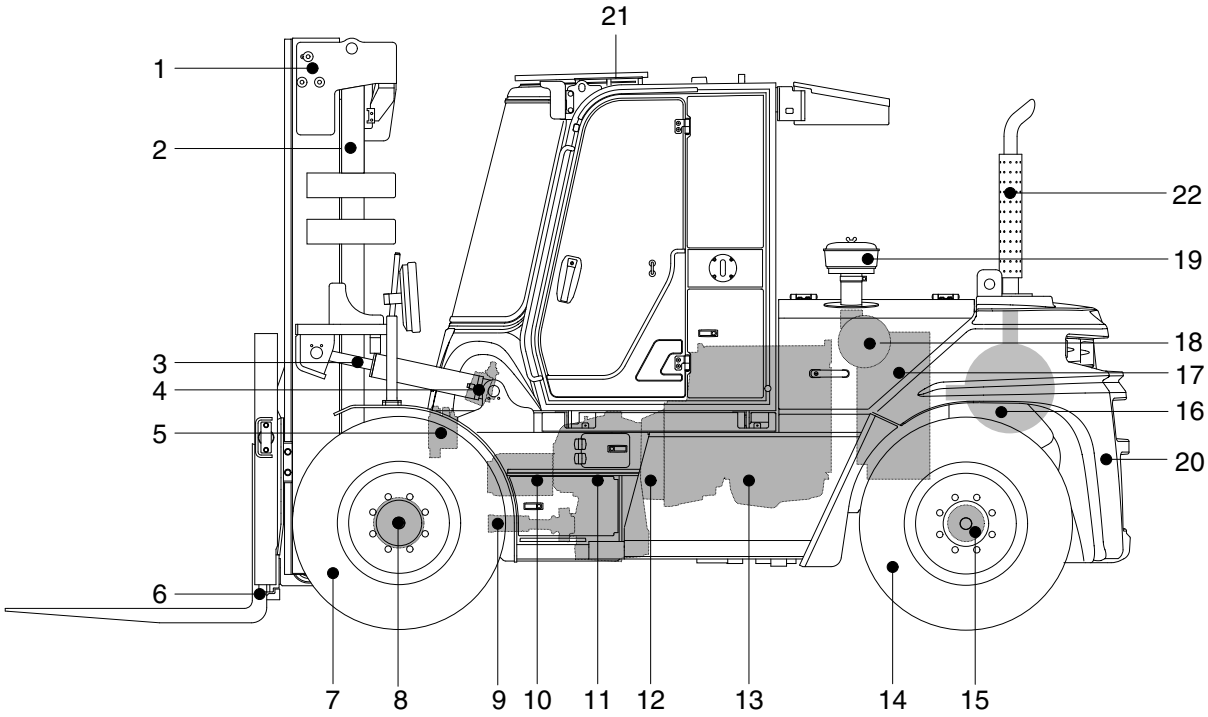
SECTION 2 REMOVAL & INSTALLATION OF UNIT

GROUP 1 STRUCTURE



100D9V7PM01

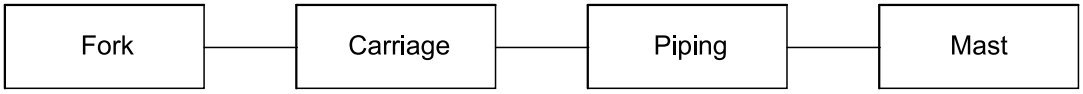
1	Mast	9	Propeller shaft	17	Radiator
2	Lift cylinder	10	Hydraulic pump	18	Air cleaner
3	Tilt cylinder	11	Transmission	19	Precleaner
4	Steering unit	12	Torque converter	20	Counterweight
5	Main control valve	13	Engine	21	Cabin
6	Fork	14	Rear wheel	22	Silencer
7	Front wheel	15	Steering axle		
8	Drive axle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

GROUP 2 REMOVAL AND INSTALLATION OF UNIT

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

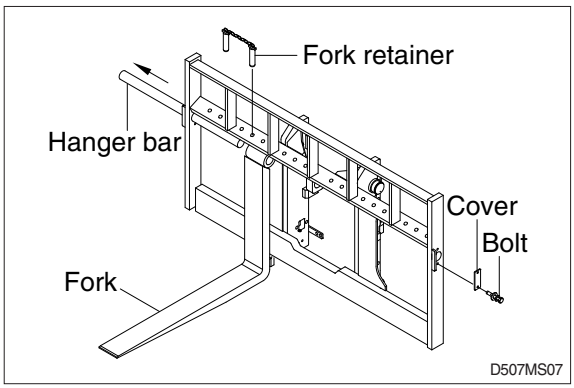
1. MAST

1) REMOVAL



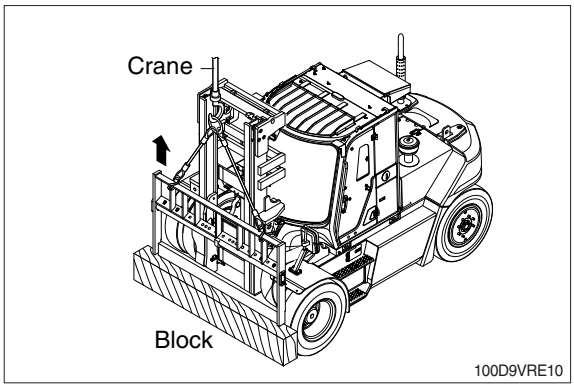
(1) SHAFT TYPE FORKS

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.

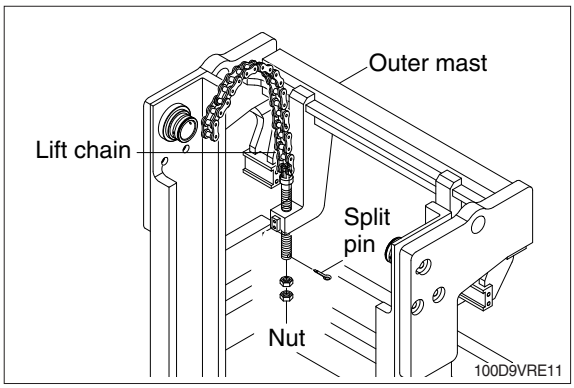


(2) CARRIAGE

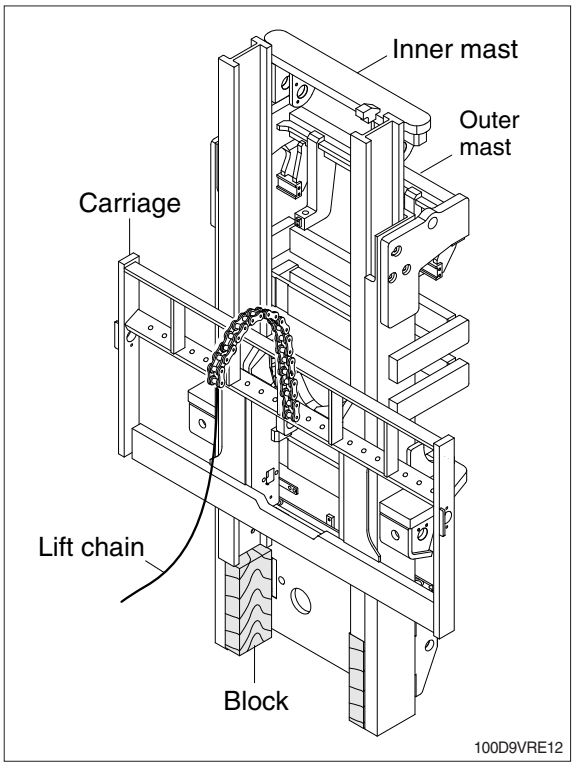
① With the mast vertical, raise the carriage high enough to place blocks under the load forks. This is done to create slack in the load chains when the carriage is lowered. Lower the carriage all the way down to the floor. Make sure the carriage is level, this will prevent any binding when the mast is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



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



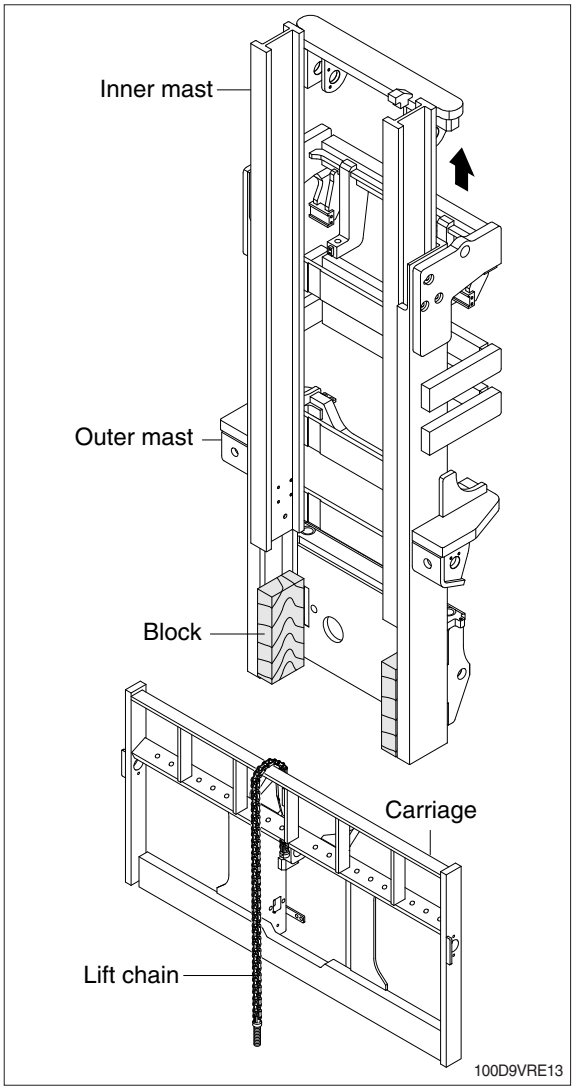
③ Pull the chains out of the sheaves and drape them over the front of the carriage.



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.

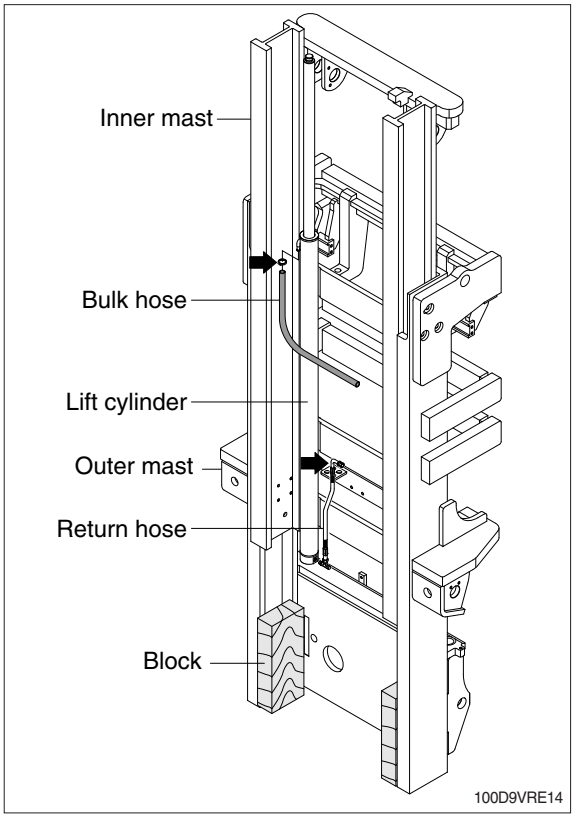


(5) PIPING

① Remove the bulk hoses and clamps attached to the 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 hexagon nuts and set bolts securing lift cylinders to inner mast.

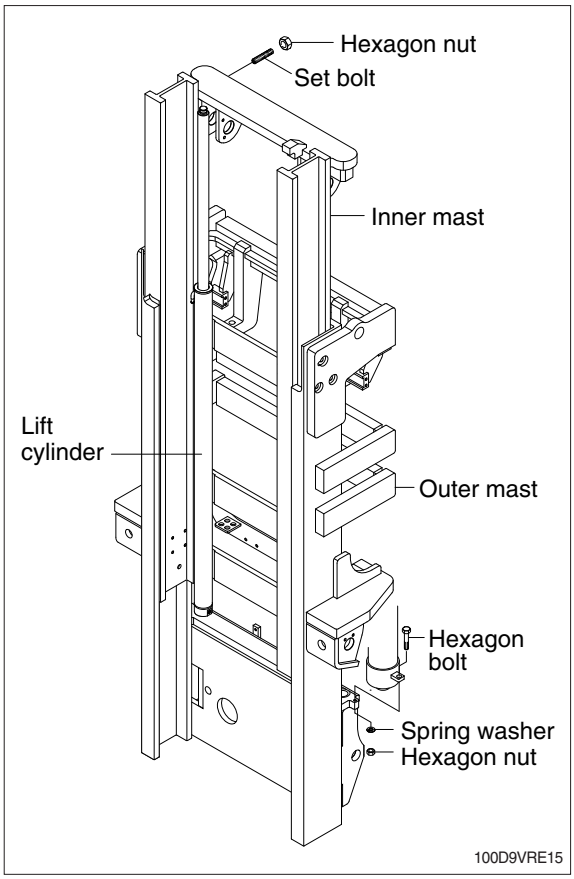
② Bind the lift cylinder with overhead hoist rope and pull up so that the rope has no slack or binding.

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

③ Loosen and remove hexagon bolts, spring washers and nuts securing lift cylinders to outer mast.

④ Using an overhead hoist, slowly raise the inner mast high enough to clear lift cylinder.

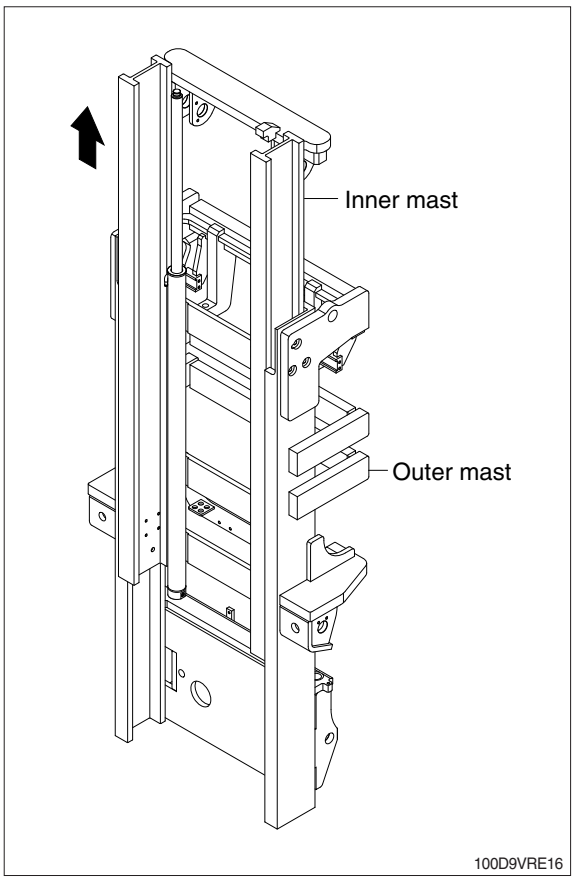
⑤ Using an overhead hoist, draw out lift cylinder carefully and put down on the work floor.



(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

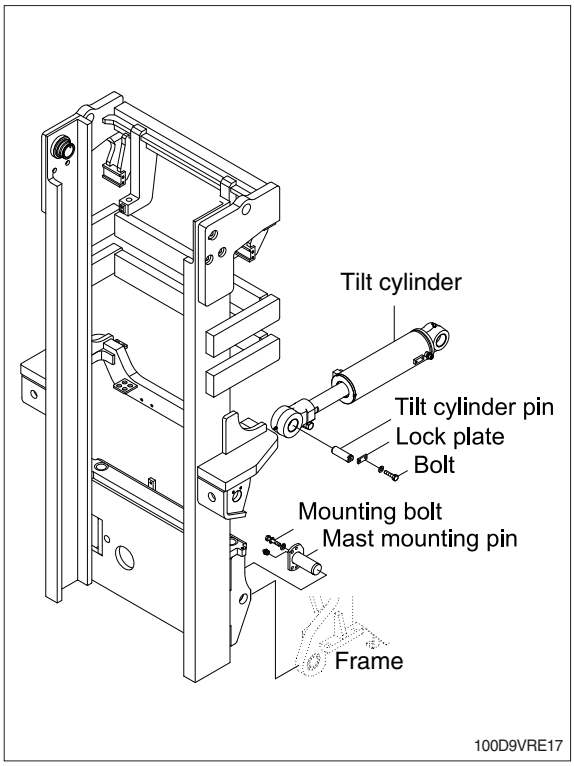
Loosen the bolt and remove the lock plate and tilt cylinder pin.

(9) MAST MOUNTING PIN

① Attach a crane to the stay at the top of the outer mast, and raise it.

② Loosen the mounting bolts and remove the mast mounting pins from frame, 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 and drive axle.

② Jack up the machine 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 (356~481 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 and lock plate by the bolts.

· Tightening torque : 15.8 kgf·m (114 lbf·ft)

(3) LIFT CYLINDER INSTALLATION AND ADJUSTMENT

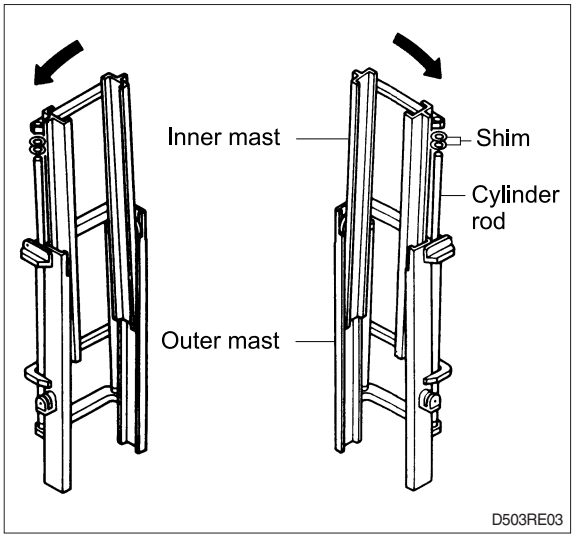
① Assemble the lift cylinder inside the outer mast, then tighten the stopper bolt. If the cylinder assembly has been replaced, adjust as follows so that the left and right cylinders are synchronized at the maximum lifting height.

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.

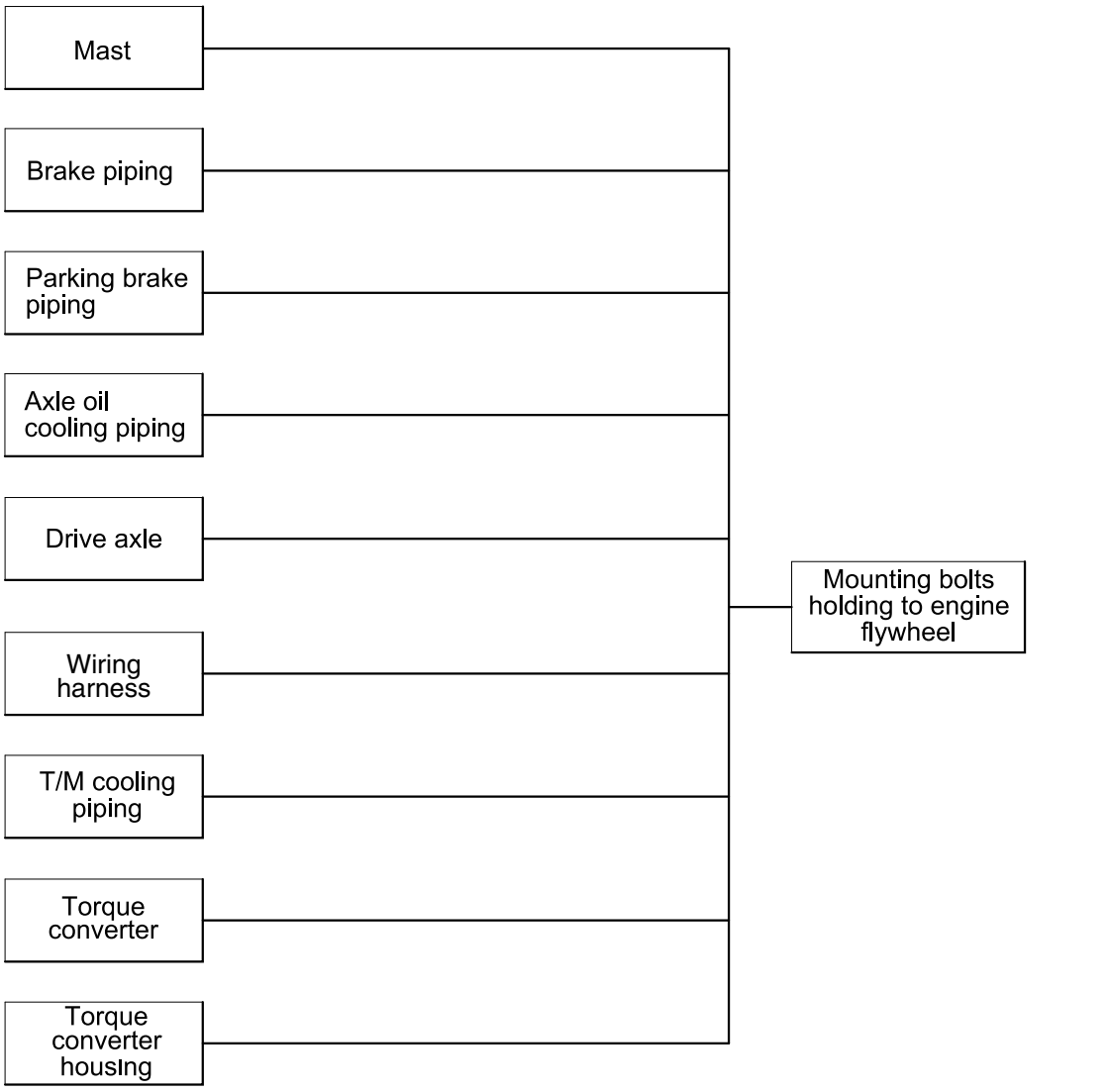
※ If play is to RIGHT, install adjustment shim to RIGHT cylinder.

· Shim thickness : 1.0 mm (0.04 in)



2. POWER TRAIN ASSEMBLY

1) REMOVAL



(1) Mast

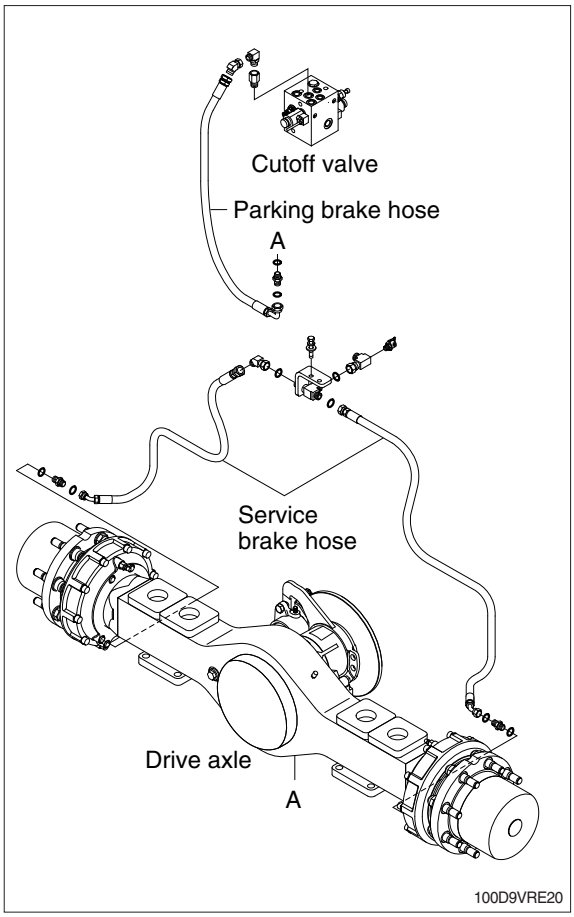
Refer to section on mast (Page 2-2)

(2) Service brake piping

Disconnect the brake hydraulic hoses from the drive axle.

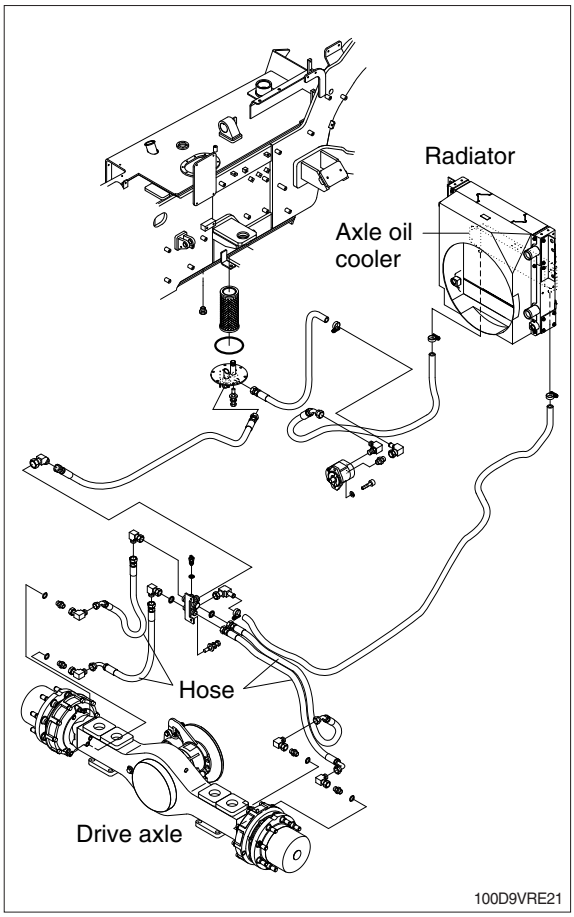
(3) Parking brake piping

Disconnect parking brake hydraulic hoses from the drive axle.



(4) Axle oil cooling piping

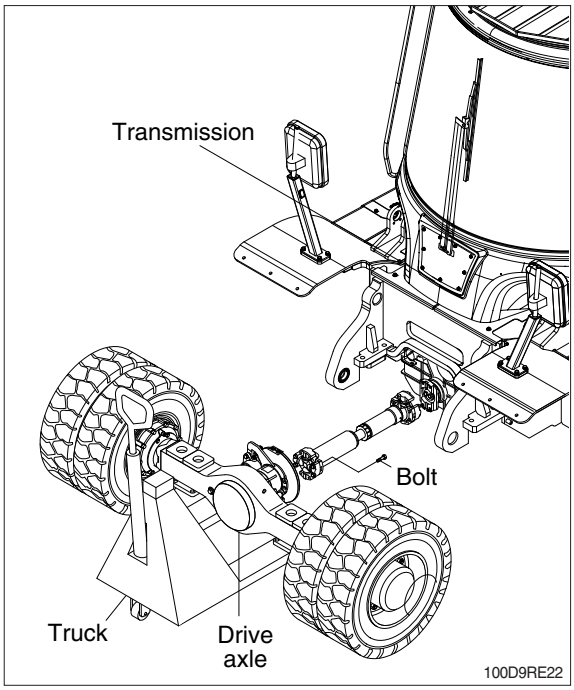
Disconnect the brake cooling hoses from the drive axle.



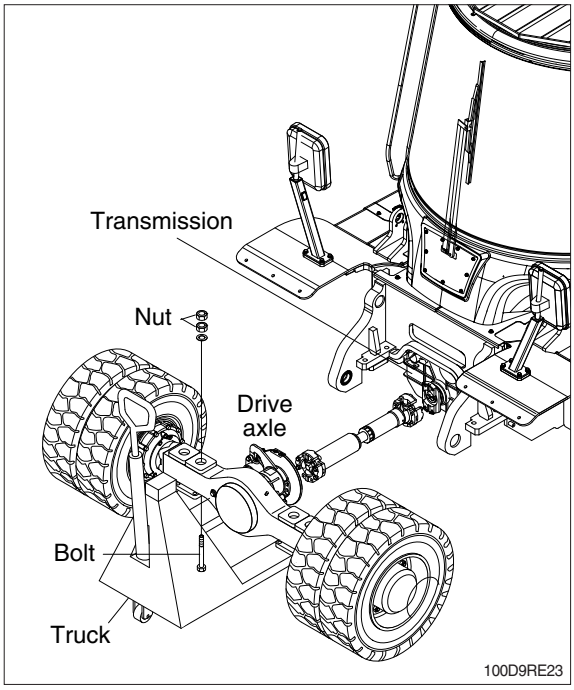
(5) Drive axle

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

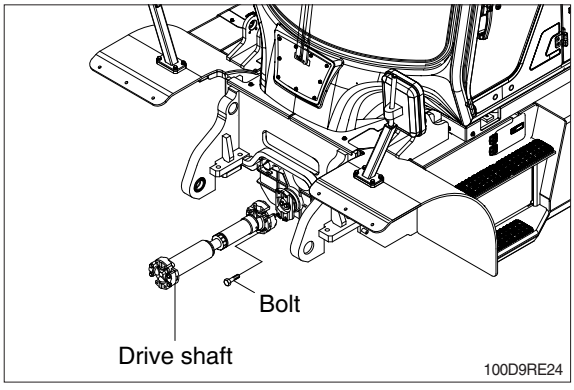
① Attach a crane to the tilt cylinder notches on the dashboard and raise the truck.
② Loosen hexagonal bolts connecting drive axle to drive shaft.
③ Put the block under the front axle and support under the drive axle with a truck.



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



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



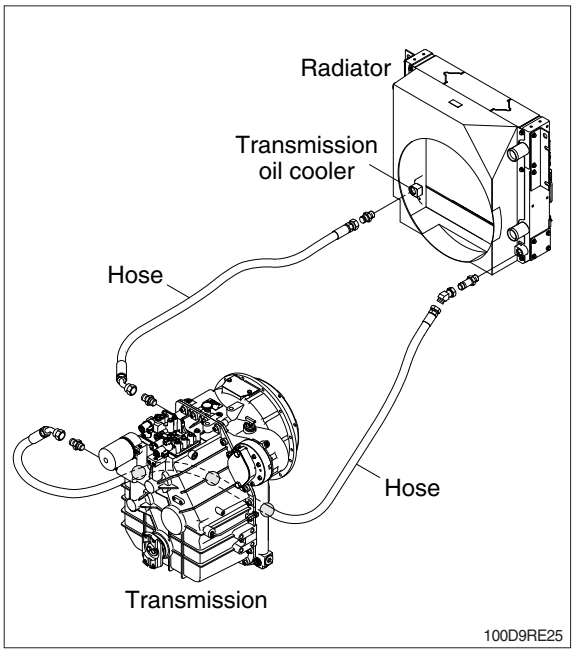
(6) Inching linkage

Remove the inching sensor cable.

(7) Transmission cooling piping

Disconnect cooling hose and connector from the transmission.

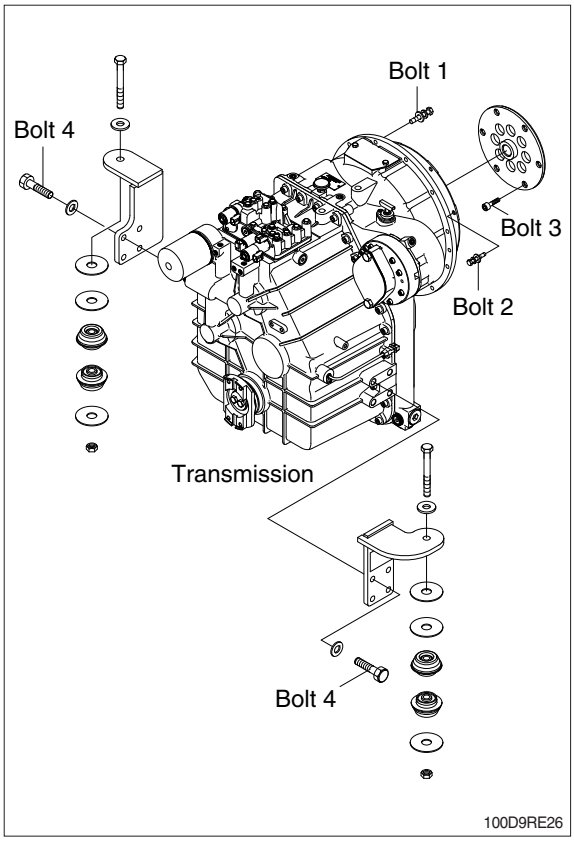
※ **Make sure that the coolant be drained from the hose.**



(8) Transmission assembly

① Remove the transmission assembly by loosening the bolts (1, 2, 3) mounted on the engine flywheel housing and the bolts (4) mounted on the bracket.

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



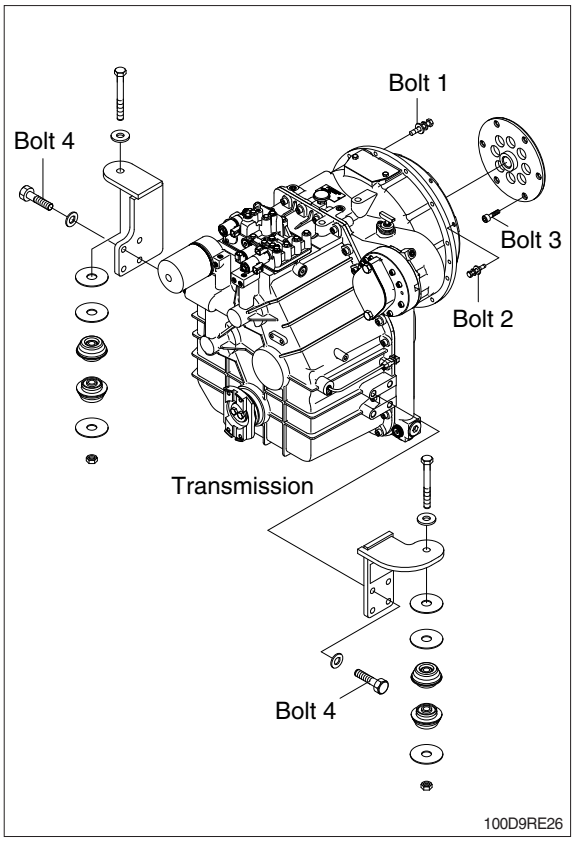
2) INSTALLATION

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

(1) Tightening torque of the mounting bolts for the transmission.

- 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 : 5.5~8.3 kgf · m (39.8~60.0 lbf · ft)
- Bolt 4 : 55~66 kgf · m (398~478 lbf · ft)

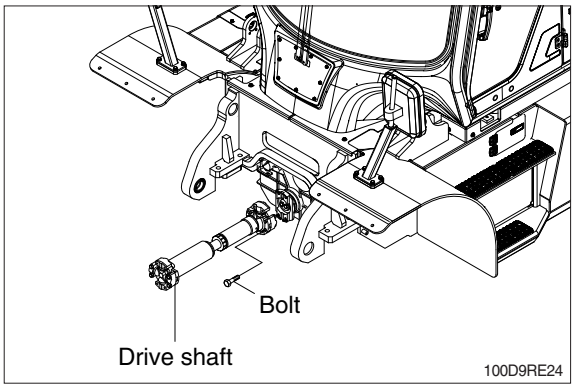
※ Apply loctite #277 on the thread before tightening.



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

- 6.3~7.7 kgf · m (45.6~55.7 lbf · ft)

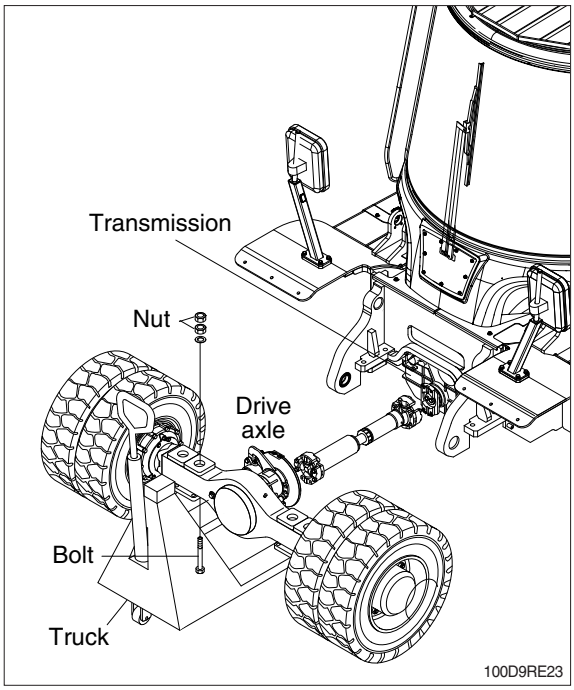
※ Apply loctite #277 on the thread before tightening.



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

· 135~165 kgf · m (976~1193 lbf · ft)

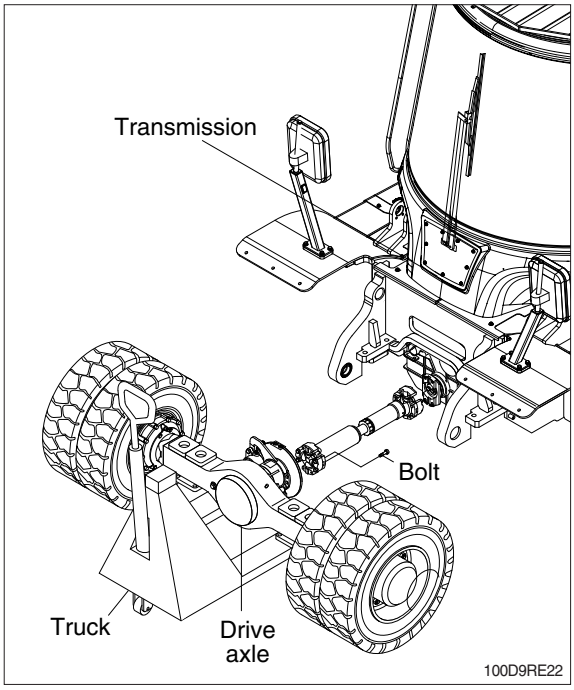
※ **Apply loctite #277 on the thread before tightening.**



(4) Tightening torque of mounting bolt for drive shaft.

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

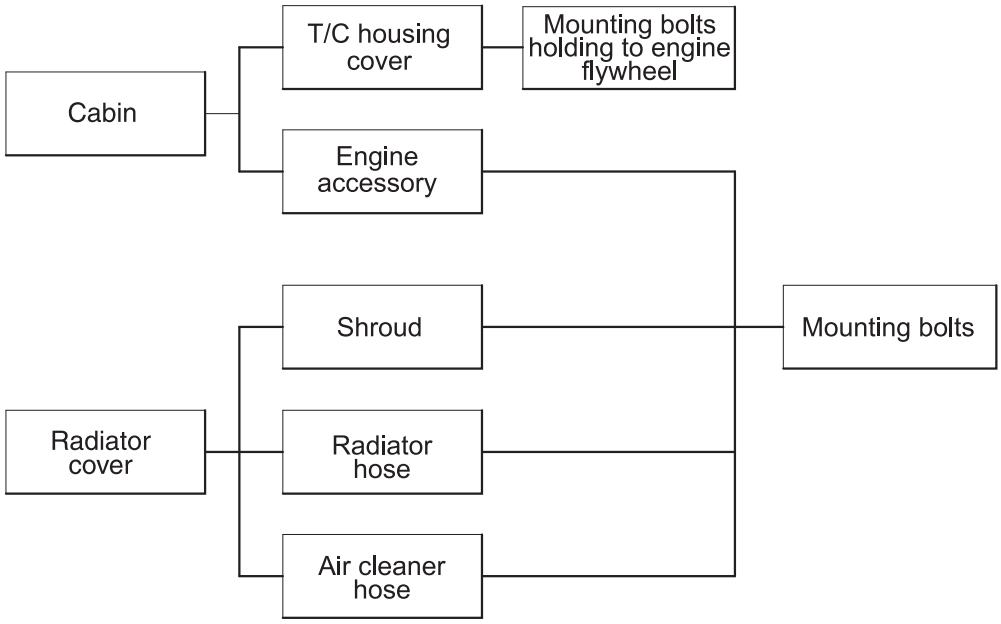
※ **Apply loctite #277 on the thread before tightening.**



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

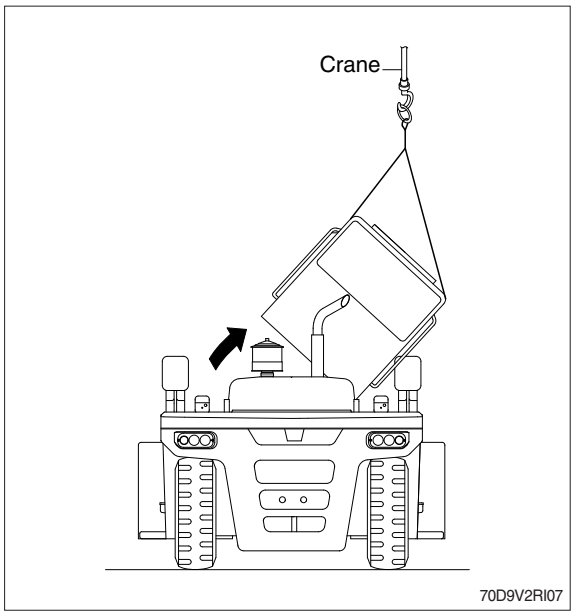
① Cabin

- First, tilt the cabin

※ **Refer to the operator's manual page 7-16.**

- 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 removal tilt option cylnder and latch assy.

② Center cover and door assy (LH, RH)
Remove the Center cover and door assy (LH, RH) by loosening the mounting bolts.



70D9V2RI07

(2) Lossen the bolts mounted on the engine flywheel housing. For details, see page 2-11.

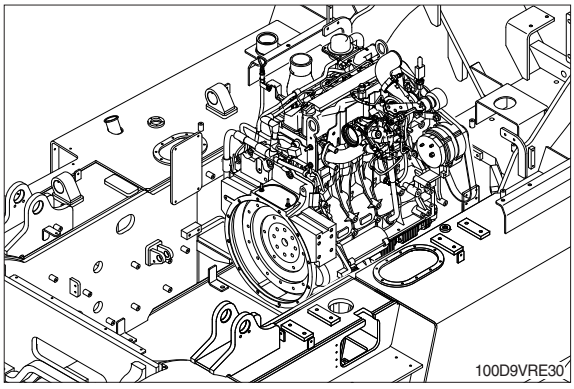
(3) Engine accessory

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

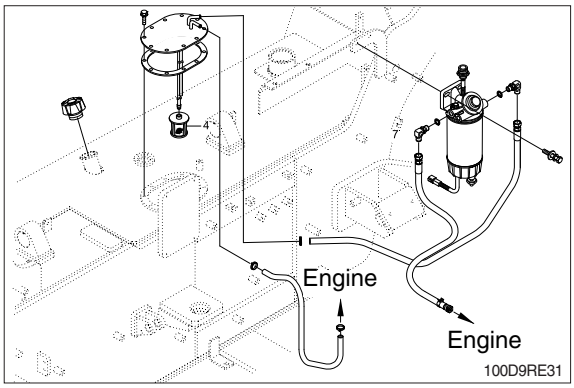
① Wiring harness to alternator and starter.

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

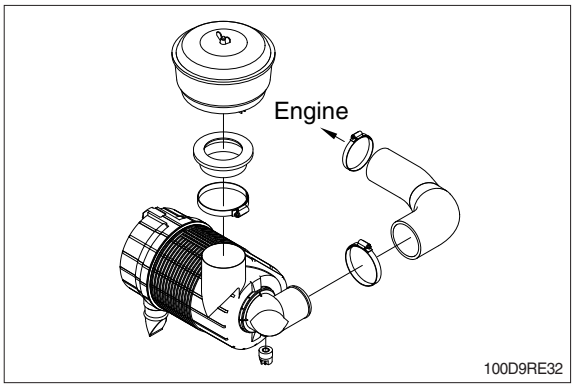
③ Cables for meters, buttons and accelerator pedal.



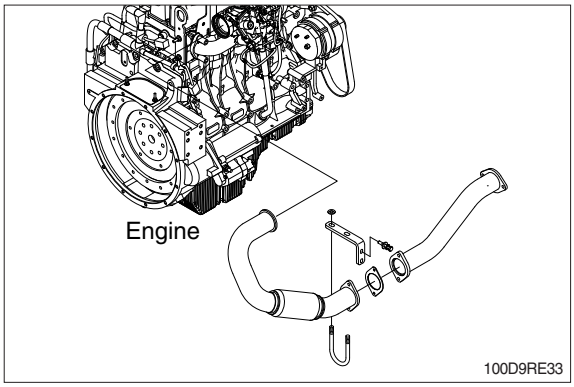
④ Hoses to fuel tank.



⑤ Hose to the air cleaner.

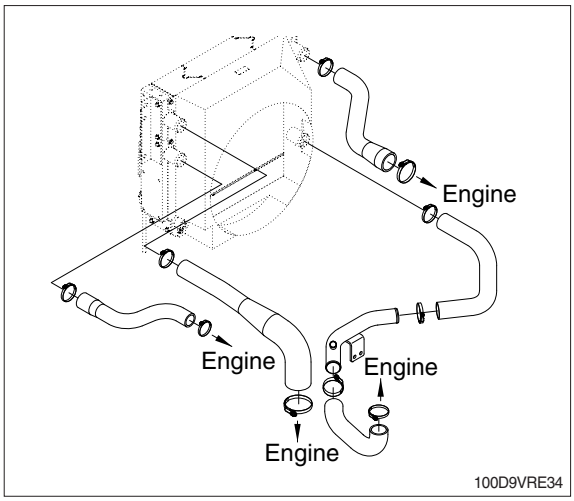


⑥ Exhaust pipe.



(4) Radiator hose

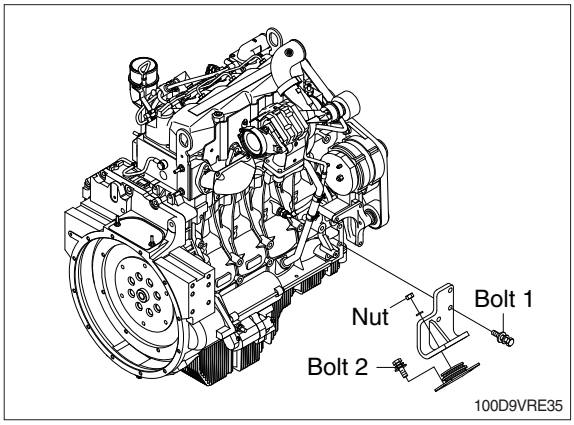
Open the drain valve of the radiator and drain the cooling water, then remove the radiator hose.



(5) Mounting bolt

Attach a crane to the engine hook and raise, then remove mounting bolts and nuts. 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.

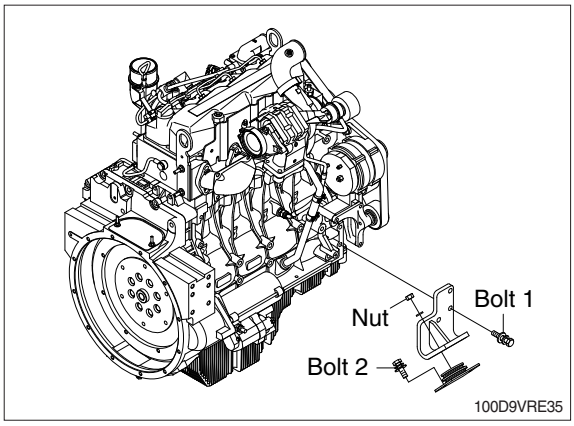
※ **Do not remove the bolts unless necessary. Loctite is coated over the threads of bolt. So, once the bolts were removed, coat them with loctite (#243) when installing.**

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

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

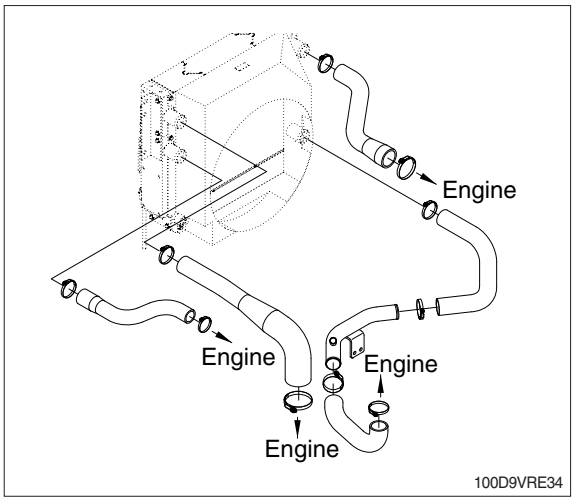
- Bolt 1 : 12.3±3.0 kgf · m (89±21.7 lbf · ft)
- Bolt 2 : 5.5~8.3 kgf · m (39.8~60.0 lbf · ft)
- Nut : 5.5~8.3 kgf · m (39.8~60.0 lbf · ft)

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



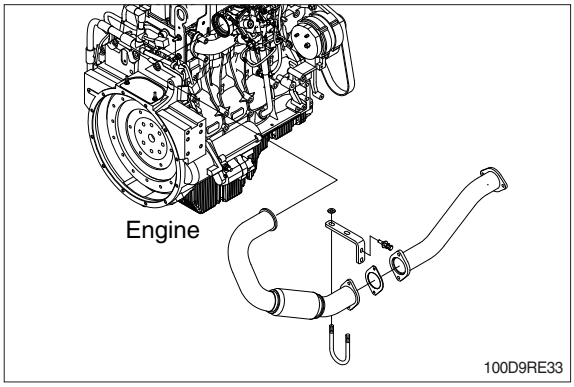
(4) Radiator hoses

Insert the radiator hoses securely and fit the clamps.



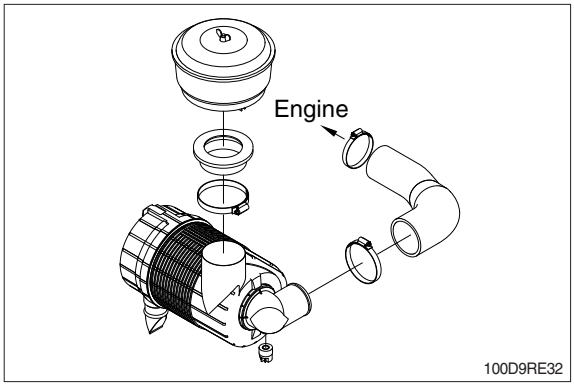
(5) Exhaust pipe

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



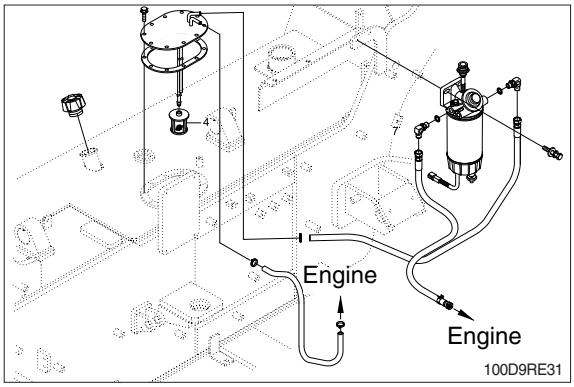
(6) Air cleaner hose

Insert the air cleaner hose securely and fit a clamp.



(7) Fuel hoses

Insert the fuel hoses securely and fit the clamps.



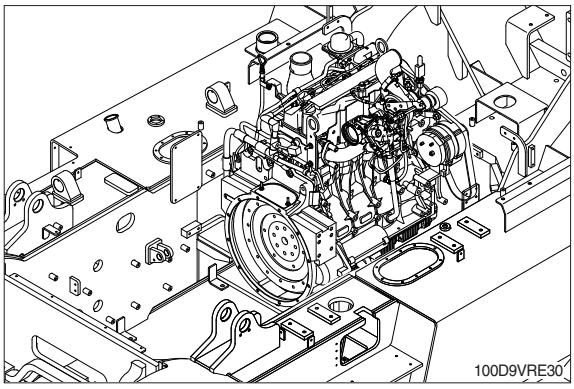
(8) Engine accessory

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

① Wiring harness to alternator and starter.

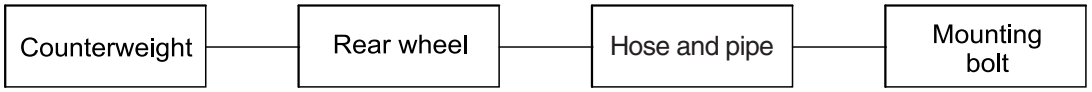
② Wiring harness for oil pressure and engine water temperature gauges.

③ Cables for meters, buttons and accelerator pedal.



4. STEERING AXLE

1) REMOVAL



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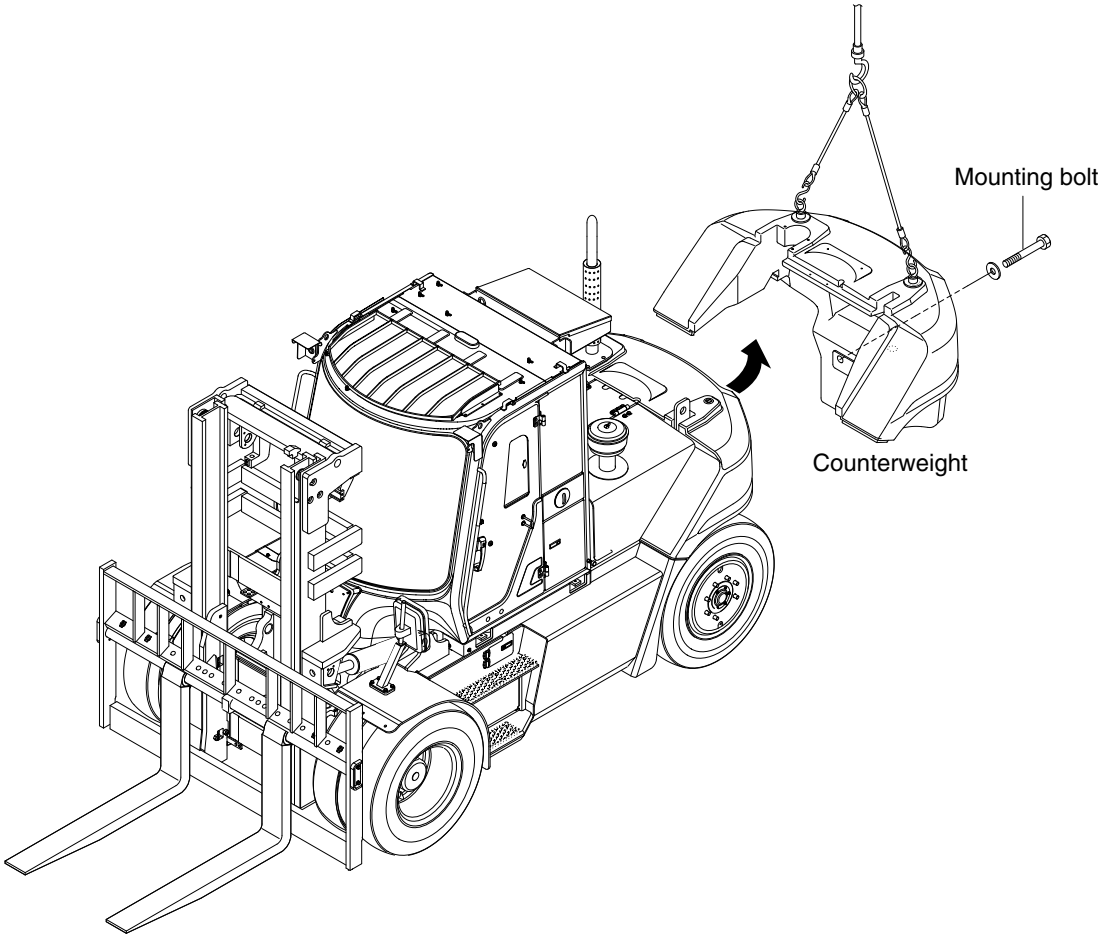


100D9VRE40

(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) : 4220 kg (9300 lb)
- Tightening torque : 100±15 kgf·m (723±108 lbf·ft)

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

(2) Rear wheel

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

· Tightening torque

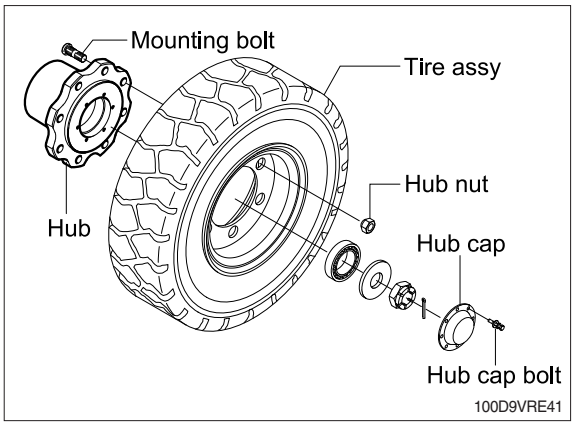
- Hub nut

  66.3±5 kgf·m (480±36.2 lbf·ft)

- Hub cap bolt

  2.5±0.5 kgf·m (18.0±3.6 lbf·ft)

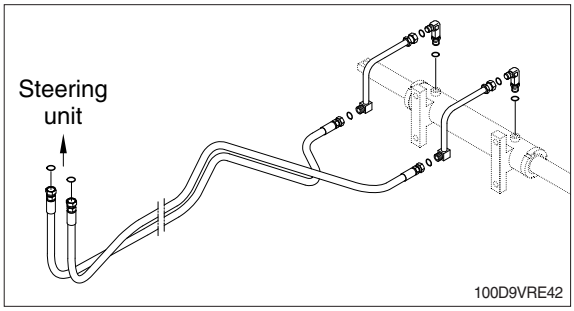
※ Keep gas tight by applying liquid gasket #1215 on the contact surface of the hub cap before assembling the hub cap.



(3) Hose and piping

① Disconnect the hoses from the steering axle and then drain out oil.

② Disconnect the pipes from the axle support.



(4) Mounting bolt

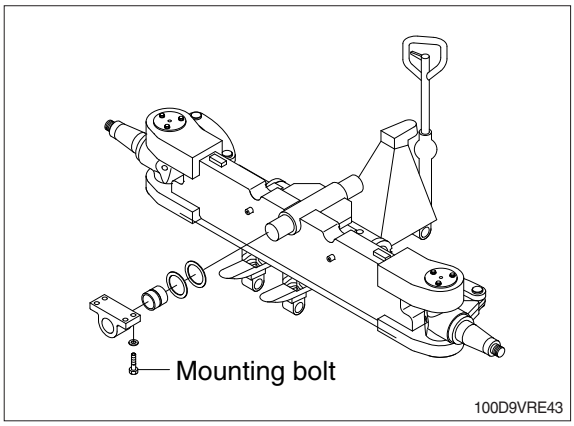
Put a block under the steering axle, support on a truck, an raise the frame with a crane. Remove the mounting bolts installing to the frame, and pull out to the rear.

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

· Mounting bolt tightening torque

  49.2~66.6 kgf·m (356~482 lbf·ft)

※ Apply loctite #277 on the thread before tightening.



GROUP 3 MAINTENANCE FOR HOSE

1) MAINTENANCE

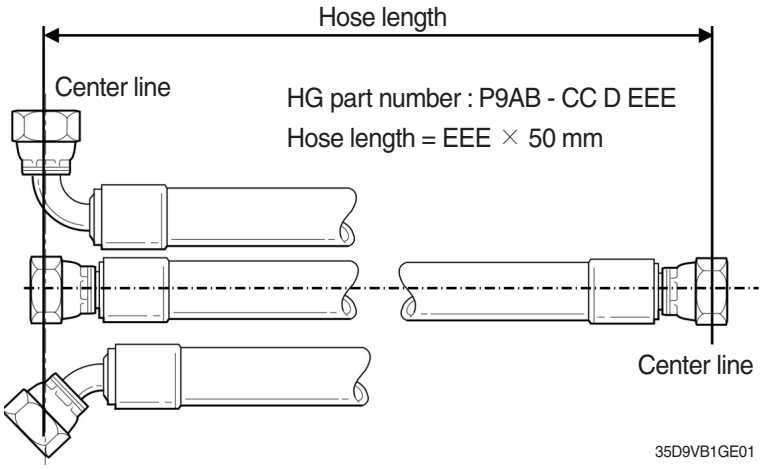
The function and service life of hydraulic components depend to a great extent on how clean the hydraulic oil is. Therefore, it is very important to prevent dirt from entering the hydraulic system. Some simple advice to keep the hydraulic system clean:

- 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 reutse 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.