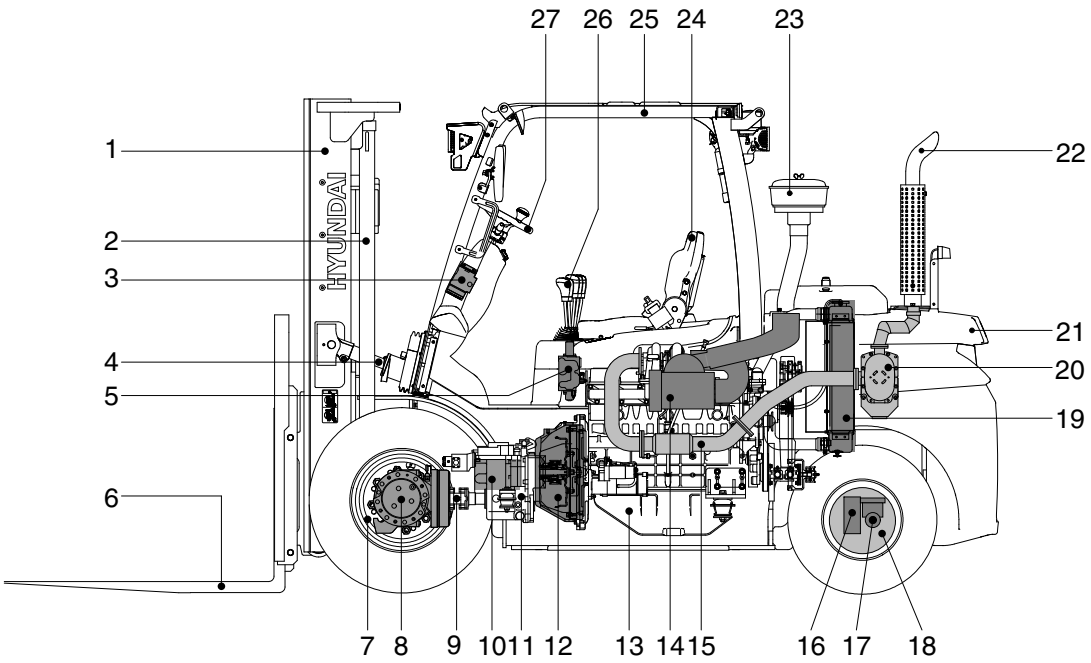
SECTION 2 REMOVAL & INSTALLATION OF UNIT

SECTION 2 REMOVAL & INSTALLATION OF UNIT

GROUP 1 MAJOR COMPONENTS



35D9VB7PM01

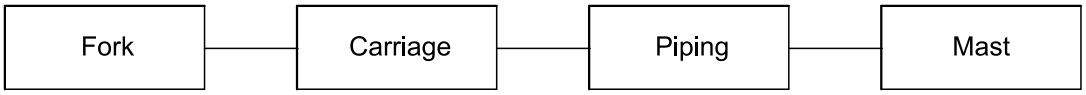
1	Mast	10	Hydraulic pump	19	Radiator
2	Lift cylinder	11	Transmission	20	Aftertreatment device
3	Steering unit	12	Torque converter	21	Counterweight
4	Tilt cylinder	13	Engine	22	Silencer
5	Control valve	14	Air cleaner	23	Precleaner
6	Fork	15	Exhaust pipe	24	Seat
7	Front wheel	16	Steering axle	25	Overhead guard
8	Drive axle	17	Steering cylinder	26	Control lever
9	Drive shaft	18	Rear wheel	27	Steering wheel

GROUP 2 REMOVAL AND INSTALLATION OF UNIT

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

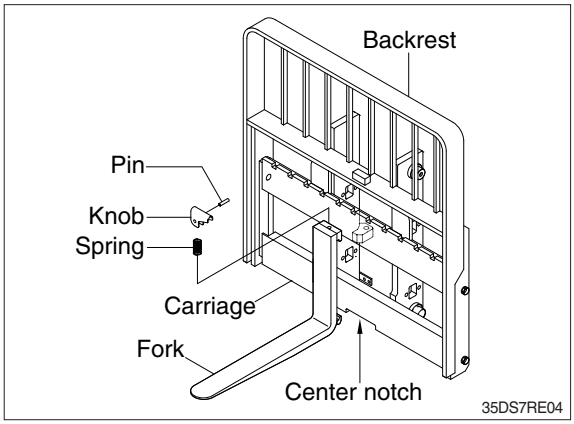
1. MAST

1) REMOVAL



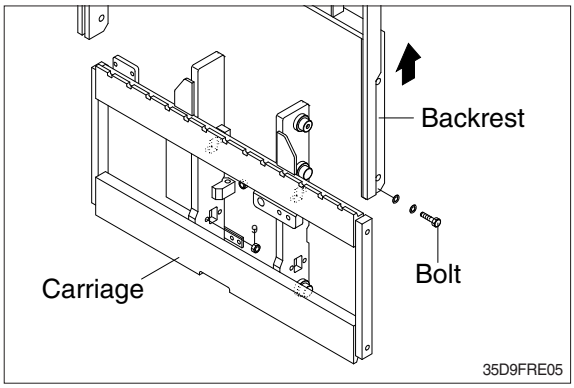
(1) Forks

① Lower the fork carriage until the forks are approximately 25 mm (1 in) from the floor.
② Turn knob up 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 removal.
③ Remove only one fork at a time.
※ On larger forks it may be necessary to use a block of wood.



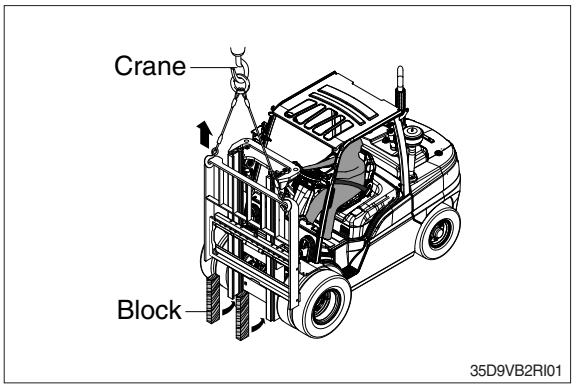
(2) Backrest (If necessary)

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

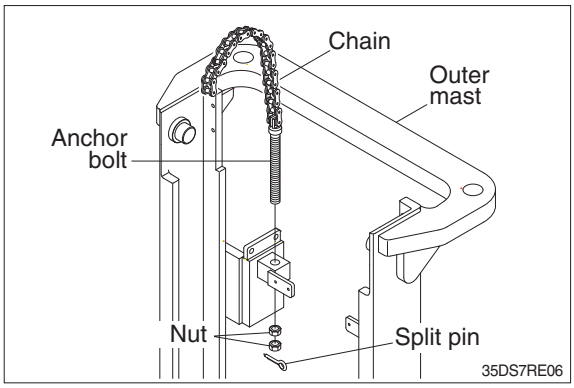


(3) Carriage

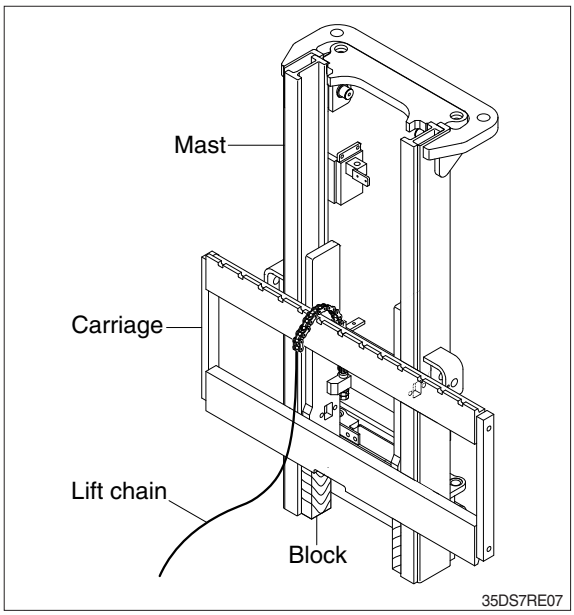
① With the mast vertical, raise the carriage high enough to place blocks under the carriage. This is done to create slack in the load chains when the carriage is lowered. Lower the carriage all the way down to the floor. Make sure the carriage is level, this will prevent any binding when the mast is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



② While supporting lift chains, remove the split pin and nuts from the anchor bolt. Slide out chain anchor bolt from the chain anchors of stationary upright.



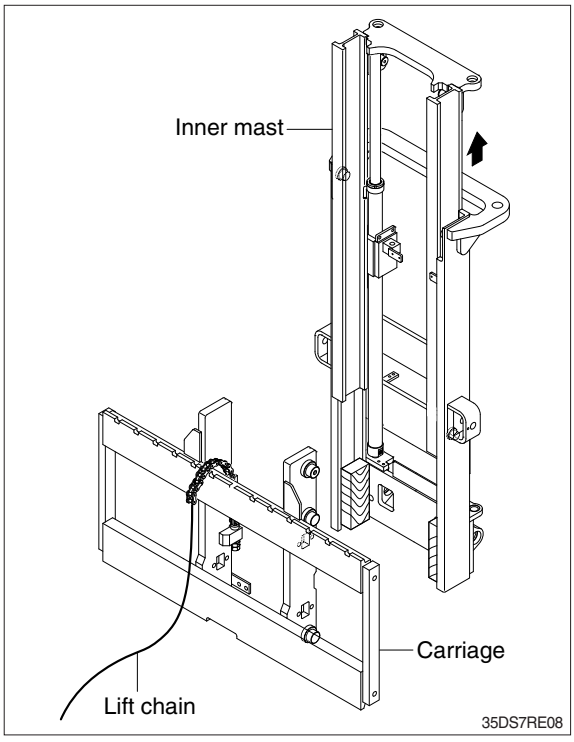
③ Pull the chains out of the sheaves and drape them over the front of the carriage.



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.

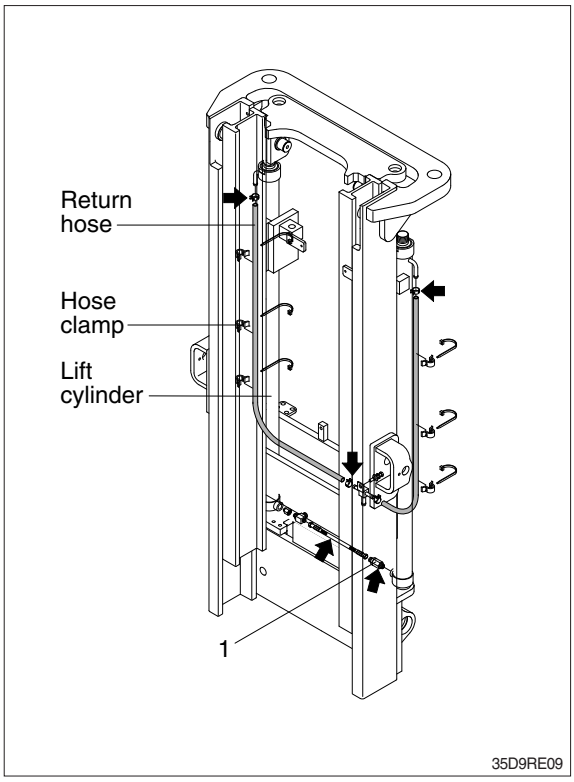
※ Inspect all parts for wear or damage. Replace all worn or damaged parts.



(4) Piping

① Remove the return hoses and clamps attached to the lift cylinder.
② Remove the return hoses from the tee.
③ Remove hose assembly, tee and down safety valve (1).

※ 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.

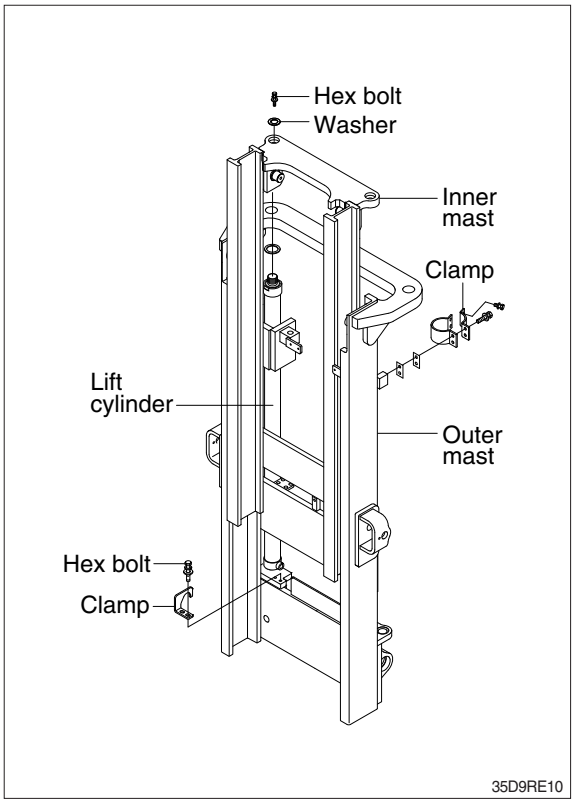


(5) Lift cylinder

① Loosen and remove hexagon bolts and washers 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.

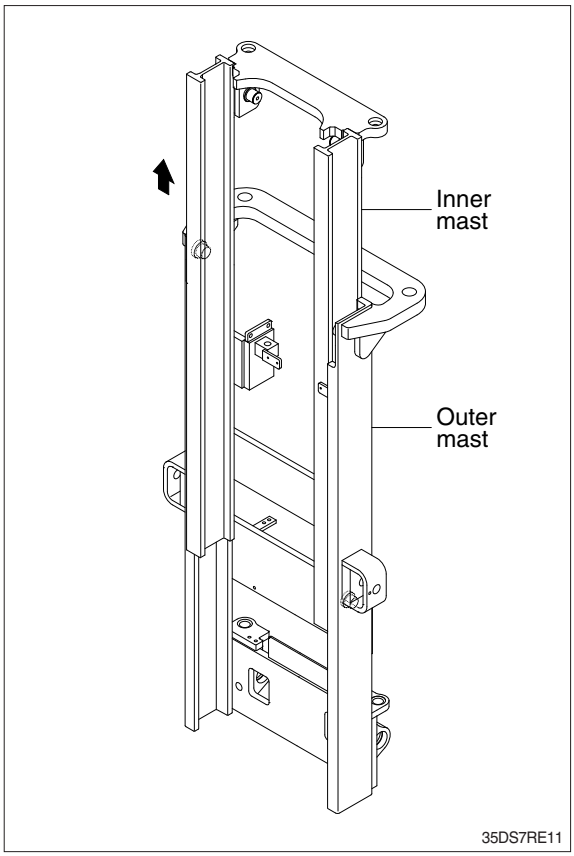
③ Loosen and remove hexagon bolts and clamp securing lift cylinders to outer mast.
④ Using an overhead hoist, slowly raise the inner mast high enough to clear lift cylinder.
⑤ Using an overhead hoist, draw out lift cylinder carefully and put down on the work floor.



(6) 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.



(7) Tilt cylinder pin

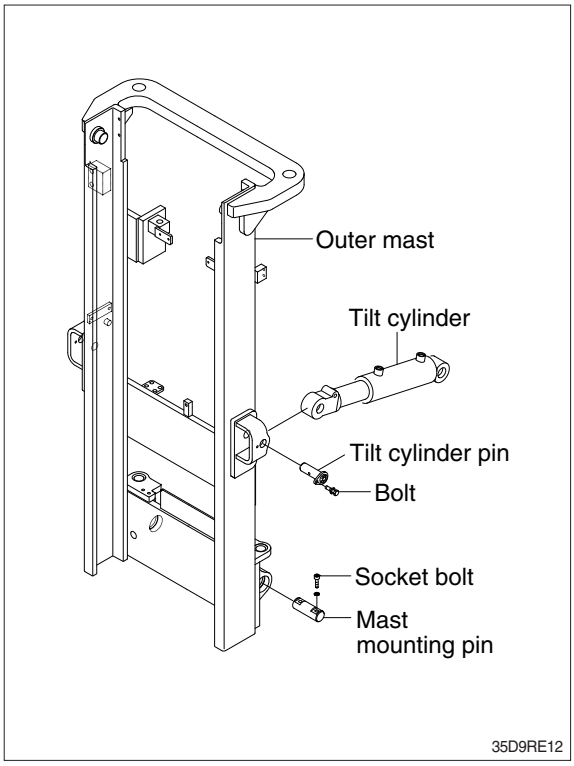
Loosen the bolt and remove the tilt cylinder pin.

(8) Mast mounting pin

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

② Loosen the mounting socket bolts and remove the mast mounting pins.
Then slowly raise the outer mast.

※ This operation is carried out under the truck, so use a pit, or if there is no pit, jack up the truck 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 frame.

③ Tighten mounting socket bolts to frame.

· Tightening torque : 35.1~47.5 kgf·m (254~344 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

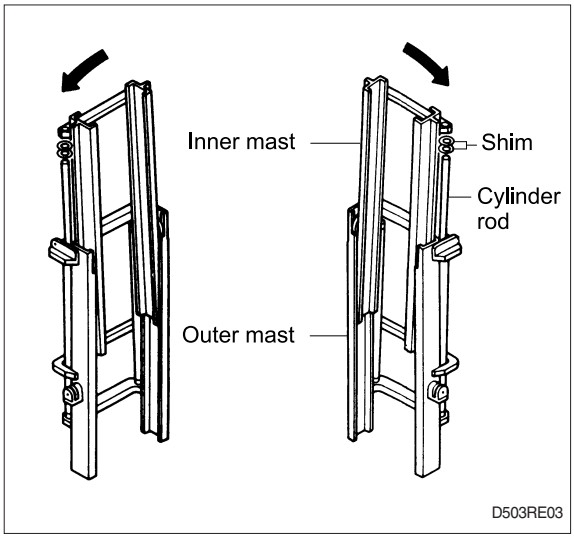
① Assemble the lift cylinder inside the outer mast, then tighten the stopper bolt. If the cylinder assembly has been replaced, adjust as follows so that the left and right cylinders are synchronized at the maximum lifting height.

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.**

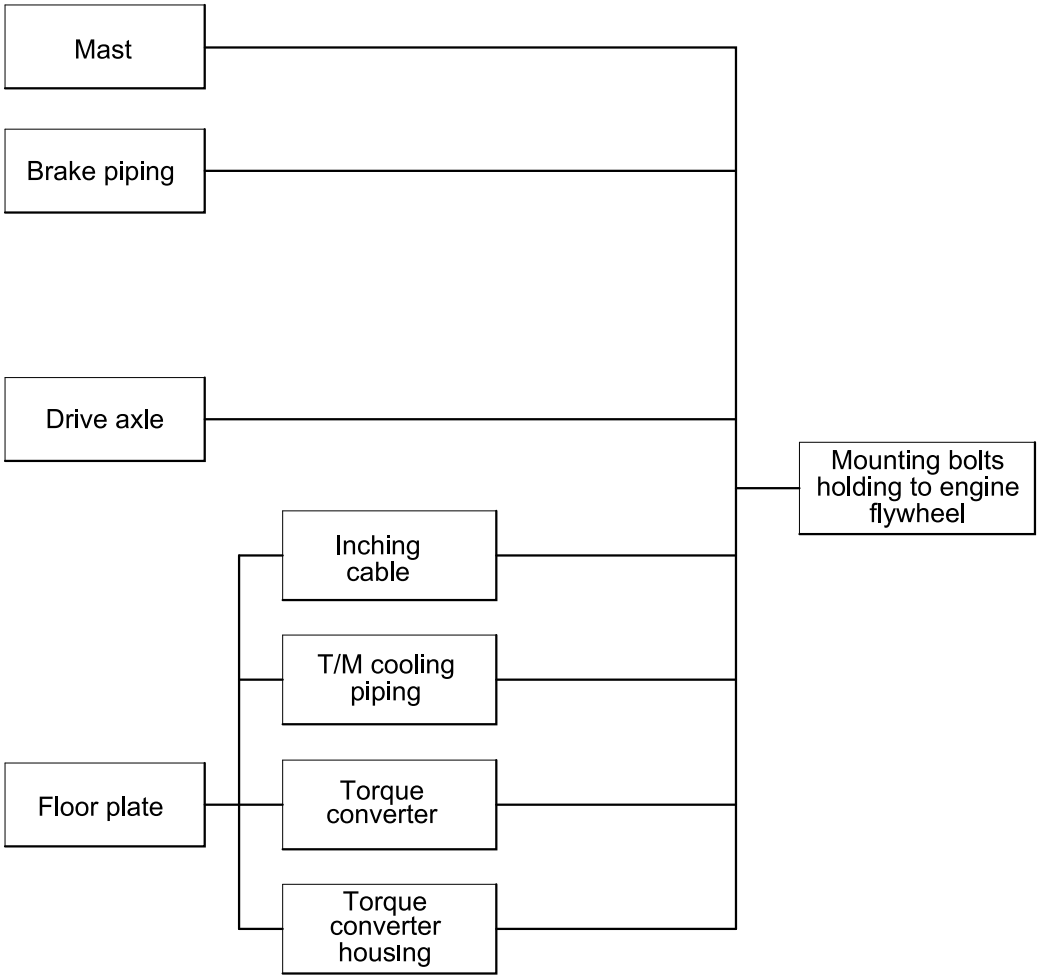
※ **If play is to RIGHT, install adjustment shim to RIGHT cylinder.**

· **Shim thickness : 1.0 mm (0.04 in)**



2. POWER TRAIN ASSEMBLY

1) REMOVAL



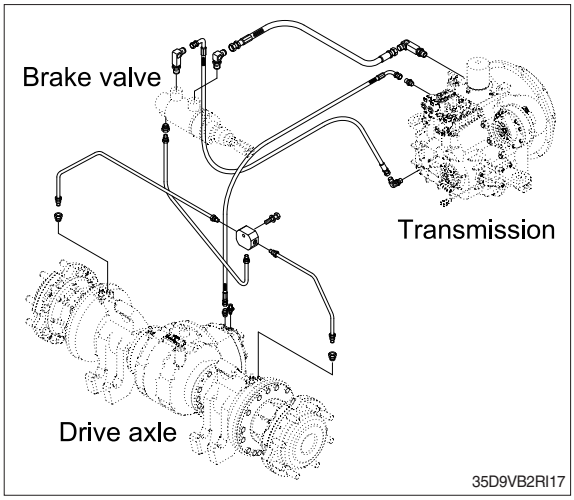
D503RE04

(1) Mast

Refer to section on mast (Page 2-2)

(2) Brake piping

Disconnect the brake piping from the brake housing of drive axle.



(3) Drive axle

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

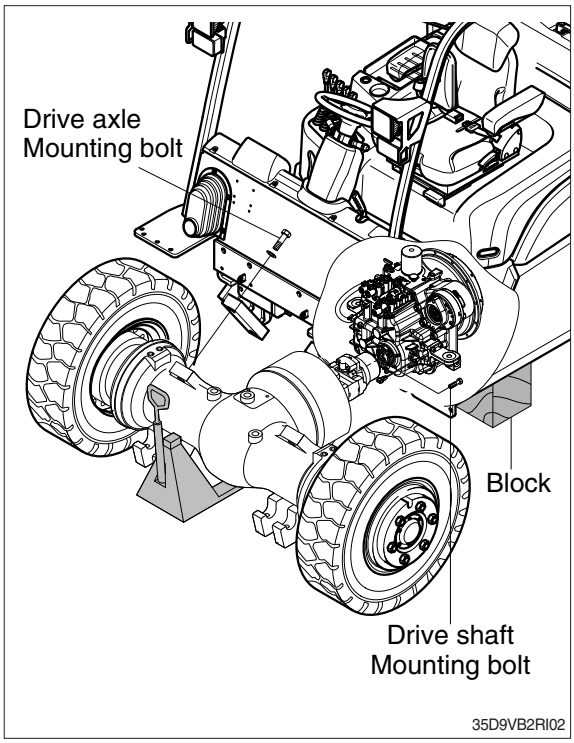
① Loosen hexagonal bolts connecting drive axle to the drive shaft.

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

② Jack up the truck and then put the block under the frame.

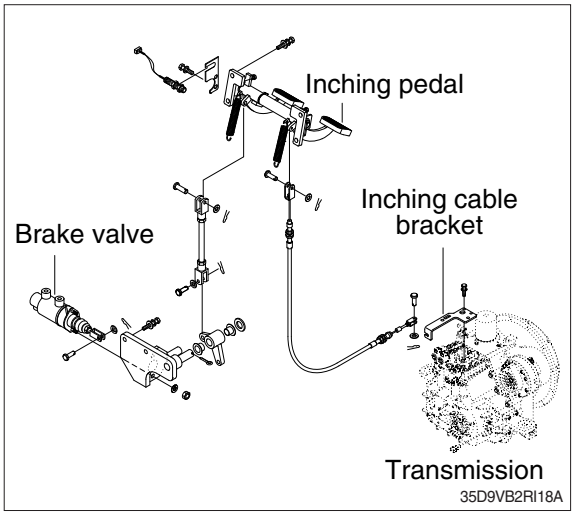
③ Prepare the truck under the drive axle unit to support it.

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

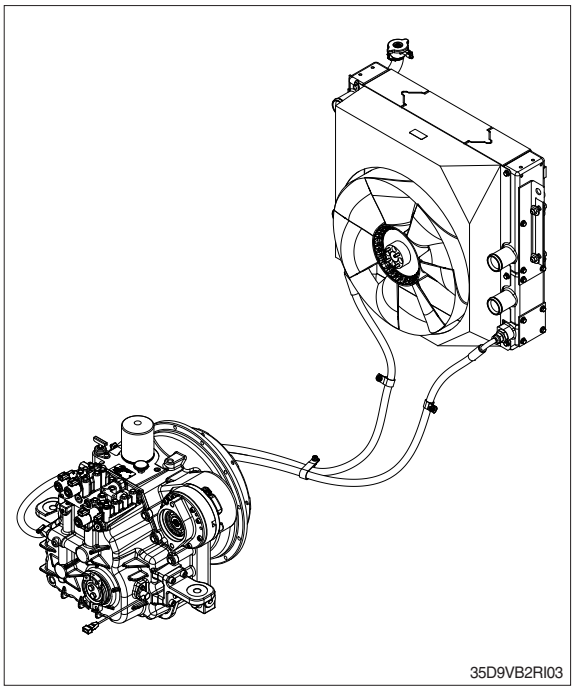
Remove the bolt fixing the inching cable bracket to T/M control valve.



(5) Transmission cooling piping

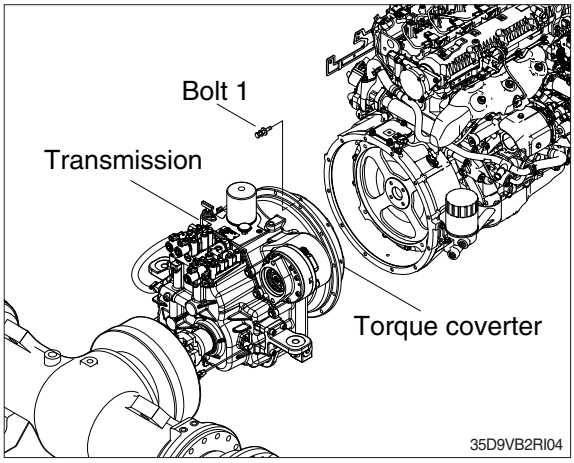
① Loosen the hose clamp and disconnect the cooling hose from the transmission.

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



(6) Torque converter

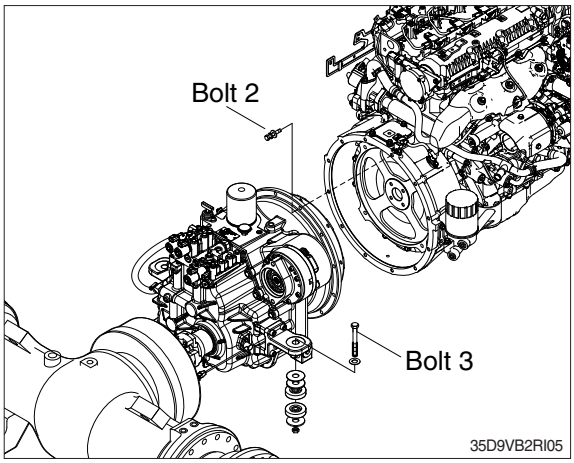
① Remove the cover on top face of the engine flywheel housing then remove the 8 mounting bolts 1 installed on the engine flywheel. To rotate the flywheel, remove 1 mounting bolt, then insert a turning tool in the mounting hole. One man must turn the engine fan by hand while the other turns the flywheel.



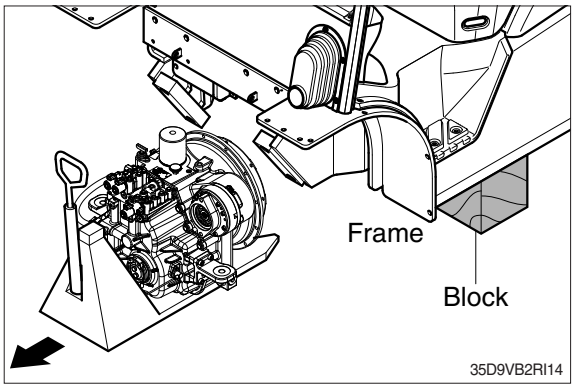
(7) Mounting bolts holding to flywheel housing

① Loosen the mounting bolts 2 to disconnect the transmission assembly from the engine flywheel.

② Loosen the mounting bolts 3 to disconnect the transmission assembly from the main frame.



③ Using a moving truck slowly pull out transmission assembly to the front.



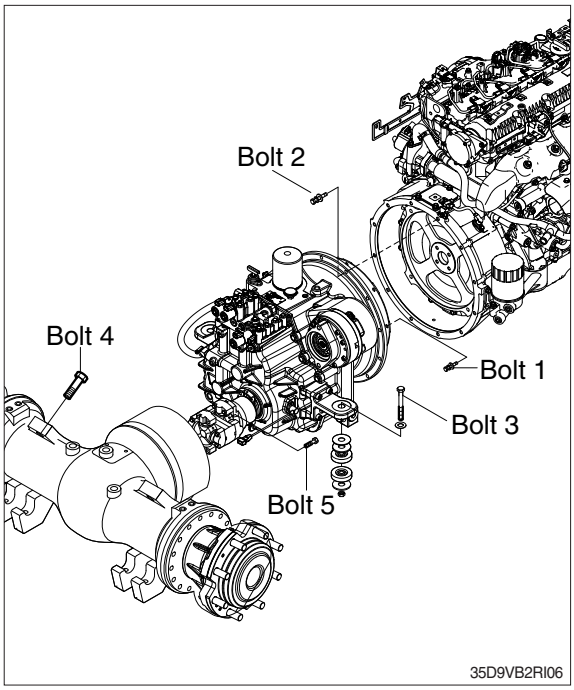
2) INSTALLATION

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

(2) Tightening torque

- Bolt 1 : 5.5~8.3 kgf·m (39.8~60.0 lbf·ft)
- Bolt 2 : 5.5~8.3 kgf·m (39.8~60.0 lbf·ft)
- Bolt 3 : 7.5 kgf·m (54.3 lbf·ft)
- Bolt 4 : 53~72 kgf·m (383~521 lbf·ft)
- Bolt 5 : 6.3~7.7 kgf·m (45.6~55.7 lbf·ft)

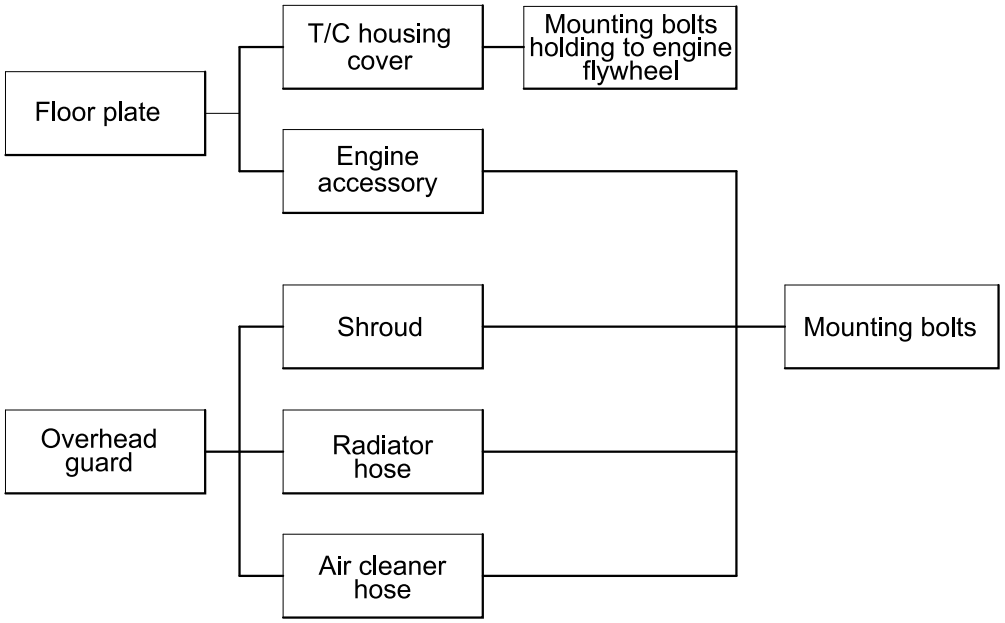
※ Apply loctite #243 on the thread of the bolt 4,5 before tightening.



3. ENGINE

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

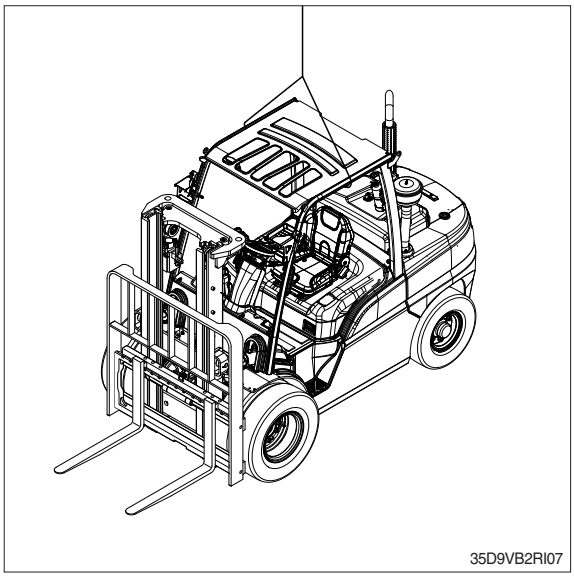
1) REMOVAL



D503RE25

(1) Overhead guard

Remove the wiring for rear combination lamp, working lamp, head lamp and flasher lamp on the stay of the overhead guard and then raise it. Then remove the bonnet with seat.



35D9VB2RI07

(2) Remove the torque converter housing cover, mounting bolts installed to flywheel housing.
For details, see page 2-9.

(3) Engine accessory

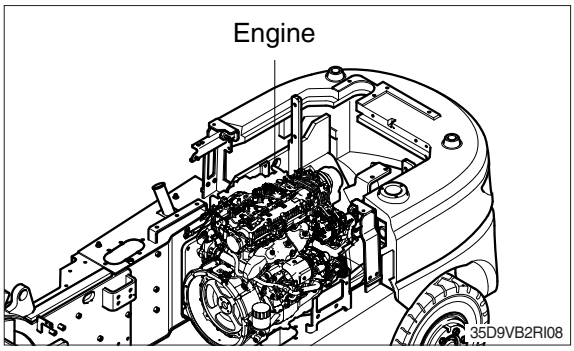
Remove all wiring harnesses, cables and hoses around the engine, dashboard and frame.

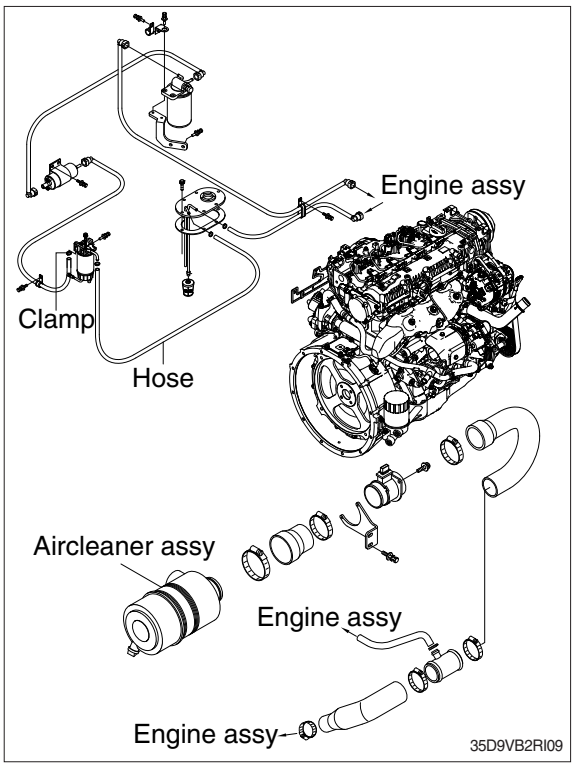
① Wiring harness to alternator and starter.

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

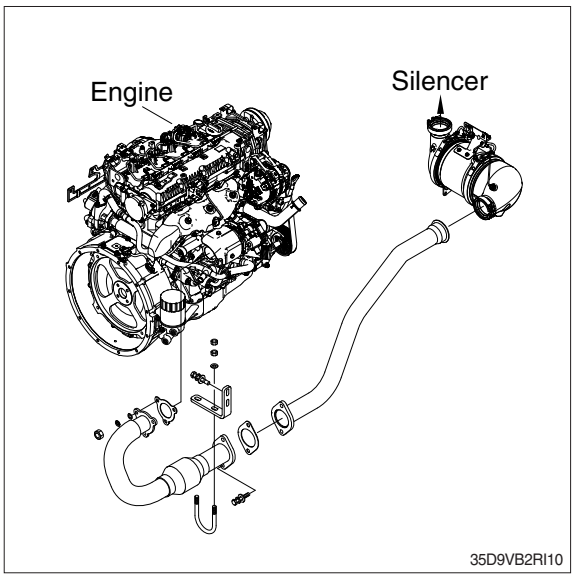
③ Cables for meters, buttons and accelerator pedal.

④ Hoses to fuel tank and air cleaner.
Loosen the clamps and disconnect the hoses from the engine.



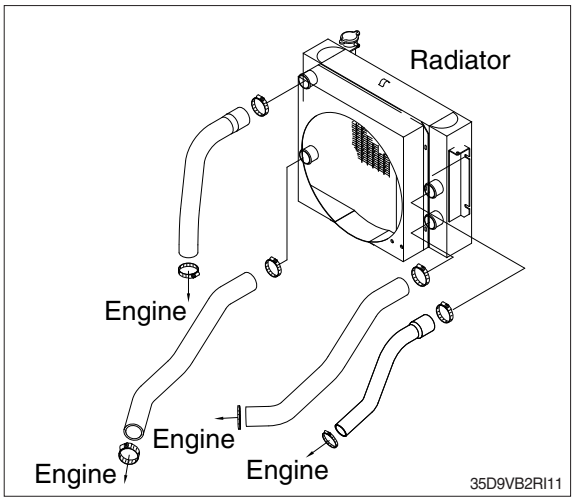


⑤ Exhaust pipe.
Loosen the nuts and disconnect the pipe from the engine.



(4) Radiator hose

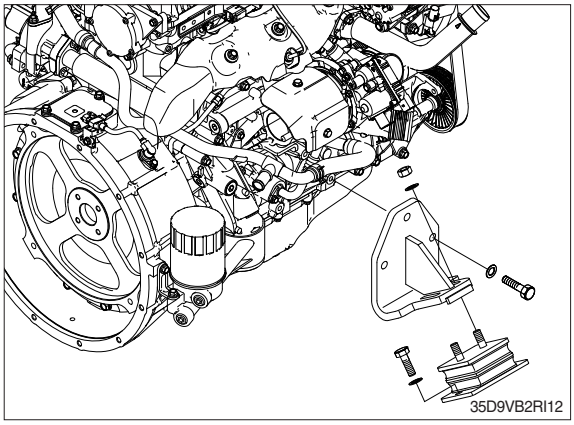
Open the drain valve of the radiator and drain the cooling water, then remove the radiator hose.



(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.**



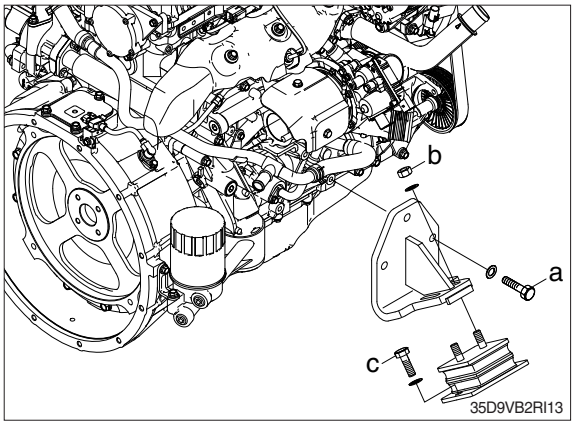
2) INSTALLATION

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

※ **Apply loctite #243 on the thread before tightening the bolts and nuts.**

※ **Do not remove the bolts and nuts unless necessary. Loctite #243 is coated over the threads of the bolts and nuts. So, once the bolts and nuts were removed, coat them with loctite #243 when installing.**

※ **Before installing the bolts and nuts, loctite #243 in the holes should be removed by a tap.**

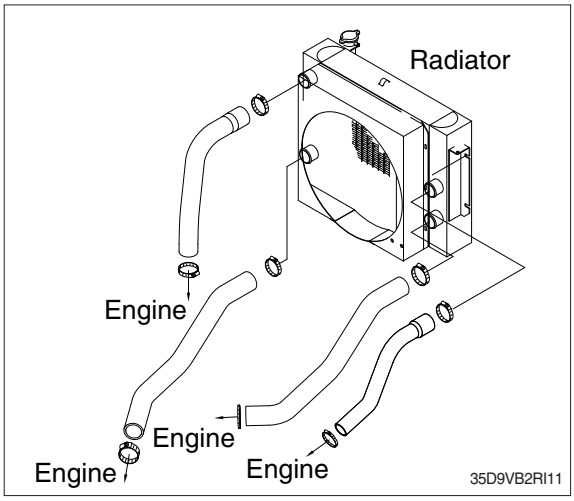


(1) Tighten the engine mounting bolts (a).
- Tighten torque : 5.9~8.9 kgf·m
  (42.7~64.4 lbf·ft)

(2) Tighten the engine mounting bracket nuts (b) and the frame mounting resillient bolts (c).
- Tighten torque : 5.5~8.3 kgf·m
  (39.8~60.1 lbf·ft)

(3) Radiator hoses

Insert the radiator hoses securely and fit the clamps.

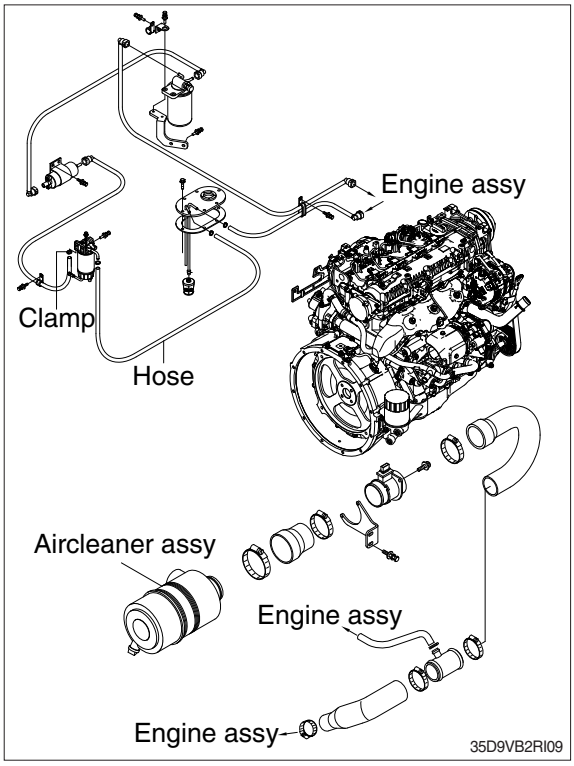


(4) Fuel hoses

Insert the fuel hoses securely and fit a clamp.

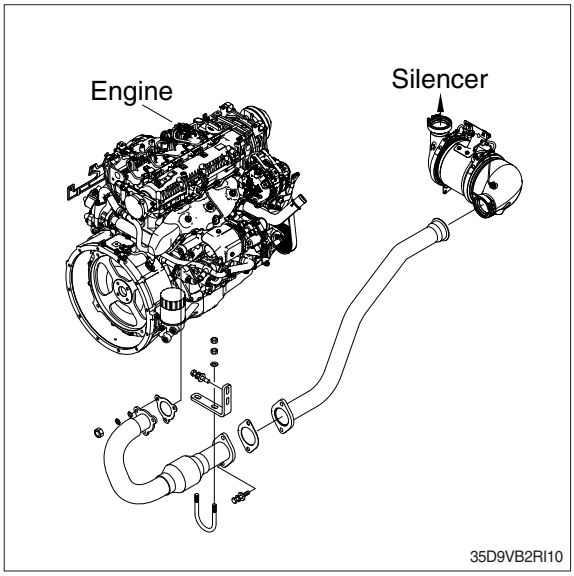
(5) Air cleaner hose

Insert the air cleaner hose securely and fit a clamp.



(6) Exhaust pipe

Insert the exhaust pipe to the engine securely and fit a V-band clamp.

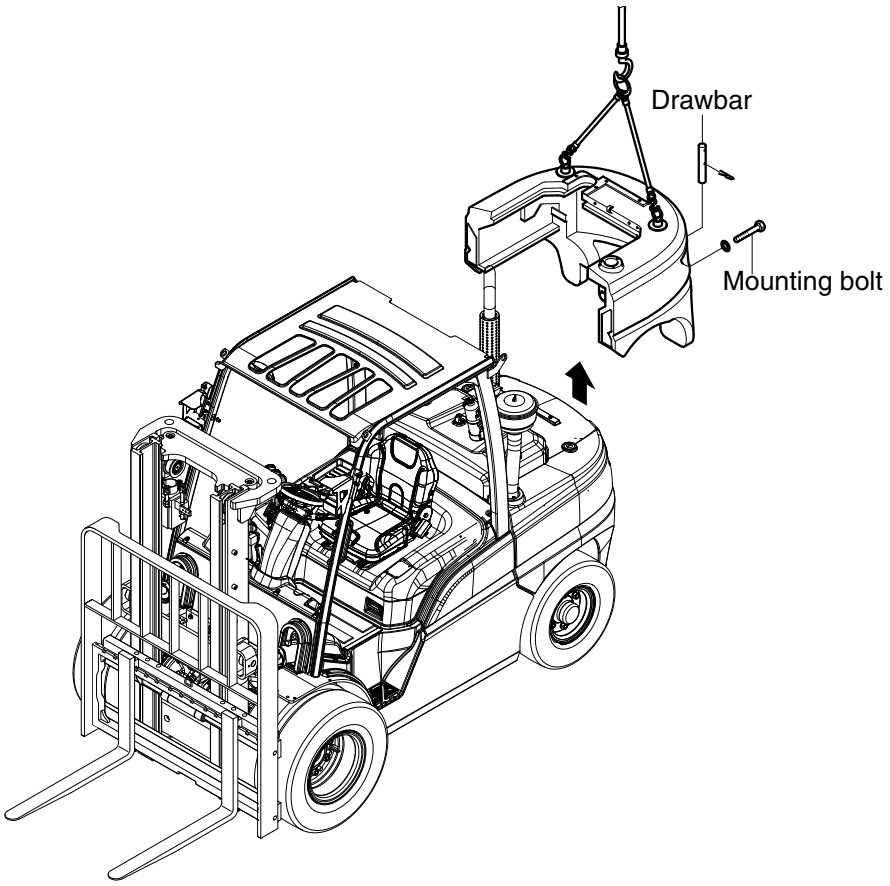


5. STEERING AXLE

1) REMOVAL

Counterweight — Rear wheel — Hose and pipe — Mounting bolt

(1) Counterweight



35D9VB2RI15

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)

35D-9VB, 40D-VC	1821 kg (4015 lb)	45D-9VB, 50DN-9VC	2544 kg (5609 lb)
40D-9VB, 45D-VC	2187 kg (4822 lb)	50DN-9VB	2866 kg (6318 lb)

· Tightening torque : 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.

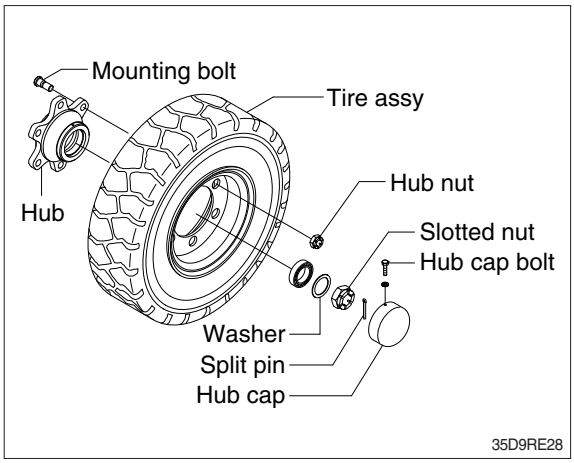
· Tightening torque

- Hub nut

  61.2±9.3 kgf·m (442±67.3 lbf·ft)

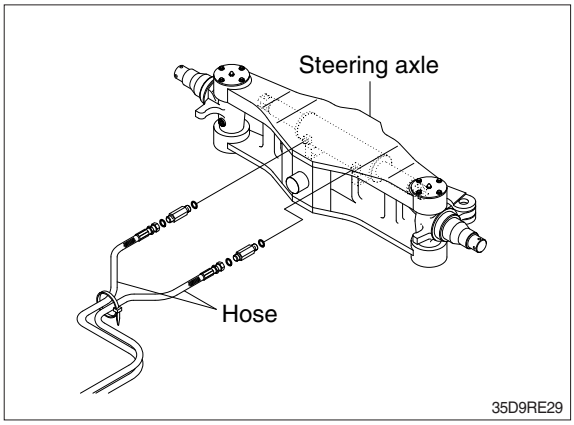
- Hub cap bolt

  1.15±0.15 kgf·m (8.3±1.1 lbf·ft)



(3) Hose

Disconnect the hoses from the steering axle.



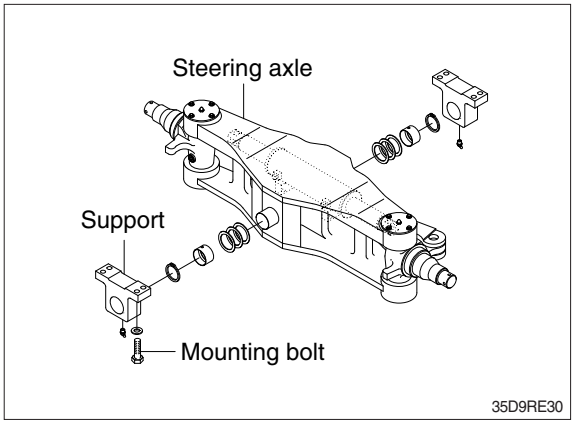
(4) Mounting bolt

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 between the support and steering axle to prevent play.

· Mounting bolt tightening torque

19.6±2.9 kgf·m (142±21.0 lbf·ft)



※ Apply loctite #277 on the thread before tightening.

※ Tighten the slotted nut to the torque 20 kgf·m and loosen it to adjust the preload (0.3~0.4 kgf·m) and fit the split pin.

GROUP 3 MAINTENANCE FOR HOSE

1) MAINTENANCE

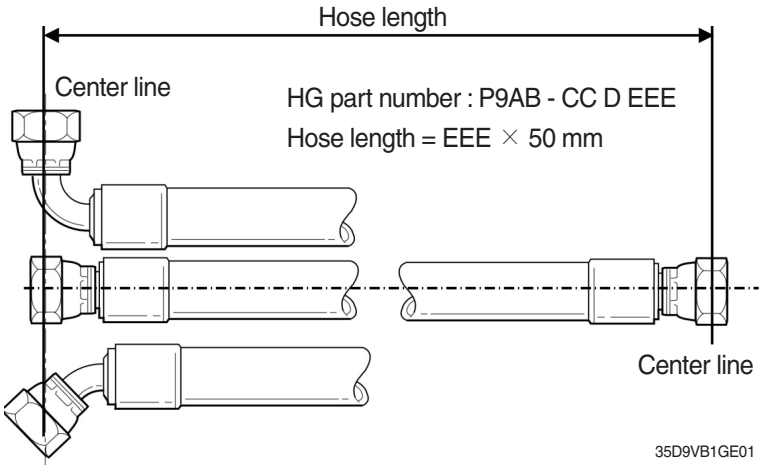
The function and service life of hydraulic components depend to a great extent on how clean the hydraulic oil is. Therefore, it is very important to prevent dirt from entering the hydraulic system. Some simple advice to keep the hydraulic system clean:

- Always clean the area around parts before starting work. If possible, it is better to wash the the truck.
- Plug hose connections immediately after disconnecting. If possible, use correct plugs for the connection type. If plugs are missing, use clean plastic bags and cable ties or tape to seal the connection.
- Never reuse oil that has been drained from the truck.
- If possible, filter the oil before pouring it into the truck, oil barrels often contain impurities.

2) HOSE LENGTH

Connected hoses have HG part number, but if they have no information the hoses are measured as follows:

- The hose length is measured on a laid-out hose between the sealing surfaces.
- On angled connections, measure from the sealing surface's center line according to the figure.



3) CAUTION FOR REPLACEMENT

When replacing hoses for maximum service life and functionality, the following must be observed:

- To avoid stress when connecting, a straight hose length must be secured after connection.
- Do not kink the hose. 7% twist reduces the service life by 90%.
- Do not use hoses that are too short. It may cause leakage or damage.
- Use the correct coupling to minimize the number of bends.
- Avoid sharp bending.
- When storing, keep the inside of the hose clean. When installing, keep the plug in place for as long as possible.