clamp.

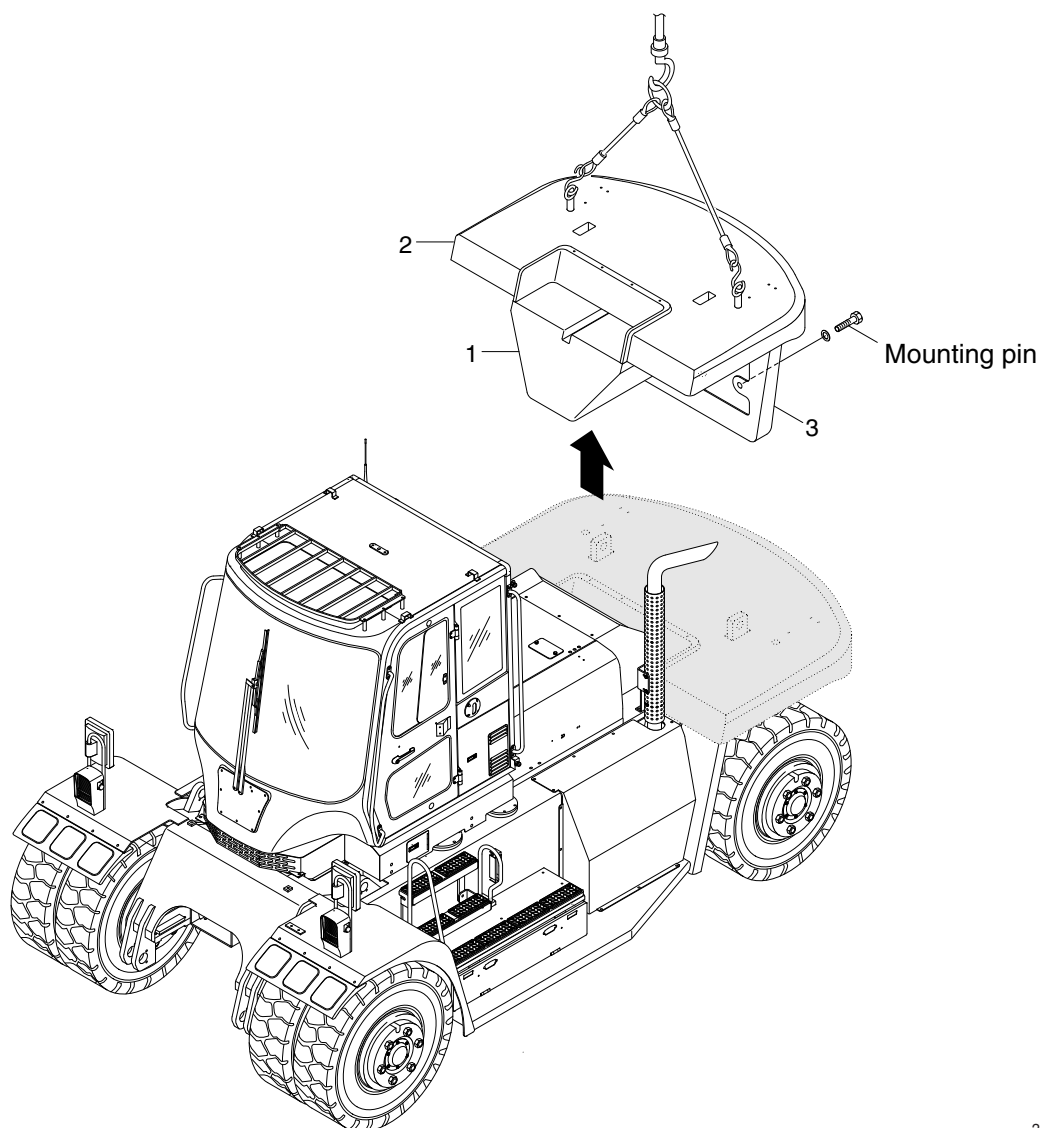


4. REAR AXLE

1) REMOVAL



D503RE35



300D9RE30E

(1) Counterweight

Hold the counterweight with hoist bars, and raise it with a crane.

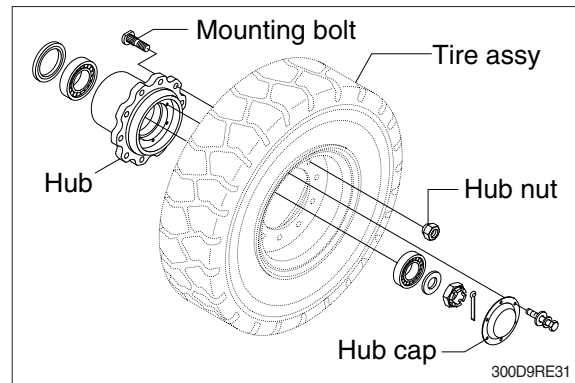
Remove the mounting bolts, raise slightly and move it slowly to rear side.

· Weight of counterweight (standard)

| Description | Weight | Tightening torque |
|--------------------------|--------------------|---|
| Counter weight (1) | 2560 kg (5640 lb) | 199 ± 30 kgf · m (1440 ± 217 lbf · ft) |
| Counter weight-upper (2) | 7470 kg (16470 lb) | 199 ± 30 kgf · m (1440 ± 217 lbf · ft) |
| Counter weight-lower (3) | 1400 kg (3090 lb) | 100 ± 15 kgf · m (723 ± 108 lbf · ft) |

(2) Rear wheel

Remove mounting bolt and hub nut with socket wrench and then carefully take out the tire assembly.



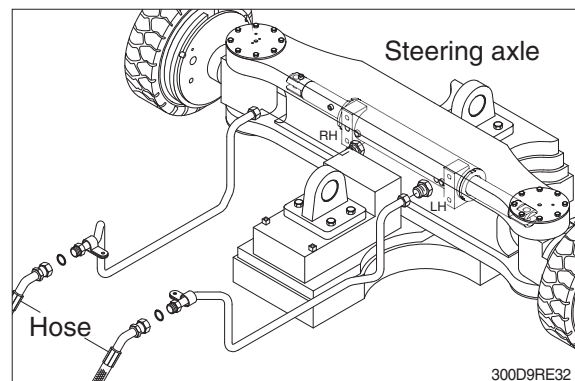
(3) Hose

Disconnect the hose from the steering axle and then drain out oil from the hoses.

⚠ When disconnecting the hoses, take care that oil should not be spilt on the floor.

If someone slips due to oil spillage, it can cause to do him severe injuries.

In case of spilling out of the oil on the floor, wipe away immediately it in order to prevent someone from unexpected accident.



(4) Mounting bolt

Put a block under the steering axle, support on a truck, and raise the frame with a crane. Remove the mounting bolts installing to the frame, and pull out to the rear.

There are shims between the support and steering axle to prevent play.

