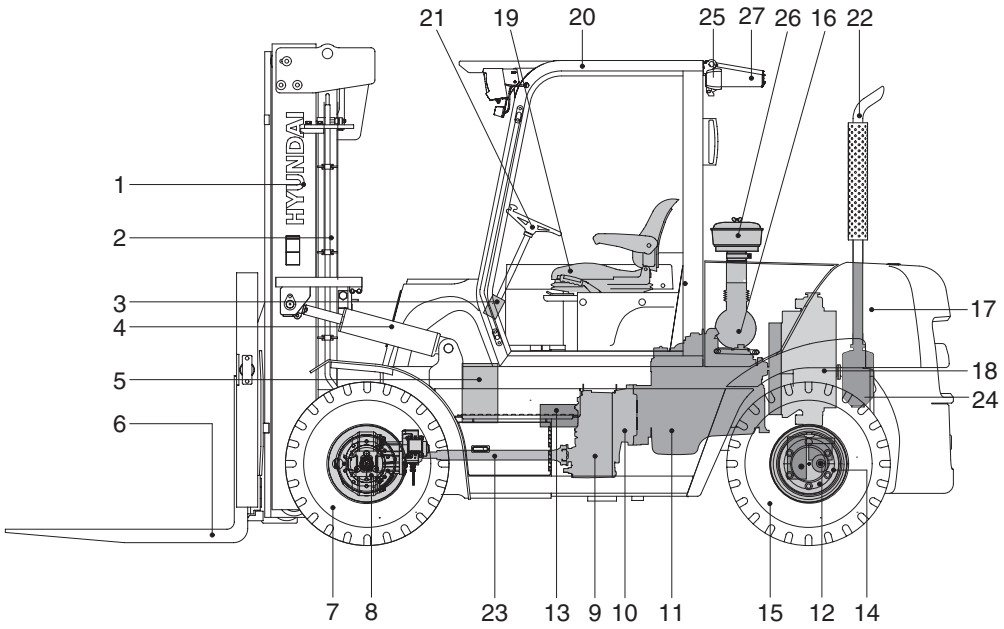
# SECTION 2 REMOVAL & INSTALLATION OF UNIT

# GROUP 1 STRUCTURE

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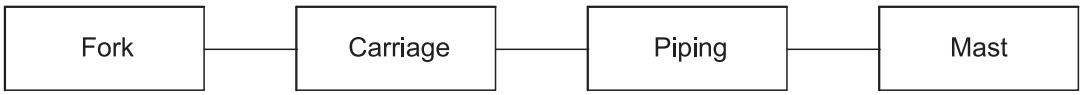
| | | | | | |
|---|---|---|---|---|---|
| 1 | Mast | 10 | Torque converter | 19 | Seat |
| 2 | Lift cylinder | 11 | Engine | 20 | Cabin |
| 3 | Steering unit | 12 | Steering cylinder | 21 | Steering handle |
| 4 | Tilt cylinder | 13 | Hydraulic pump | 22 | Silencer |
| 5 | Main control valve | 14 | Steering axle | 23 | Drive shaft |
| 6 | Fork | 15 | Rear wheel | 24 | DOC |
| 7 | Front wheel | 16 | Air cleaner | 25 | Beacon lamp |
| 8 | Drive axle | 17 | Counterweight | 26 | Precleaner |
| 9 | Transmission | 18 | Radiator | 27 | Aircon condensor |

# GROUP 2 REMOVAL AND INSTALLATION OF UNIT

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

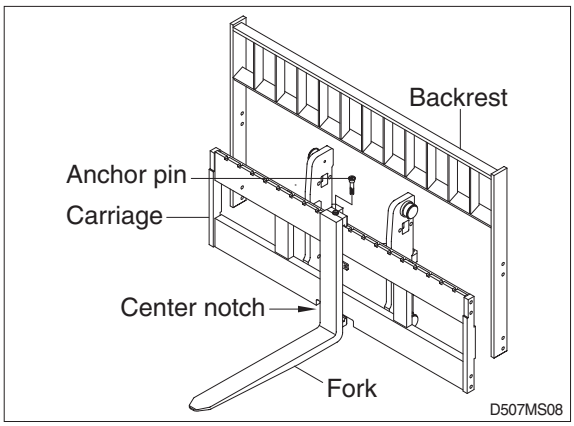
## 1. MAST

### 1) REMOVAL



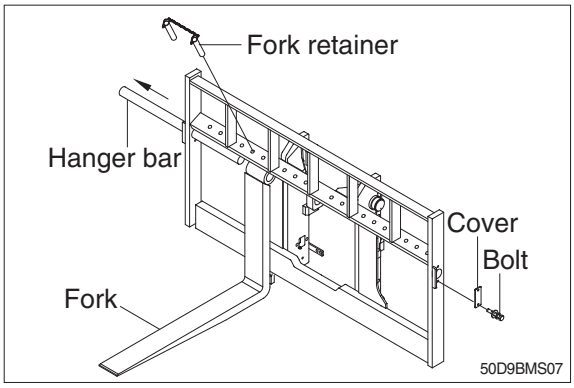

**(1) Hook on type forks** (standard)

① Lower the fork carriage until the forks are approximately 25 mm (1 in) from the floor.
② Release fork anchor pins and slide one fork at a time toward the center of the carriage where a notch has been cut in the bottom plate for easy fork removal.
③ Remove only one fork at a time.
※ On larger forks it may be necessary to use a block of wood.



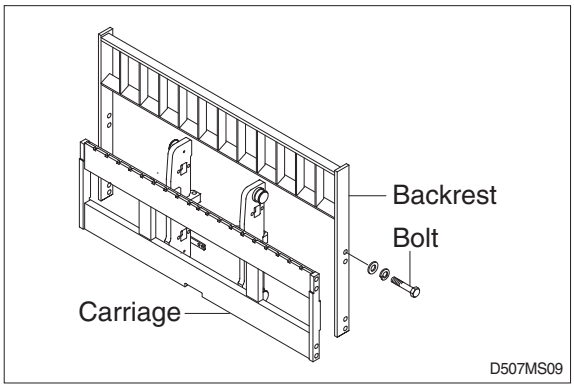

**(2) Shaft type forks** (option)

① Lower the fork carriage until the forks are approximately 25 mm (1 in) from the floor.
② Release fork retainer and remove cover.
③ Slide one hanger bar at a time out of carriage assembly.
④ Remove only one fork at a time.
※ On larger forks it may be necessary to use a block of wood.



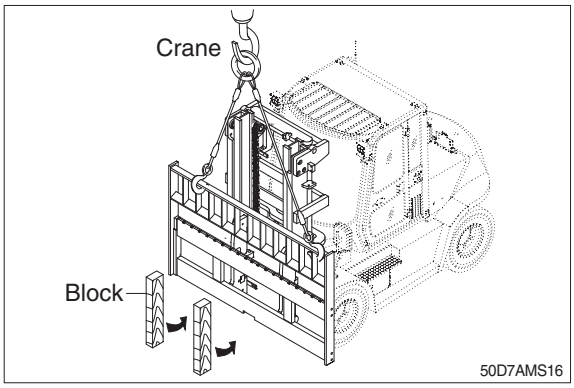

**(3) Backrest**

① Remove bolts securing backrest to fork carriage. Lift backrest straight up and remove it from carriage.

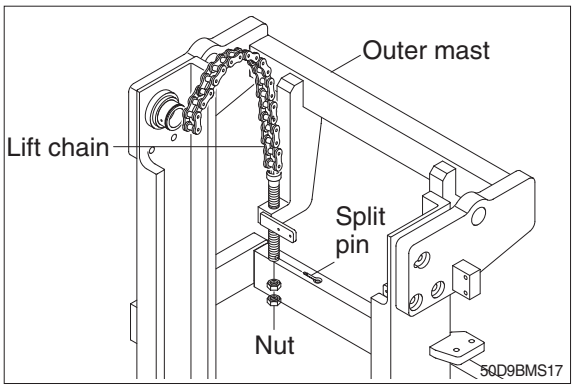


### (4) Carriage

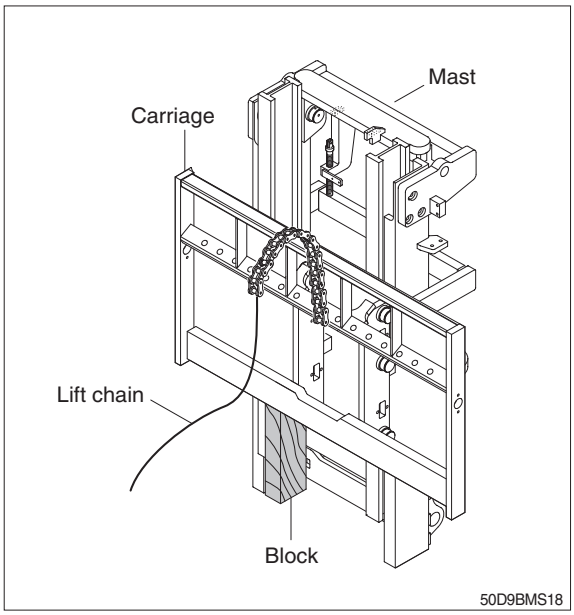
① With the mast vertical, raise the carriage high enough to place blocks under the load forks. This is done to create slack in the load chains when the carriage is lowered. Lower the carriage all the way down to the floor. Make sure the carriage is level, this will prevent any binding when the mast is raised.




② While supporting lift chains, remove the split pin and nuts from the chain anchor bolts of stationary upright.



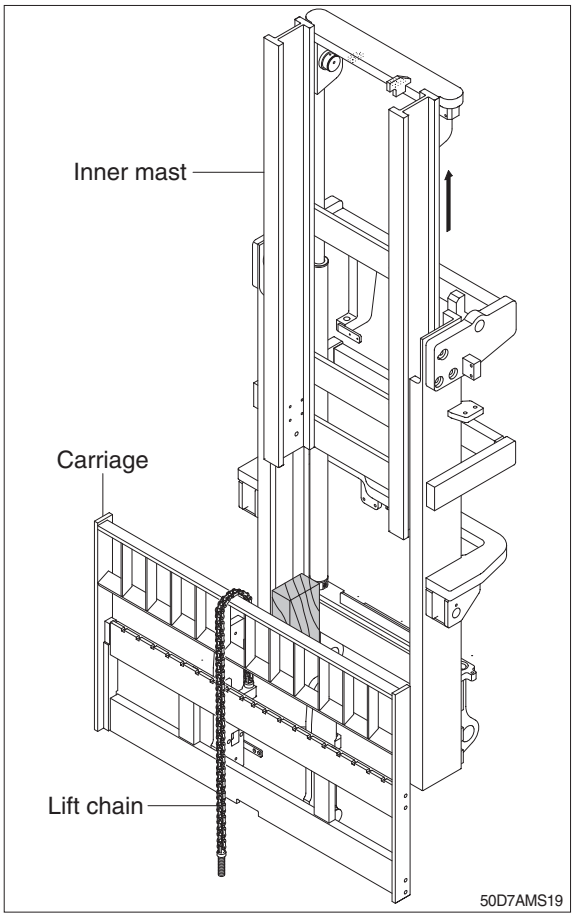

③ Pull the chains out of the sheaves and drape them over the front of the carriage.



④ 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.**

※ Inspect all parts for wear or damage. Replace all worn or damaged parts.

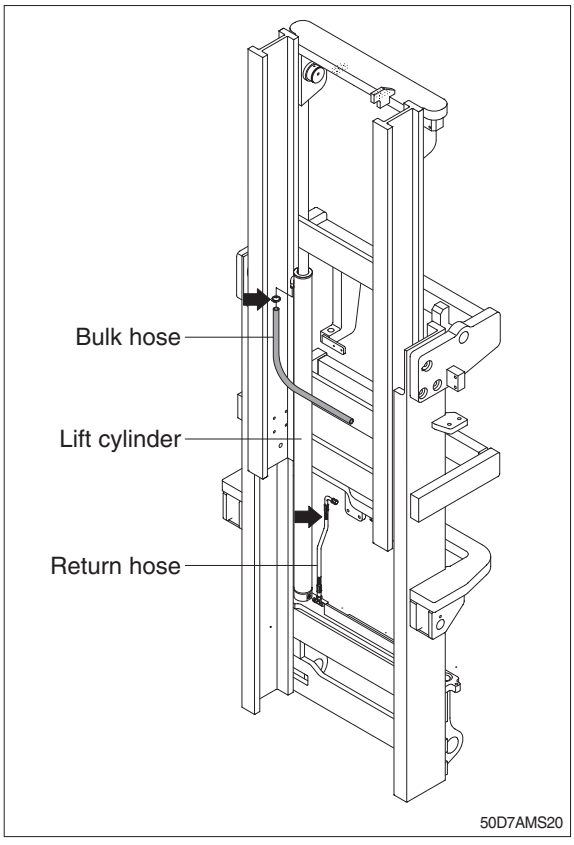



### (5) Piping

① Remove the bulk hoses and clamps attached to the lift cylinder.

② Remove the return hose from the down control valve.

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

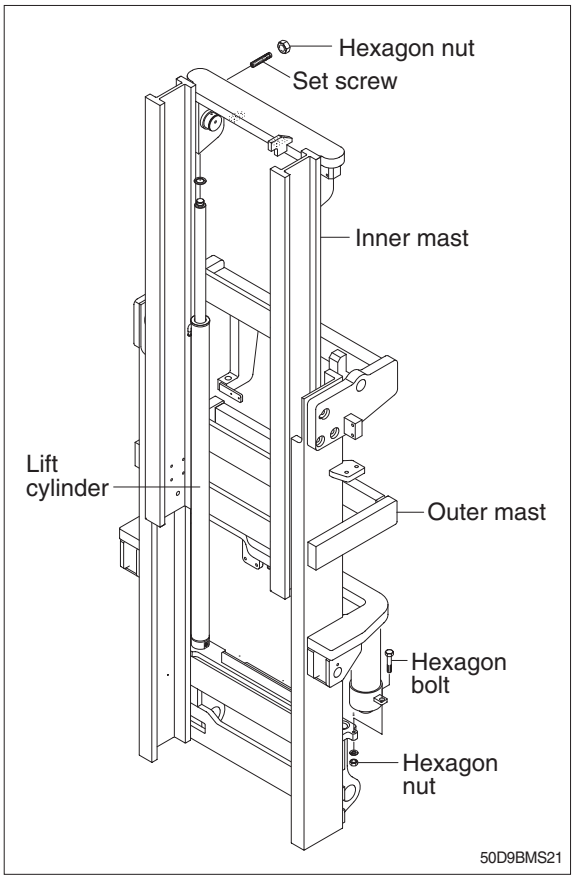


### (6) Lift cylinder

① Loosen and remove set screw and nut securing lift cylinders to inner 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.**

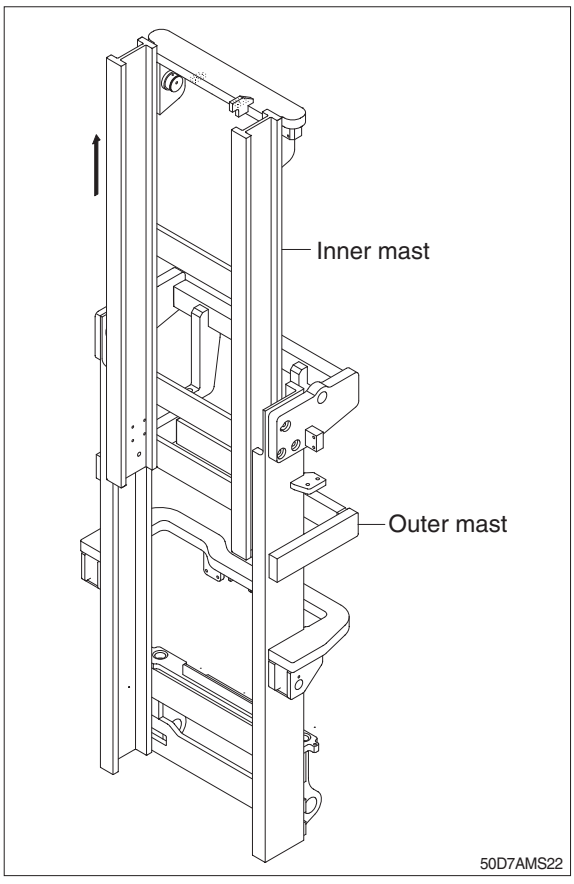
③ Loosen and remove hexagon bolts and nuts securing lift cylinders to outer mast.
④ Using an overhead hoist, slowly raise the inner mast high enough to clear lift cylinder.
⑤ Using an overhead hoist, draw out lift cylinder carefully and put down on the work floor.




### (7) INNER MAST

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

**⚠ Be careful the mast not to swing or fall.**



### (8) Tilt cylinder pin

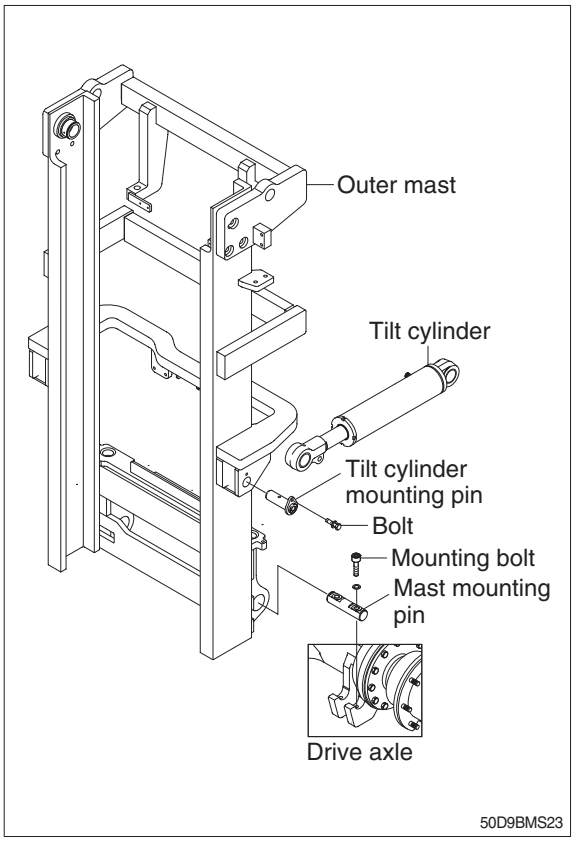
Loosen the bolt and remove the tilt cylinder mounting pin.

### (9) Mast mounting pin

① Attach a crane to the stay at the top of the outer mast, and raise it enough to sustain jacked up truck.

② Loosen the mounting bolts and remove the mounting pins from drive axle, then slowly raise outer mast.

※ This operation is carried out under the truck, 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 mounting pin

① Check the mast mounting pins for wear, then install pins into the mast support bracket .

② Jack up the truck so that the front is raised and then using an overhead hoist assemble outer mast to drive axle unit.

③ Tighten mounting socket bolts to drive axle unit.

· Tightening torque : 49.2~66.6 kgf · m (355~481 lbf · ft)

### (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

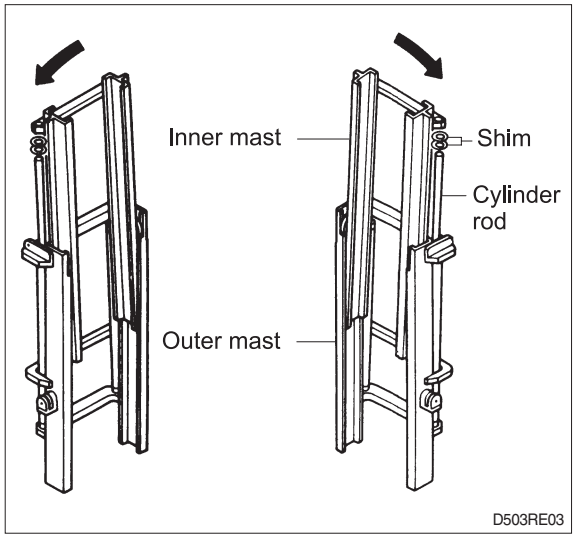
① Assemble the lift cylinder inside the outer mast, then tighten the stopper bolt. If the cylinder assembly has been replaced, adjust as follows so that the left and right cylinders are synchronized at the maximum lifting height.

② Assemble the cylinder rod to the inner 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.

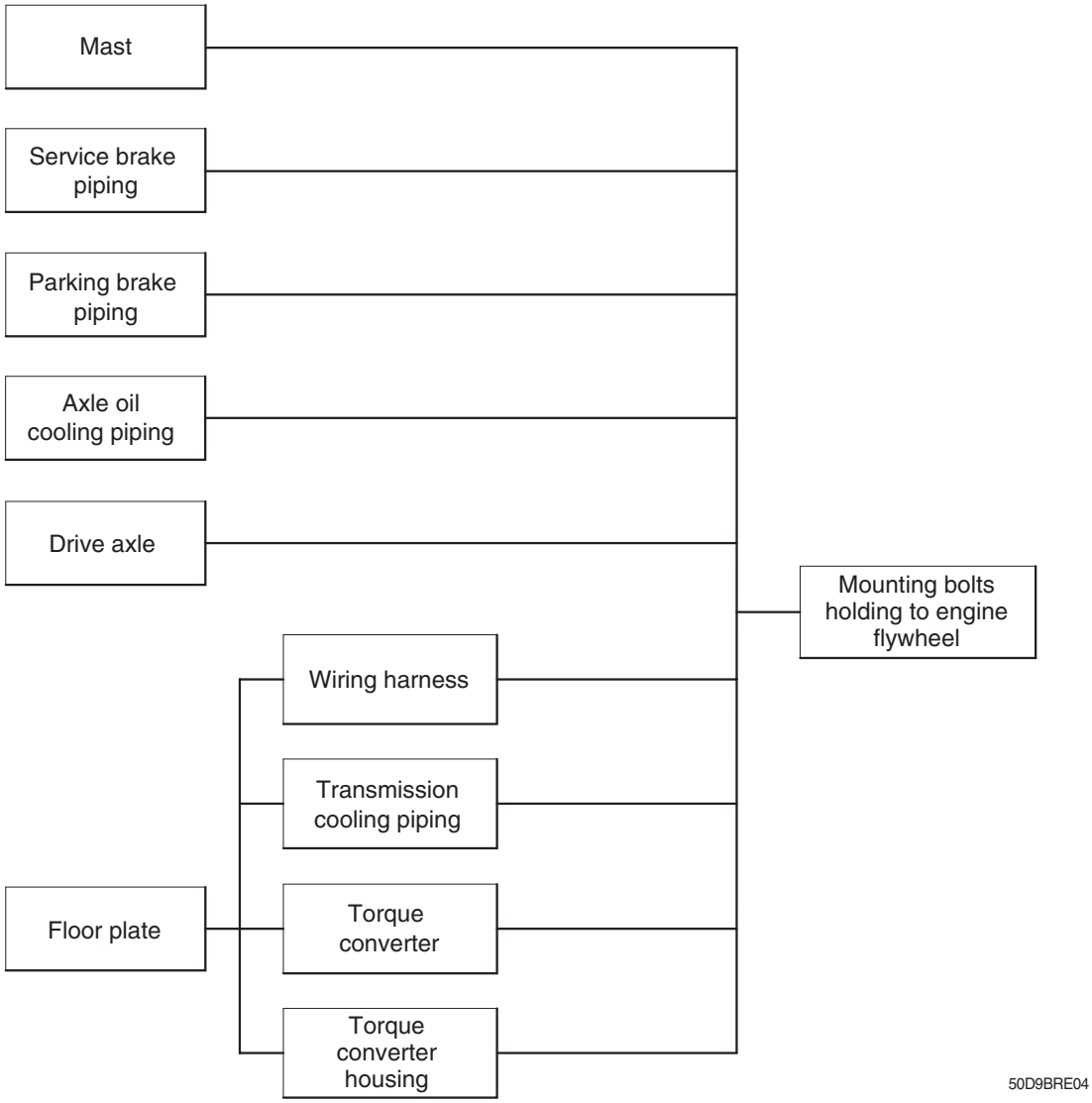
※ If play is to RIGHT, install adjustment shim to RIGHT cylinder.

· Shim thickness : 1.0 mm (0.04 in)



## 2. POWER TRAIN ASSEMBLY

### 1) REMOVAL




#### (1) Mast

Refer to section on mast (Page 2-2)

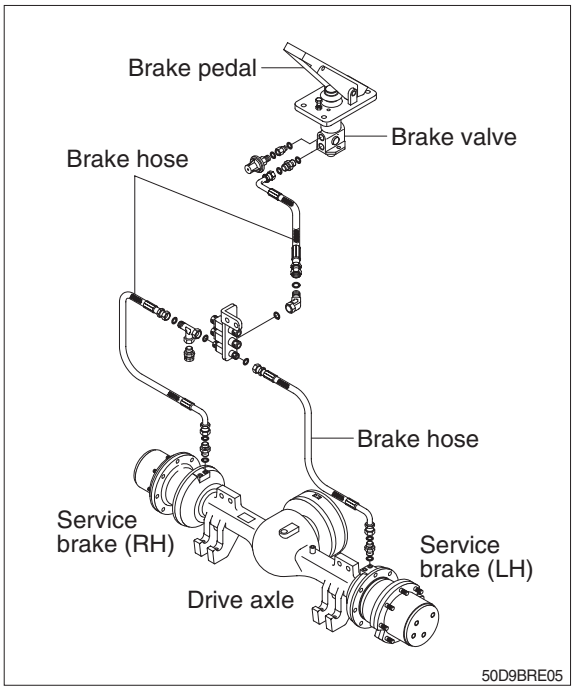
### (2) Service brake piping

Disconnect the service brake piping from the wheel cylinder end.

**⚠ When disconnecting the brake hoses or filling the oil into the drive axle housing, take care that oil should not be spilt on the floor.**

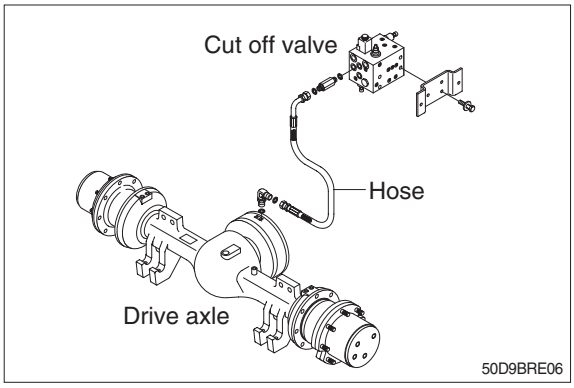
If someone slips due to oil spillage, it can cause to do him severe injuries.

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



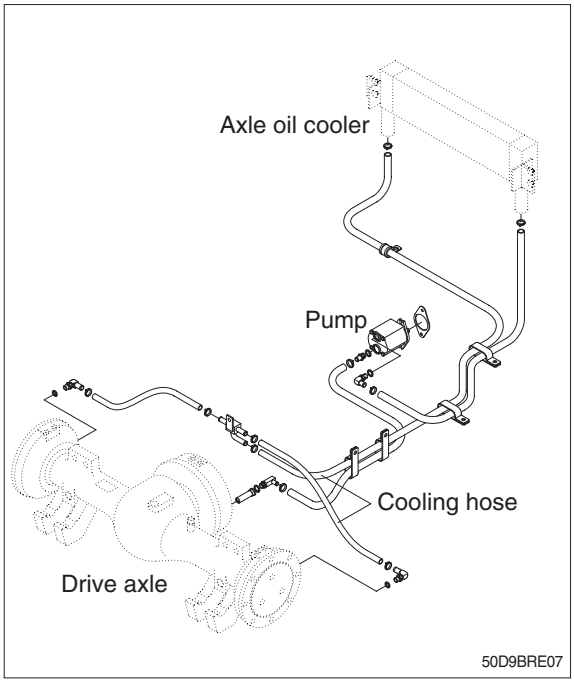

### (3) Parking brake hose

Disconnect parking brake piping from the drive axle.




### (4) Axle oil cooling piping

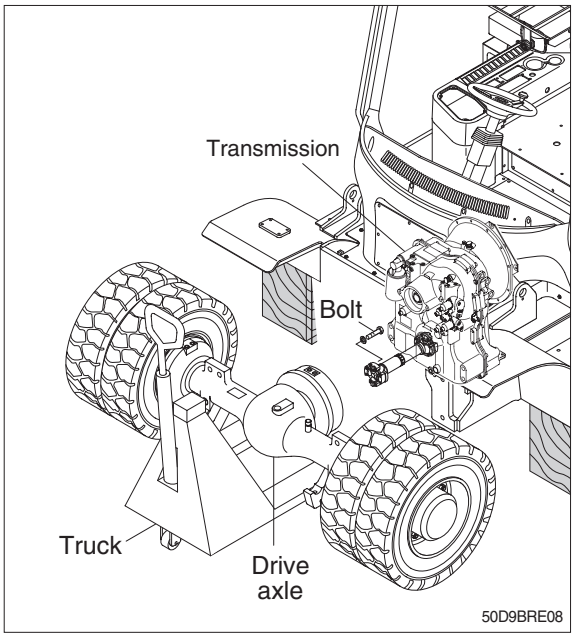
Disconnect the brake cooling piping from the drive axle.



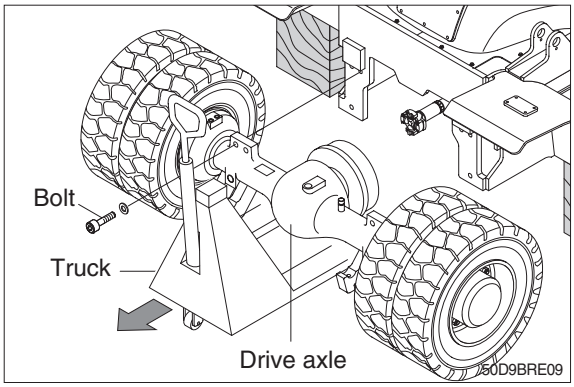
### (5) Drive axle

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

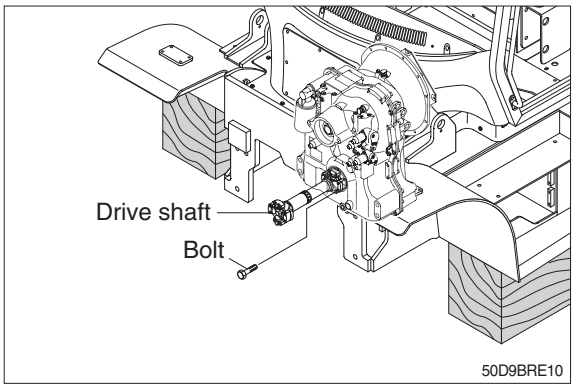
① Attach a crane to the tilt cylinder notches on the dashboard and raise the machine.
② Loosen hexagonal bolts connecting drive axle to drive shaft.
③ Put the block under the drive axle and support under the drive axle with a truck.




④ Remove drive axle mounting bolts from the frame and then slowly pull out the truck with drive axle to the front.

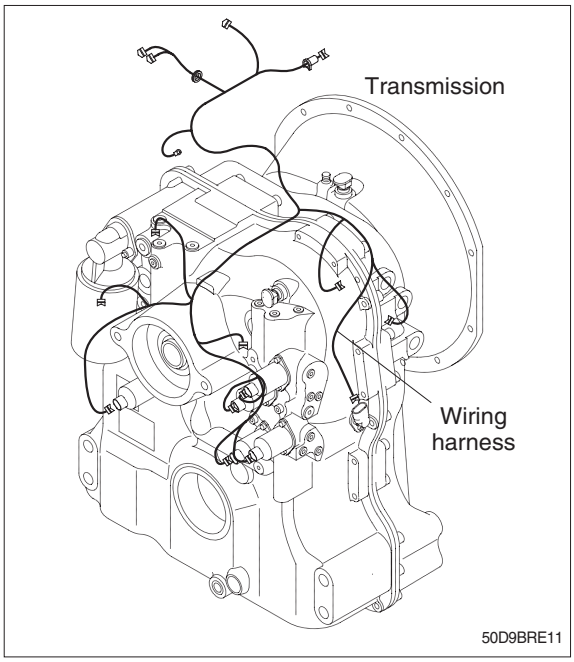



⑤ Remove the drive shaft from the transmission by loosening the mounting bolts.



### (6) Wiring harness

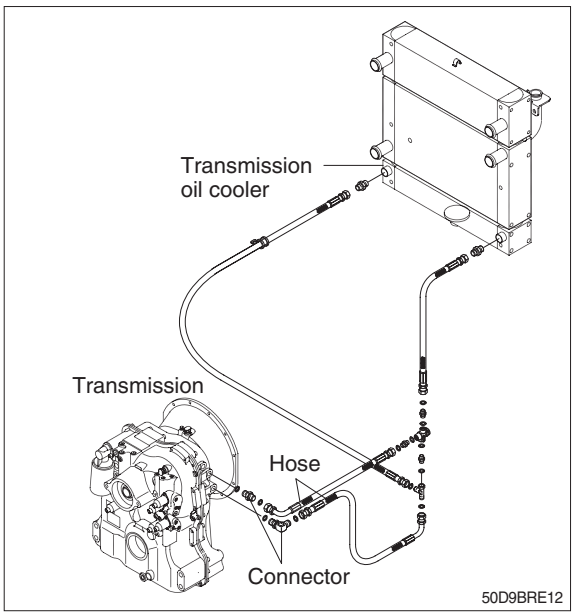
Disconnect wiring harness for the solenoid valve or sensor etc from the transmission.




### (7) Transmission cooling piping

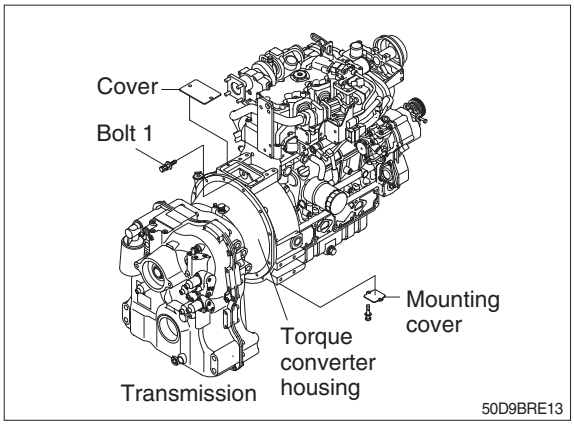
① Disconnect cooling hose and connector from the transmission.

※ Make sure that the coolant be drained from the hose.



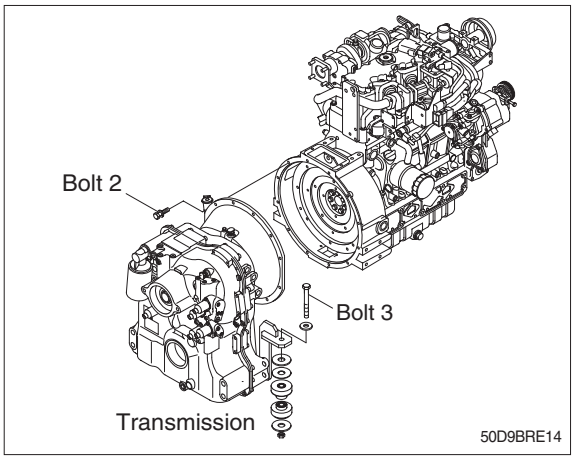

### (8) Torque converter

① Remove the cover on the top face of the engine flywheel housing then remove the 4 mounting bolts installed on the engine flywheel. To rotate the flywheel, remove 1 mounting bolt, then insert a turning tool in the mounting cover hole. One man must turn the engine fan by hand while the other turns the flywheel.

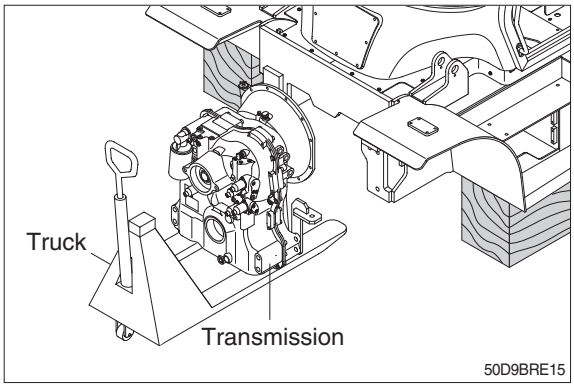


### (9) Transmission

① Remove the transmission assembly from the torque converter housing by loosening the mounting bolts.
Remove torque converter housing from the engine flywheel by loosening the mounting bolts and pins.



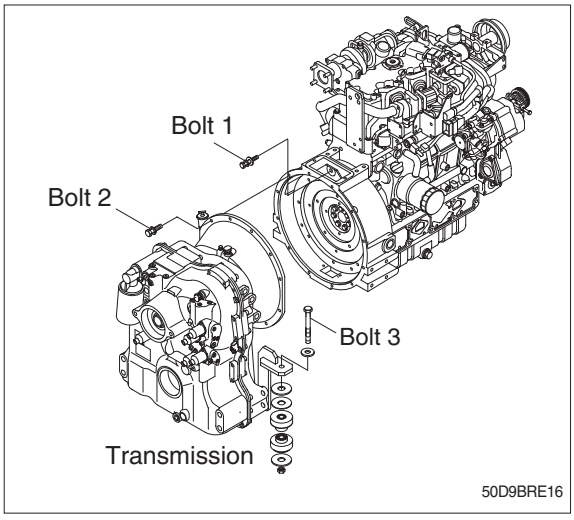

② Using a moving truck slowly, pull out transmission assembly to the front.




### 2) INSTALLATION

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

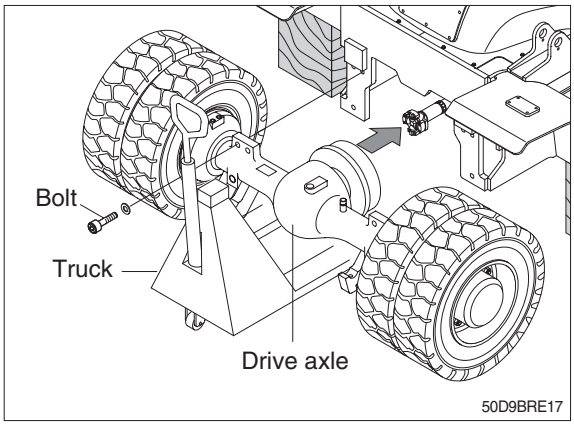
(1) Tightening torque of mounting bolt for the transmission.
① Bolt 1 : 5.5~8.3 kgf·m (39.8~60.0 lbf·ft)
② Bolt 2 : 5.5~8.3 kgf·m (39.8~60.0 lbf·ft)
③ Bolt 3 : 7.5 kgf·m (54.2 lbf·ft)
※ Apply loctite #277 on the thread before tightening the bolts.



(2) Tightening torque of mounting bolt for drive axle.

· 135~165 kgf · m (976~1193 lbf · ft)

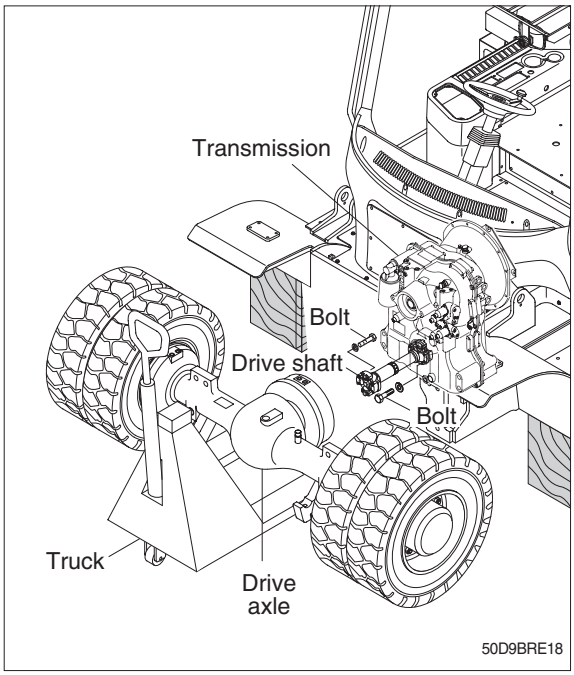
※ Apply loctite #277 on the thread before tightening the bolts.




(3) Tightening torque of mounting bolt for the drive shaft.

· 6.3~7.7 kgf · m (45.6~55.6 lbf · ft)

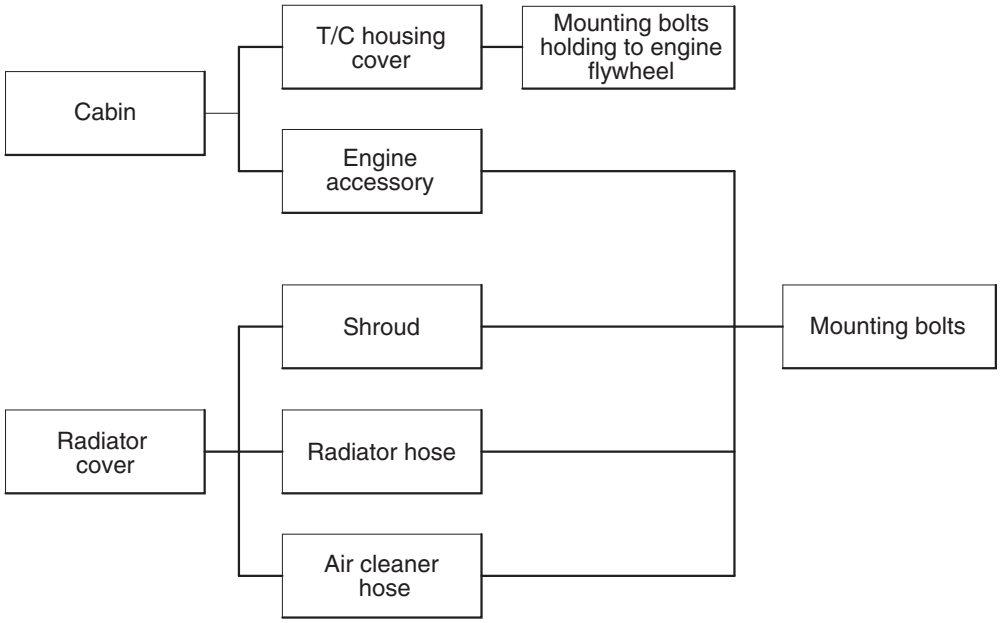
※ Apply loctite #277 on the thread before tightening the bolts.



## 3. ENGINE

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

### 1) REMOVAL

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#### (1) Engine hood

① Overhead guard or cabin

-First, tilt the overhead guard or cabin

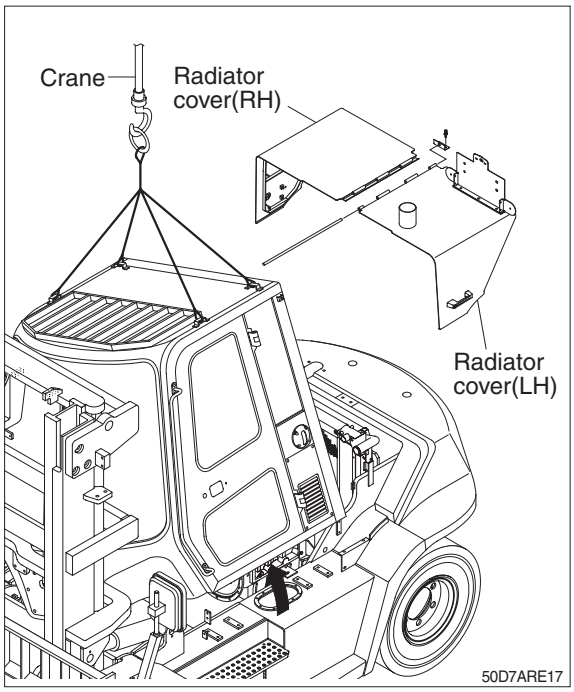
※Refer to page 7-18 for operator's manual.

-After remove the wiring for rear combination lamp, work lamp, head lamp and flasher lamp on the stay of the overhead guard and then raise it with a crane

-Finally remove cabin for removal tilt option cylnder and latch assy.

② Radiator cover (LH, RH)

Remove radiator cover by loosening the mounting bolts.

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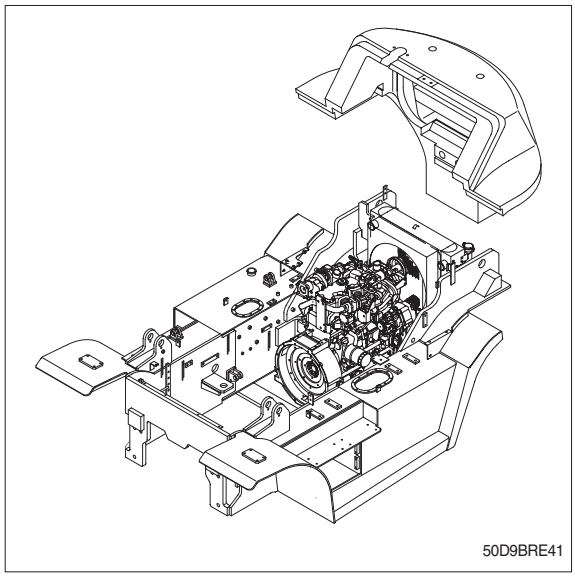
(2) Remove the torque converter housing cover and mounting bolts installed to flywheel housing.
For details, see page 2-11.




**(3) Engine accessory**

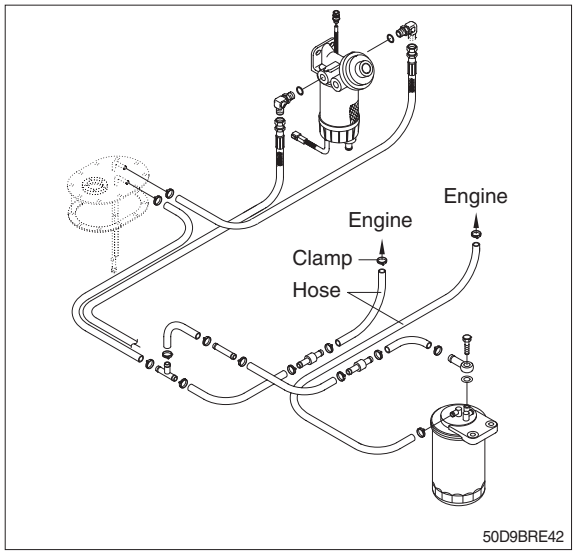
Remove all wiring harnesses, cables and hoses around the engine, dashboard and frame.

① Wiring harness to alternator and start motor.

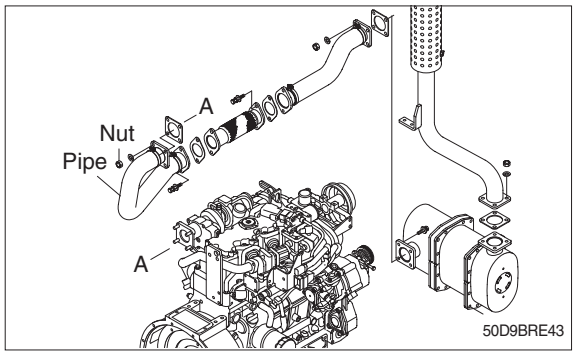
② Wiring harness for oil pressure and engine water temperature gauges.

③ Cables for meters, buttons and accelerator pedal.

④ Fuel tank hose.
Loosen the hose clamp and disconnect the hoses.

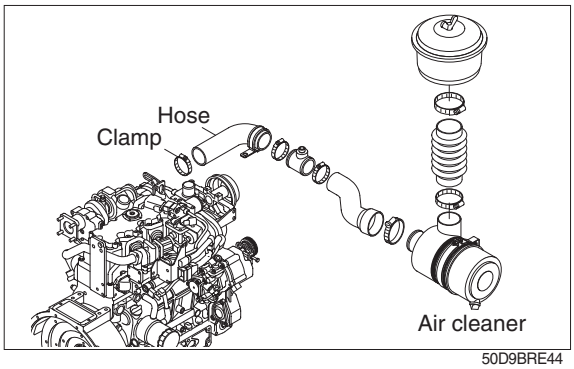



⑤ Exhaust pipe.
Loosen the nut and disconnect the pipe.



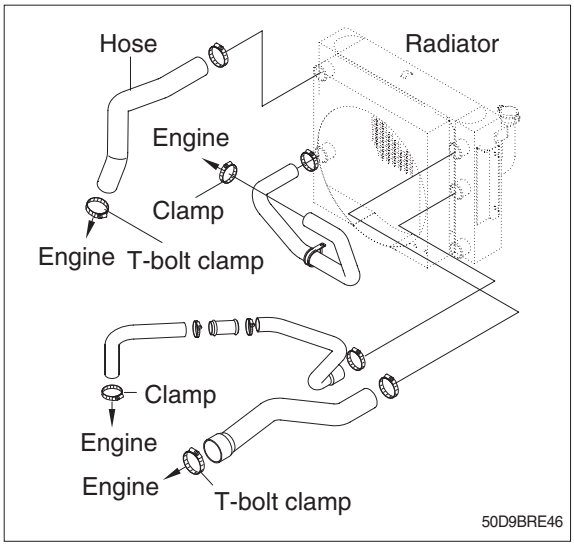
⑥ Air cleaner hose.

Loosen the hose clamp and disconnect the hose.




**(4) Radiator hose**

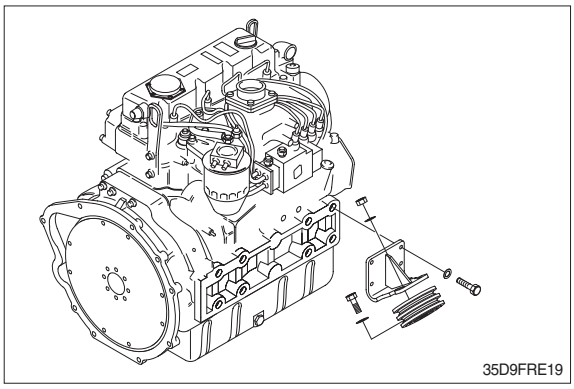
Open the drain valve of the radiator and drain the cooling water, then loosen the T-bolt clamp and hose clamp and disconnect the hoses.




**(5) Mounting bolt**

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 engine and radiator.



## 2) INSTALLATION

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

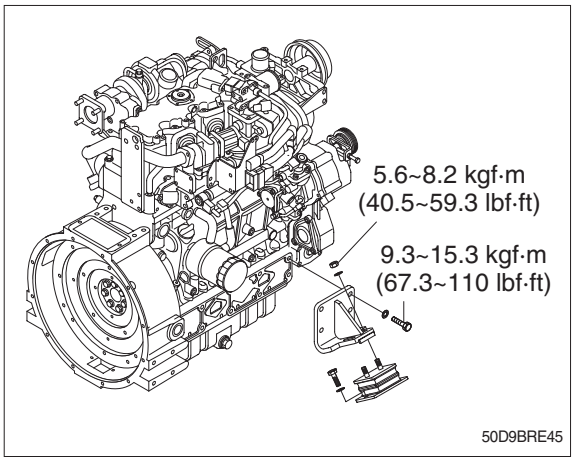
(1) Tighten the engine mounting bolts and nuts.

(2) Tighten the engine mounting bracket bolts.

※ Do not remove the bolts unless necessary.

※ Before installing the bolts, loctite in the holes should be removed by a tap.

※ Apply loctite #243 on the thread before tightening the engine mounting bolts and bracket mounting bolts.

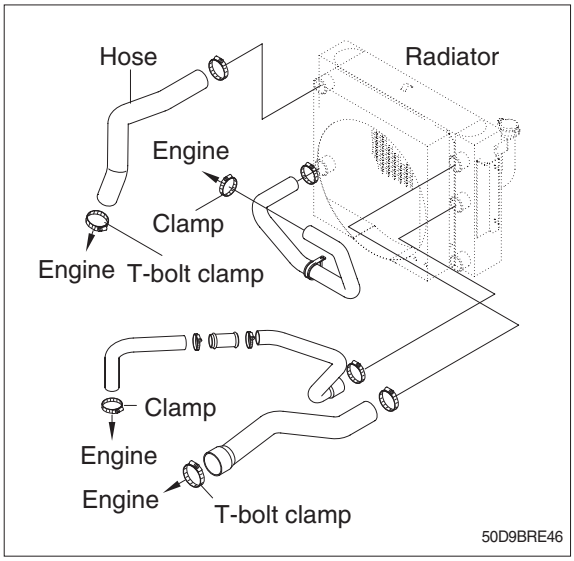



(3) Tightening torque of mounting bolt installing to torque converter housing.

· 5.5~8.3 kgf · m (39.8~60.0 lbf · ft)

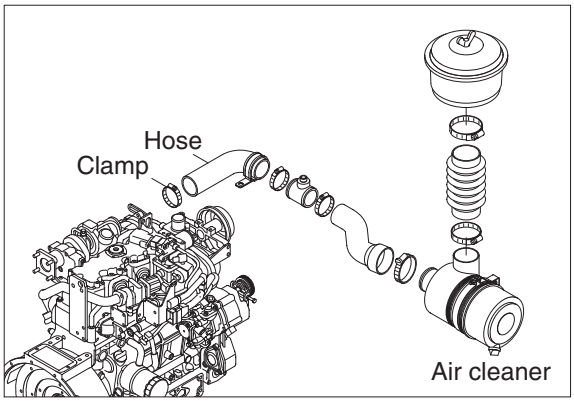
### (4) Radiator hoses

Insert the radiator hose securely and fit a T-bolt clamp and hose clamp.




### (5) Air cleaner hose

Insert the air cleaner hose securely and fit a clamp.

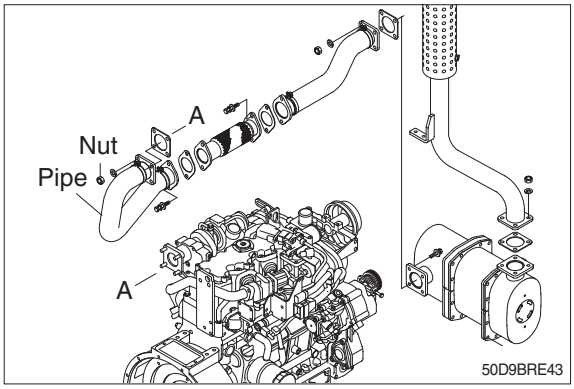


### (6) Exhaust pipe

Align the exhaust pipe with the engine exhaust hole and tighten the nut.

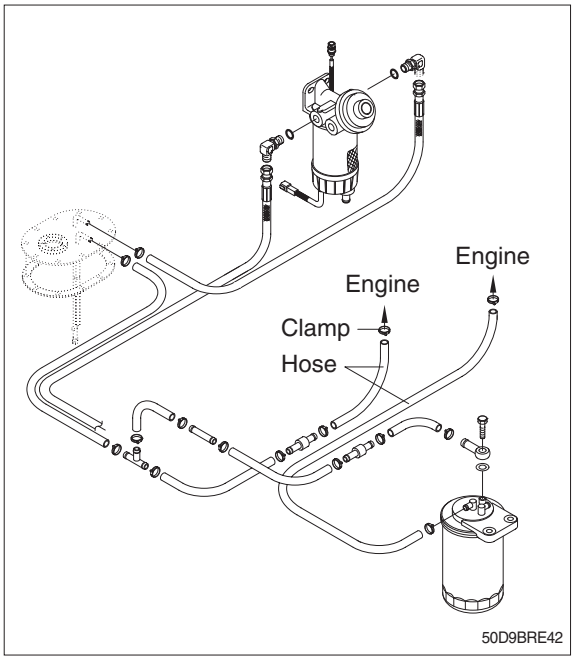
Tightening torque : 6.0~8.9 kfg.m (43.4 ~64.4 lbf·ft)

※ Apply liquid gasket on the gasket before mounting the gasket.




### (7) Fuel hoses

Insert the fuel hose securely and fit a clamp.

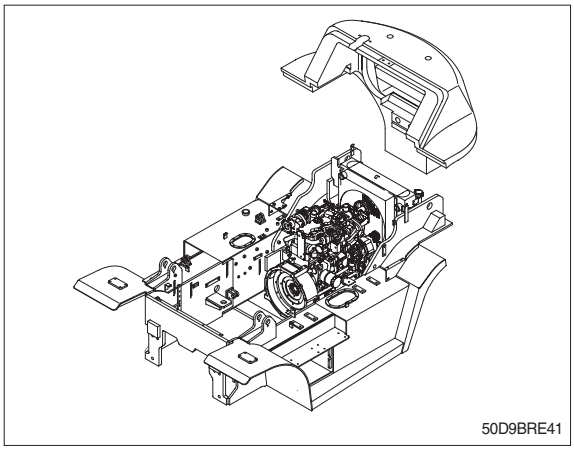



### (8) Engine accessory

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

Wiring harness to alternator and start motor.

Wiring harness for oil pressure and engine water temperature gauges etc..

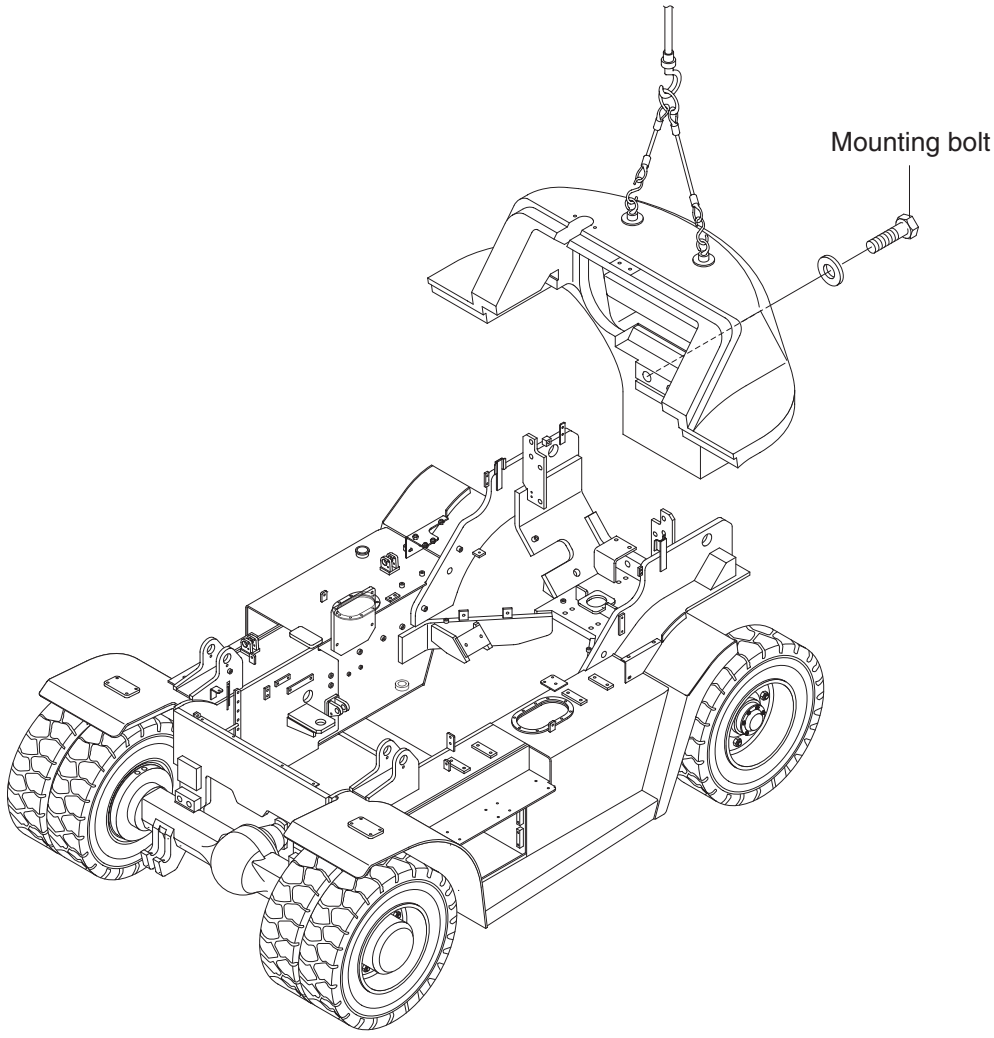


## 4. STEERING AXLE

### 1) REMOVAL


D503RE35

#### (1) Counterweight




50D9BRE30

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.

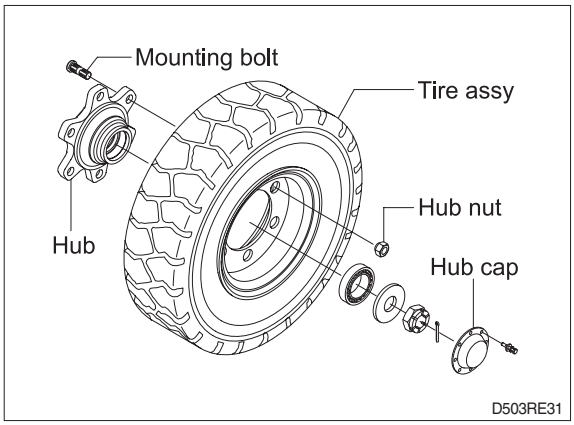
- Weight of counterweight (standard)
  50D-9B : 1,825 kg (4,020 lb)
  70D-9B : 3,160 kg (6970 lb)
- Tightening torque : 199±3. kgf·m (1440±217 lbf·ft)

⚠ **Make sure wire rope is proper size for the lifting of the counterweight.**

### (2) Rear wheel

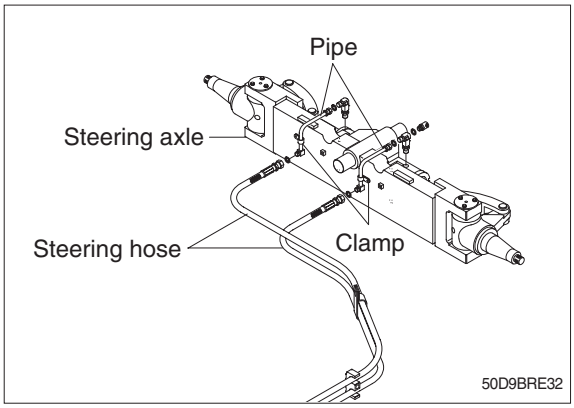
Remove mounting bolt and hub nut with socket wrench and then carefully take out the tire assembly.

· Hub nut tightening torque : 25.0±2.0 kgf.m (181±14.5 lbf·ft)

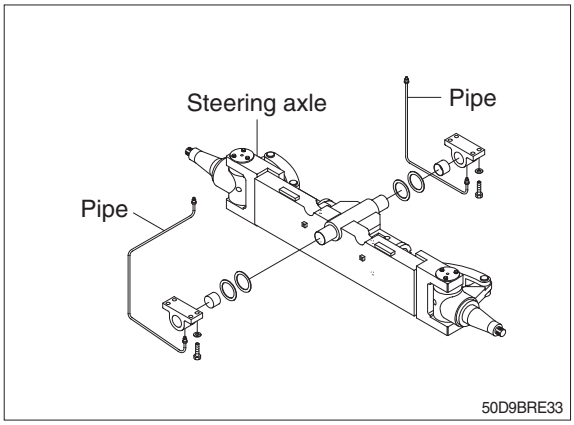



### (3) Hose and pipe

① Remove the clamp and disconnect the hose and pipe from steering axle and then drain out oil.




② Disconnect the grease pipe for the support.




### (4) Mounting bolt

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

※ There are shims (0.5t, 1t) between the support and steering axle to prevent play.

· Tightening torque : 41.3±6.2 kgf.m (300±45 lbf·ft)

※ Apply loctite #277 on the thread before tightening the bolts.