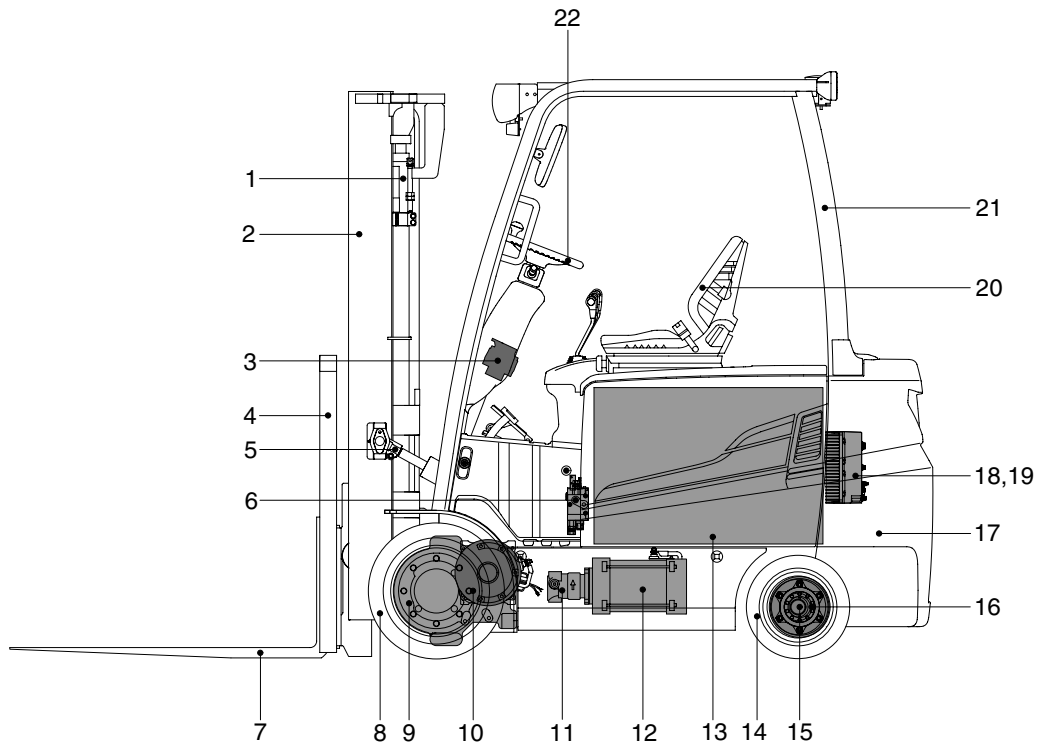


# SECTION 2 REMOVAL & INSTALLATION OF UNIT

Group 1	Major components .....	2-1
Group 2	Removal and installation of unit .....	2-2

## SECTION 2 REMOVAL & INSTALLATION OF UNIT

### GROUP 1 MAJOR COMPONENTS



20BC9RE02

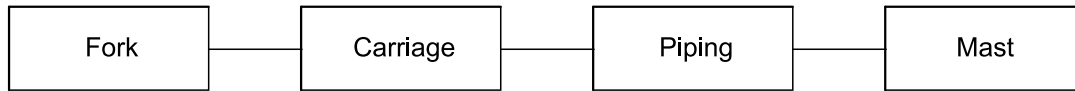
- |   |                    |    |                   |    |                     |
|---|--------------------|----|-------------------|----|---------------------|
| 1 | Lift cylinder      | 9  | Drive unit        | 17 | Counterweight       |
| 2 | Mast               | 10 | Drive motor       | 18 | Traction controller |
| 3 | Steering unit      | 11 | Hyd gear pump     | 19 | Pump controller     |
| 4 | Backrest           | 12 | Pump motor        | 20 | Seat                |
| 5 | Tilt cylinder      | 13 | Battery           | 21 | Overhead guard      |
| 6 | Main control valve | 14 | Rear wheel        | 22 | Steering wheel      |
| 7 | Forks              | 15 | Steering axle     |    |                     |
| 8 | Front wheel        | 16 | Steering cylinder |    |                     |

## GROUP 2 REMOVAL AND INSTALLATION OF UNIT

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

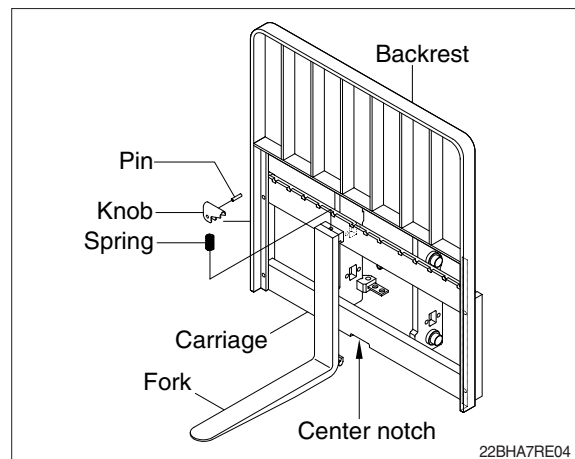
### 1. MAST

#### 1) REMOVAL



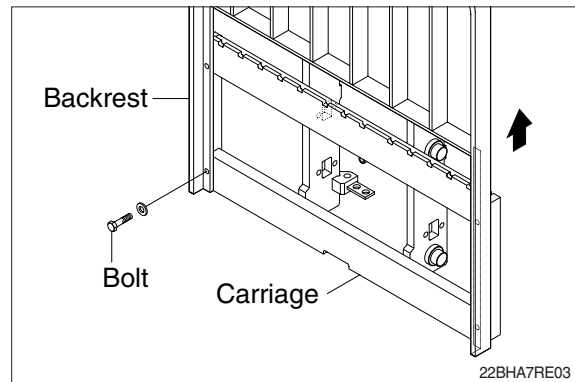
#### (1) Forks

- ① Lower the fork carriage until the forks are approximately 25mm (1in) 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.



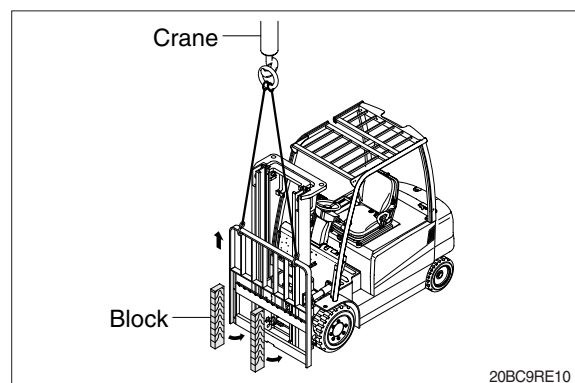
#### (2) Backrest (If necessary)

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

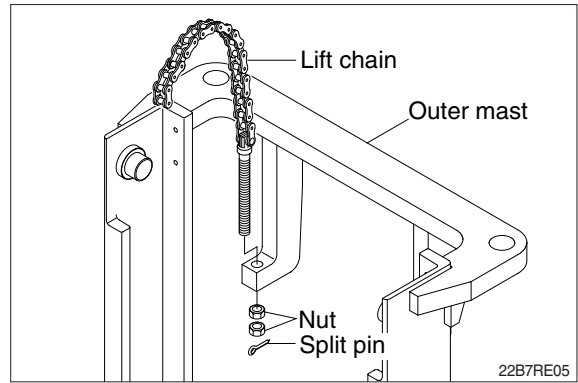


#### (3) Carriage

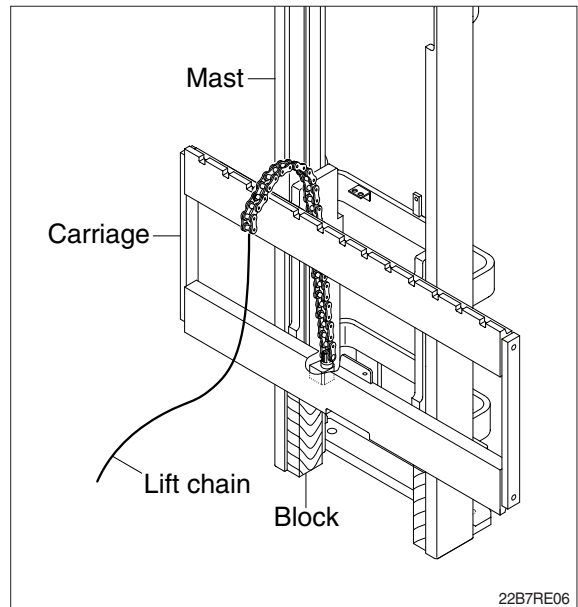
- ① With the mast vertical, raise the carriage high enough to place blocks under the load forks. This is done to create slack in the load chains when the carriage is lowered. Lower the carriage all the way down to the floor. Make sure the carriage is level, this will prevent any binding when the mast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



- ② While supporting lift chains, remove the split pins and nuts from anchor pins of stationary upright.



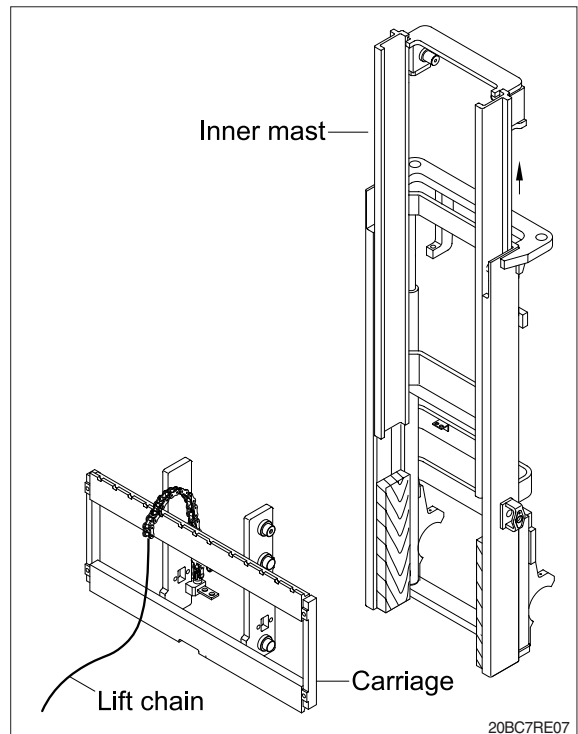
- ③ Pull the chains out of the sheaves and drape them over the front of the carriage.



- ④ Slowly raise inner mast upright until mast clears top of fork carriage. Move carriage to work area and lower the mast.

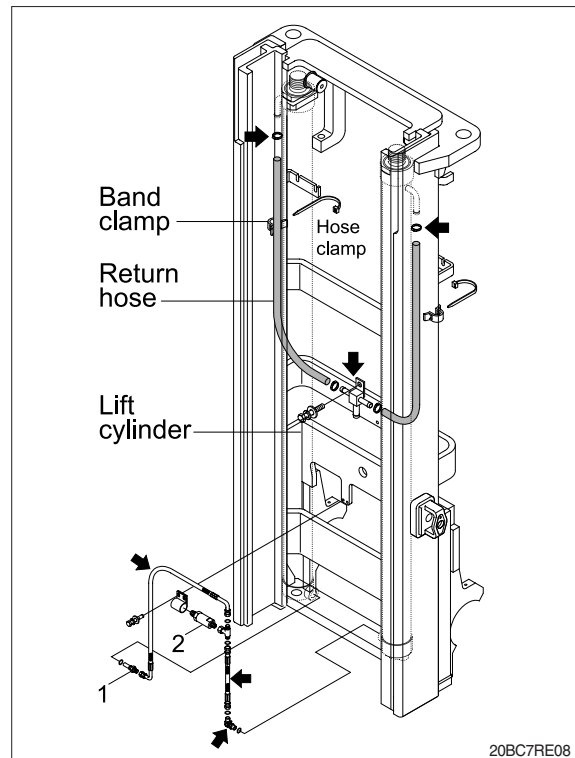
**▲ Make sure that carriage remains on floor and does not bind while mast is being raised.**

- ⑤ 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 cylinder.
- ② Remove the return hoses from the connector.
- ③ Remove hose assembly, tee, velocity fuse valve(1) from the lift cylinder.
- ④ Disconnect hose assembly from the flow regulator(2).

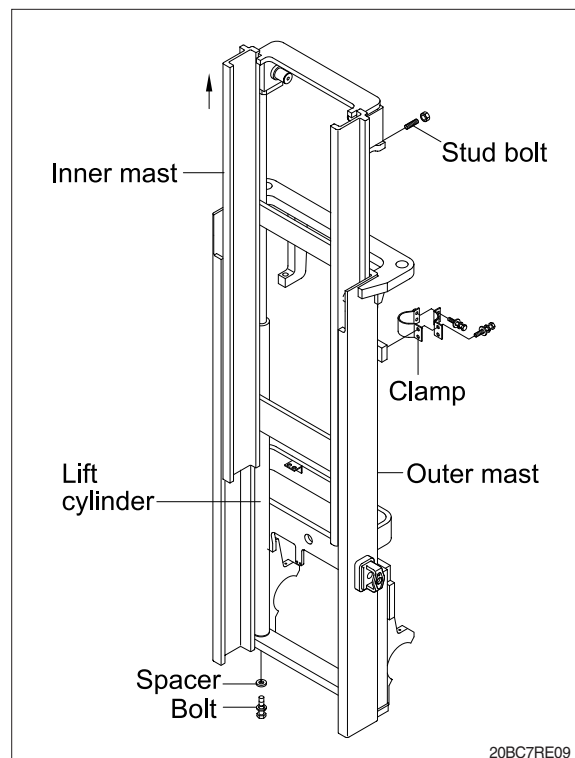


#### (5) Lift cylinder

- ① Loosen hexagonal bolts and remove spacers securing the lift cylinders to outer mast.
- ② Bind the lift cylinder with overhead hoist rope and pull up so that the rope has no slack or binding.

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

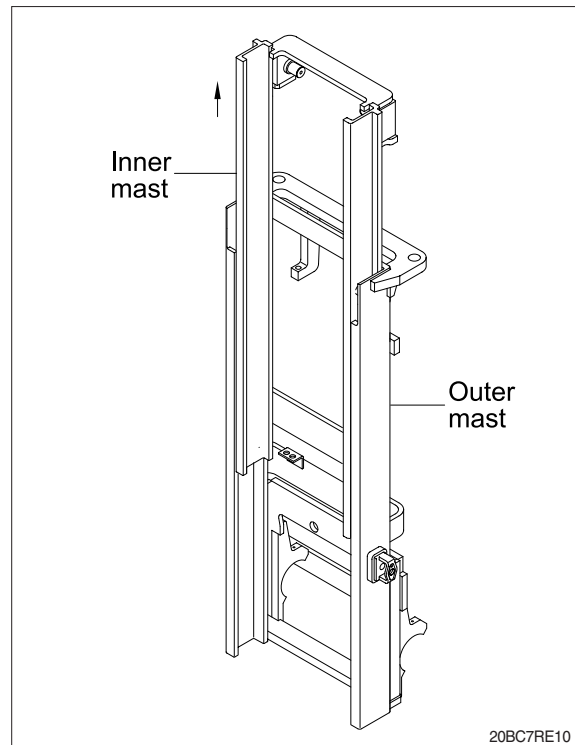
- ③ Loosen and remove hexagon bolts and clamp securing cylinder.
- ④ Using an overhead hoist, slowly raise the inner mast high enough to clear lift cylinder.
- ⑤ Using an overhead hoist, draw out lift cylinder carefully and put down on the work floor.



## (6) Inner mast

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

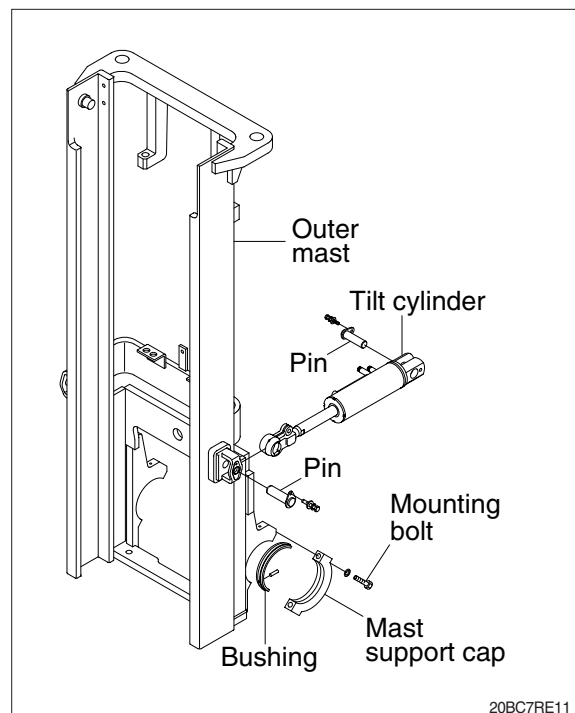
▲ Be careful the mast not to swing or fall.



## (7) Tilt cylinder pin

### (8) Mast support cap

- ① Attach a crane to the stay at the top of the outer mast, and raise enough to sustain jacked up machine.
  - ※ This operation is carried out from under the machine, so use a pit, or if there is no pit, jack up the machine and loosen with on impact wrench.
- ② Remove the mounting bolts from the cap. Then slowly raise the outer mast.



## 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 cap

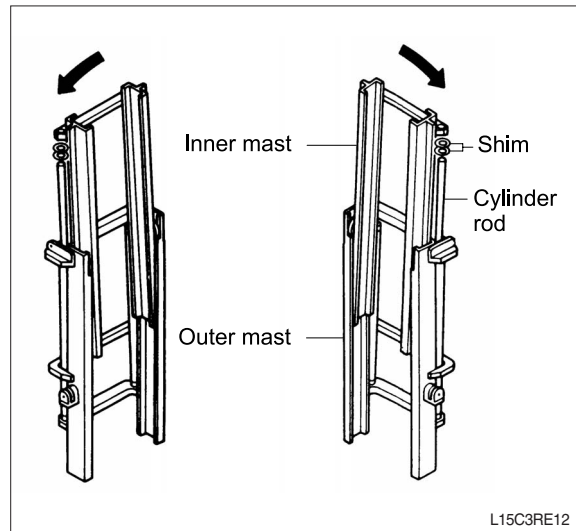
- ① Check the mast support cap and spring pin for wear.
- ② Jack up the machine so that the front is raised and then using an overhead hoist assemble outer mast to drive axle unit.
- ③ Tighten mounting bolts to mast support cap. Apply loctite #277.
  - Tightening torque : 19.9~26.9 kgf · m (144~195 lbf · ft)

### (2) Tilt cylinder pin

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

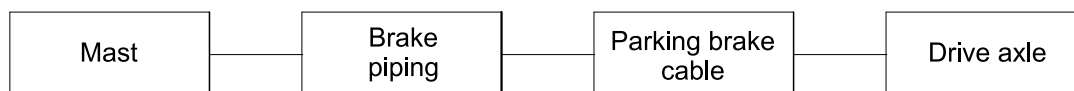
### (3) Lift cylinder installation and adjustment

- 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 : 1.0mm(0.04in)



## 2. POWER TRAIN ASSEMBLY

### 1) REMOVAL

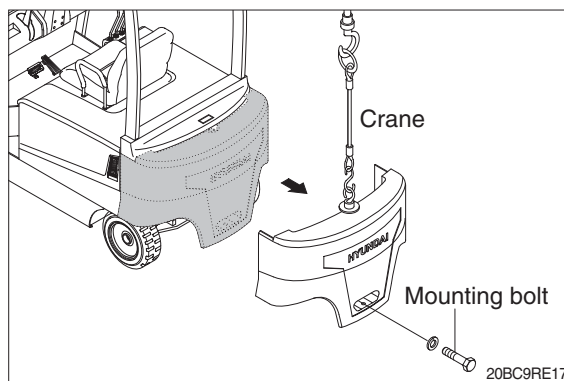


B153RE00

#### (1) Mast and counterweight

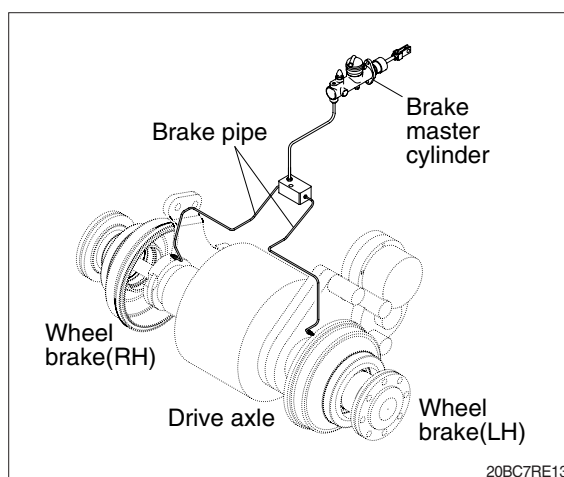
Refer to section on mast(Page 2-2)

- ※ After removing mast, remove the counterweight to prevent the truck from turning over.



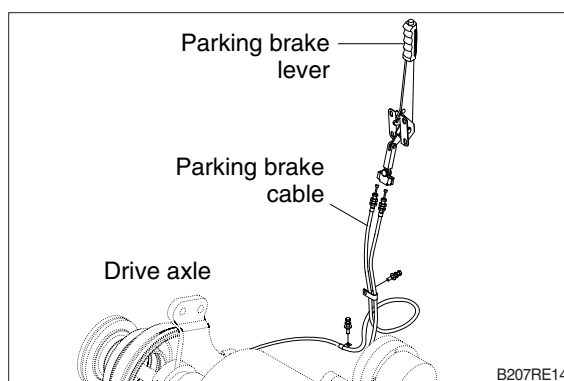
#### (2) Brake piping

Disconnect the brake piping from the wheel brake assembly.



#### (3) Parking brake cable

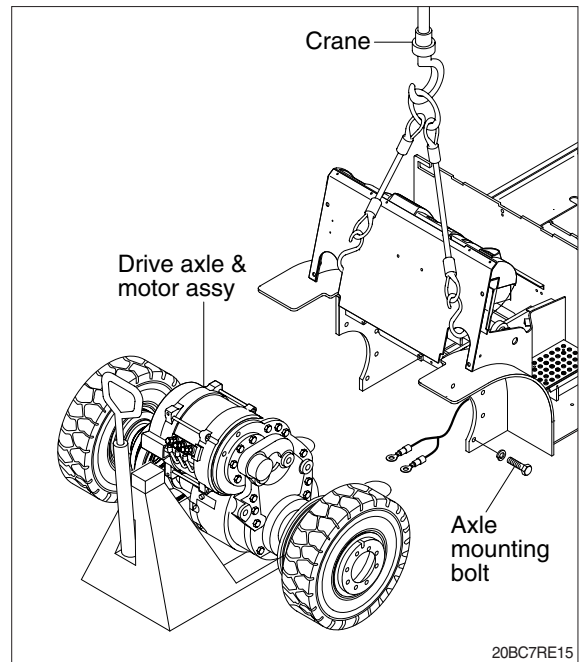
Disconnect parking brake cable from the wheel brake assembly.



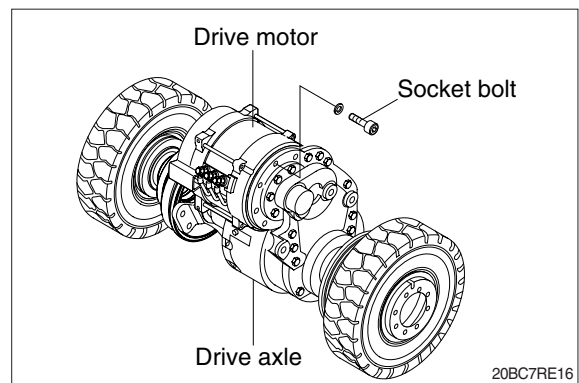


#### (4) Drive axle and motor assy

- ① Attach a crane to the tilt cylinder notches on the dashboard and raise the machine enough for truck to slide under drive axle-transmission-drive motor assembly.
- ② Put the block between the truck and drive axle assembly.
- ③ Disconnect the harness from the drive motor terminal.
- ④ Remove drive axle mounting bolts from the frame and then slowly pull out the truck with drive axle forward the front.



- ⑤ Remove five socket bolts holding the drive motor in place.
- ⑥ Carefully remove the drive motor from the drive axle.



## 2) INSTALLATION

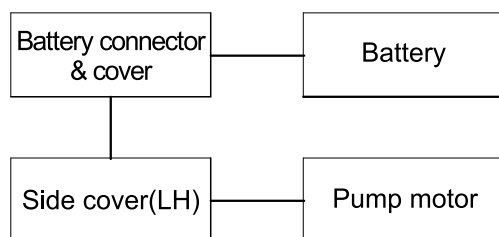
Installation is the reverse order of removal, but be careful of the following points.

- (1) Tighten the mounting bolts and apply loctite #277.
  - Drive axle  
48~53 kgf · m (347~383 lbf · ft)
  - Drive motor  
6~8 kgf · m (43.4~57.9 lbf · ft)

### 3. ELECTRICAL COMPONENTS

Before removing each component, disconnect cables and earth lines attached to the component.

#### 1) REMOVAL



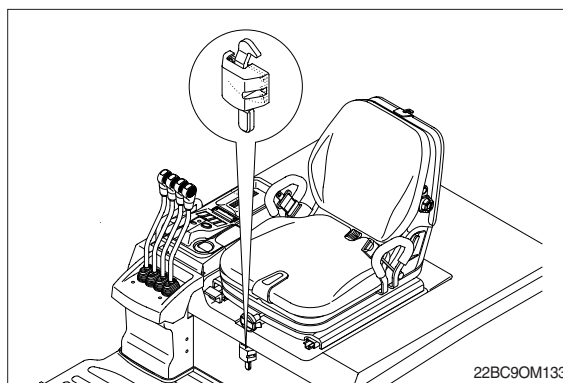
22B7RE29

#### (1) Battery

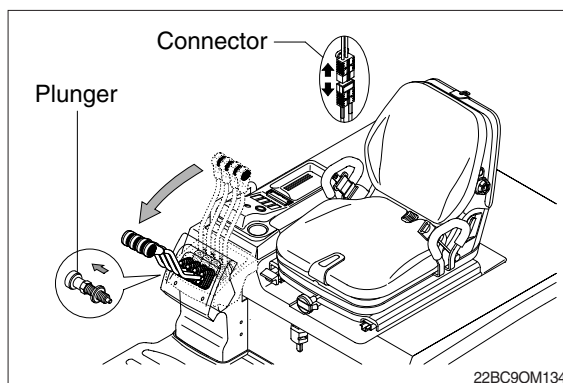
**▲** Before pulling out the battery plug, tilt the mast forward a little, and lower the fork to the lowest position.

The batteries weigh from around 1040kg to 1500kg so the extreme care must be taken when handling them.

- ① Release the battery cover latch.



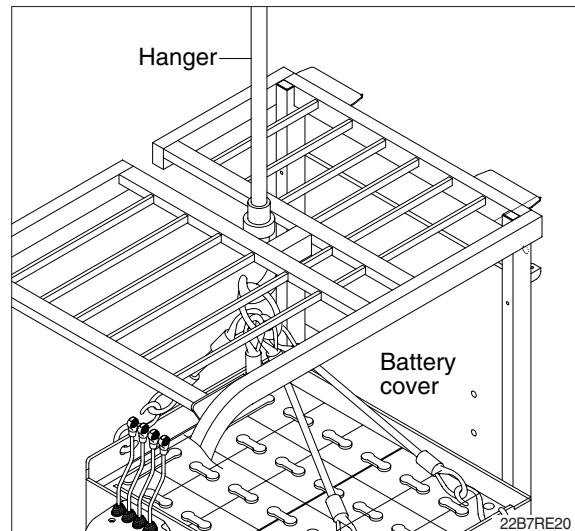
- ② Pull the plunger and tilt the levers forward.
- ③ Open the battery cover.
- ④ Disconnect the battery connector.



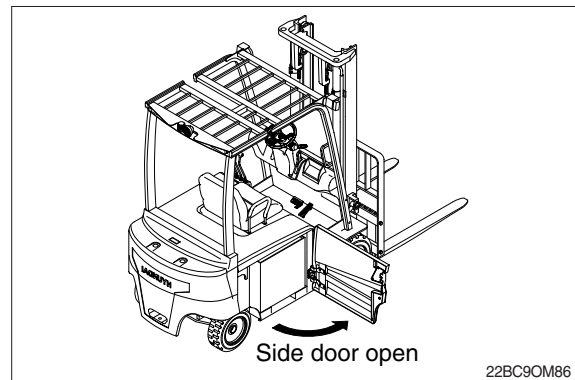
- ⑤ Using a battery hanger, carefully raise the battery assembly.

**▲ Put down the battery with fork lift or chain block by hang up hook at 4 links which located in right and left of the battery.**

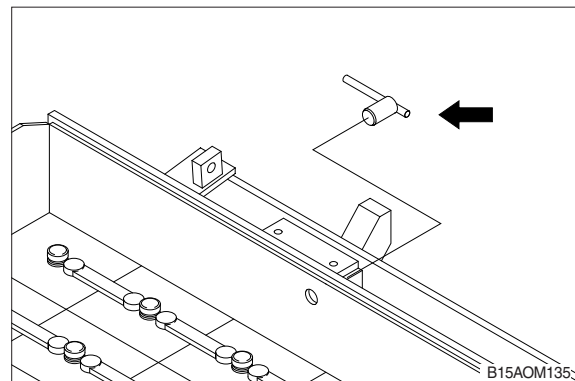
- ※ Be careful not to damage overhead guard or control system.



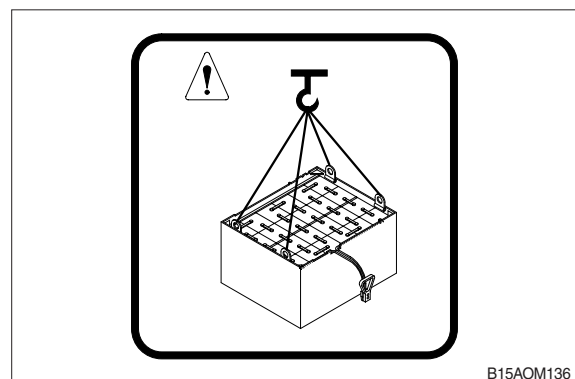
- ⑥ Open the side door. (SBR Type)



- ⑦ Remove the battery stopper.

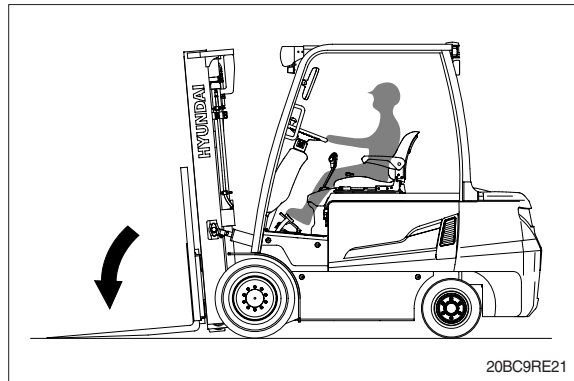


- ⑧ Put down the battery with fork lift or chain block by hang up hook at 4 links which located in right and left of the battery.

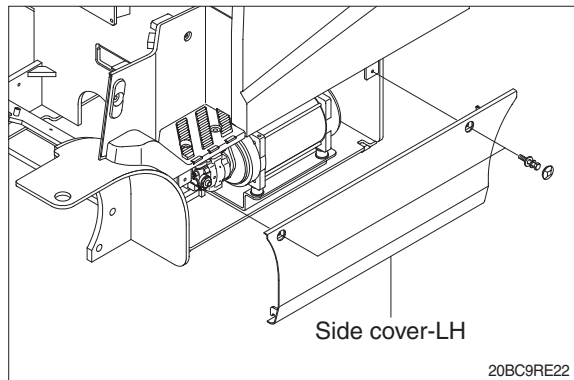


## (2) Pump motor

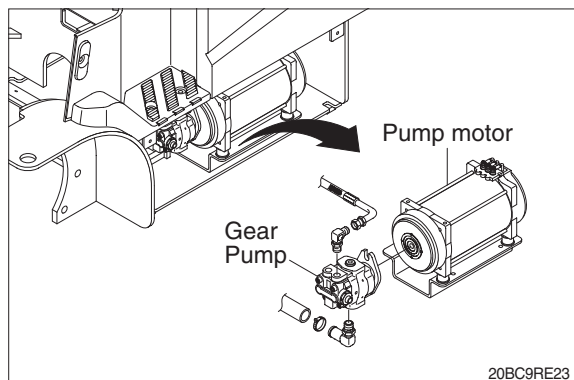
- ① Lower the fork to floor.



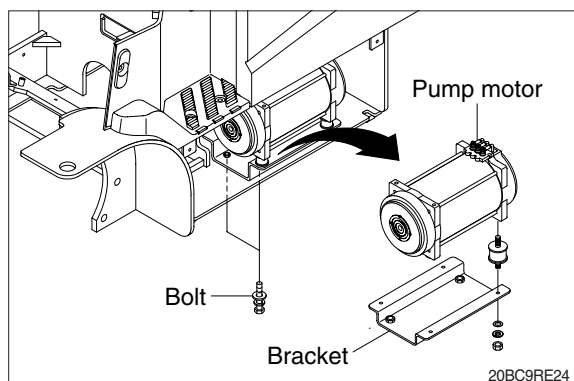
- ② Remove the left hand side cover.



- ③ Disconnect the wiring of pump motor and remove the gear pump from pump motor.

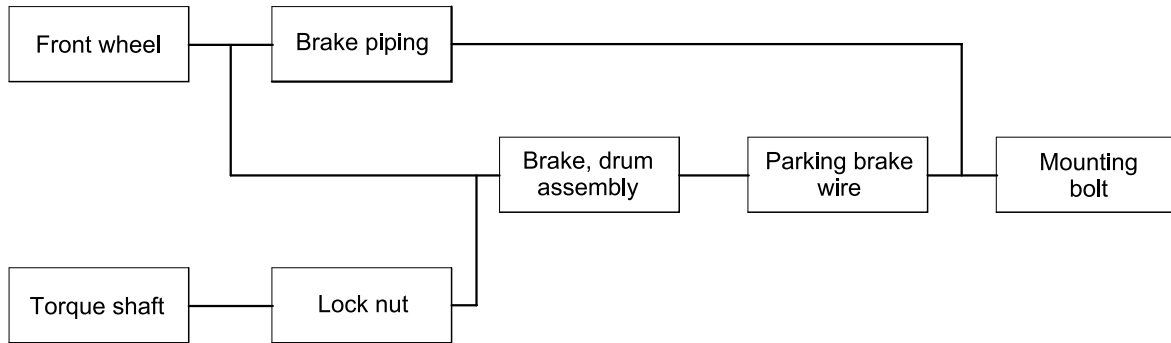


- ④ Remove the tightening bolts of the pump motor mounting bracket. Remove the motor from mounting bracket.



## 4. WHEEL BRAKE

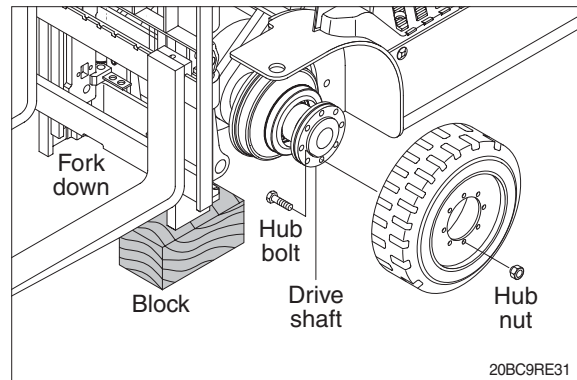
### 1) REMOVAL



B153RE002

#### (1) Front wheel

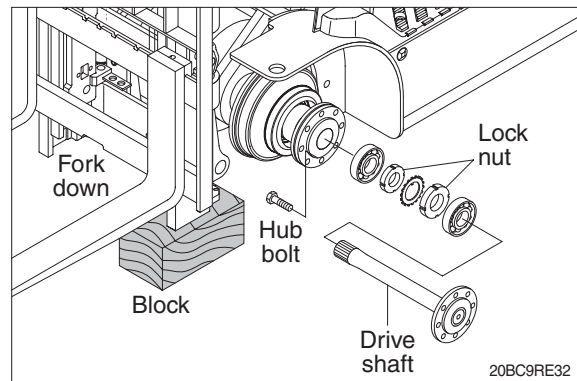
Put a block under the mast and tilt forward, or jack up the bottom of the frame to raise the front wheels off the ground, then remove the front wheels.



20BC9RE31

#### (2) Drive shaft

Pull out drive shaft carefully with lock washer, lock nut and oil seal.  
Remove lock nut with a hub nut wrench.

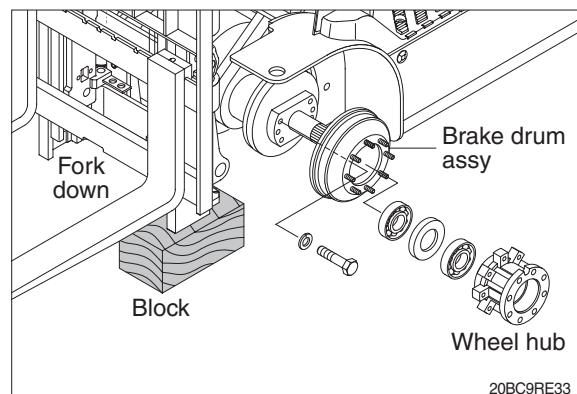


20BC9RE32

#### (3) Brake, drum assembly

The oil seal inside the nub acts as a seal for the axle shaft end. Therefore when removing or installing the brake and drum assembly, remove or install in a straight line to prevent twisting the seal up and down or to the right and left.

When the brake and drum assembly is removed the oil seal is connected to the inside of the hub.

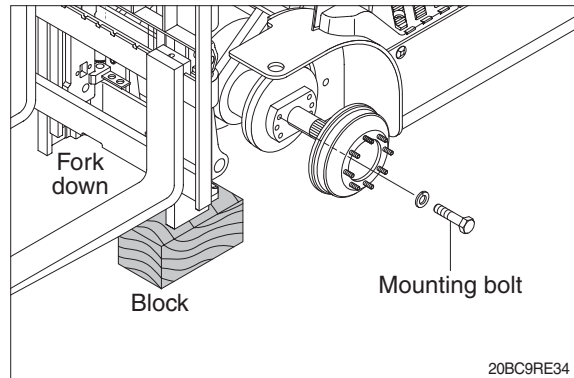


20BC9RE33

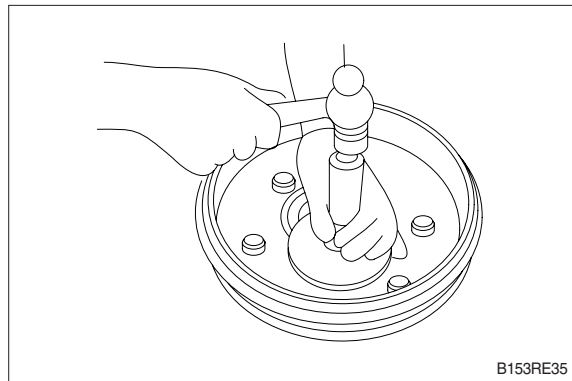
## 2) INSTALLATION

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

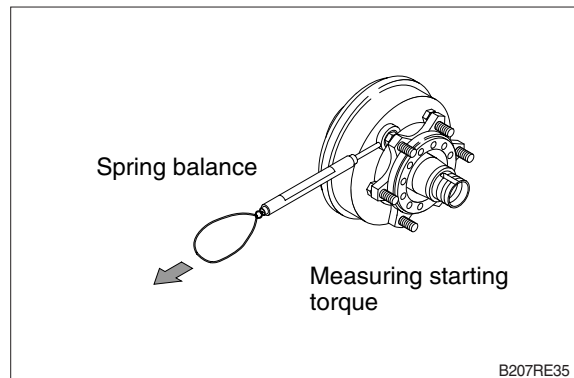
- (1) Coat the mounting bolts with loctite and tighten to  $26 \text{ kgf} \cdot \text{m}$  ( $188 \text{ lbf} \cdot \text{ft}$ )



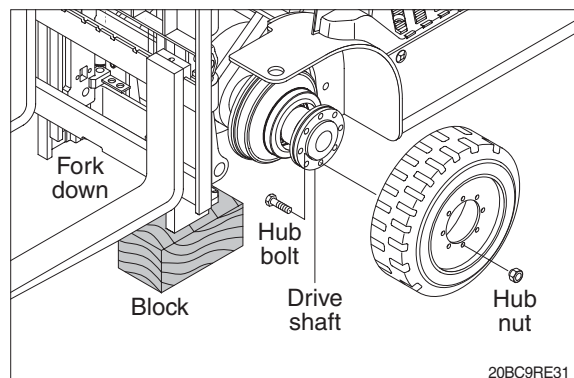
- (2) When replacing the oil seal inside the hub, be careful to install the seal facing in the correct direction (Lip on outside) and knock into place.



- (3) Wipe the inside of the brake drum clean, coat the lip of the seal with grease, and assemble the brake and drum assembly. Adjust the starting torque with the nut. Attach a spring balance to the hub bolt and adjust the nut to give a starting force of 12 to 20 kgf ( $27 \sim 44 \text{ lbf}$ )

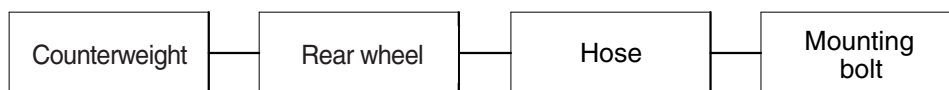


- (4) Tightening torque of hub nut for front wheel.
  - $22 \sim 25 \text{ kgf} \cdot \text{m}$  ( $159 \sim 181 \text{ lbf} \cdot \text{ft}$ )Coat the hub bolt with molybdenum disulphide.

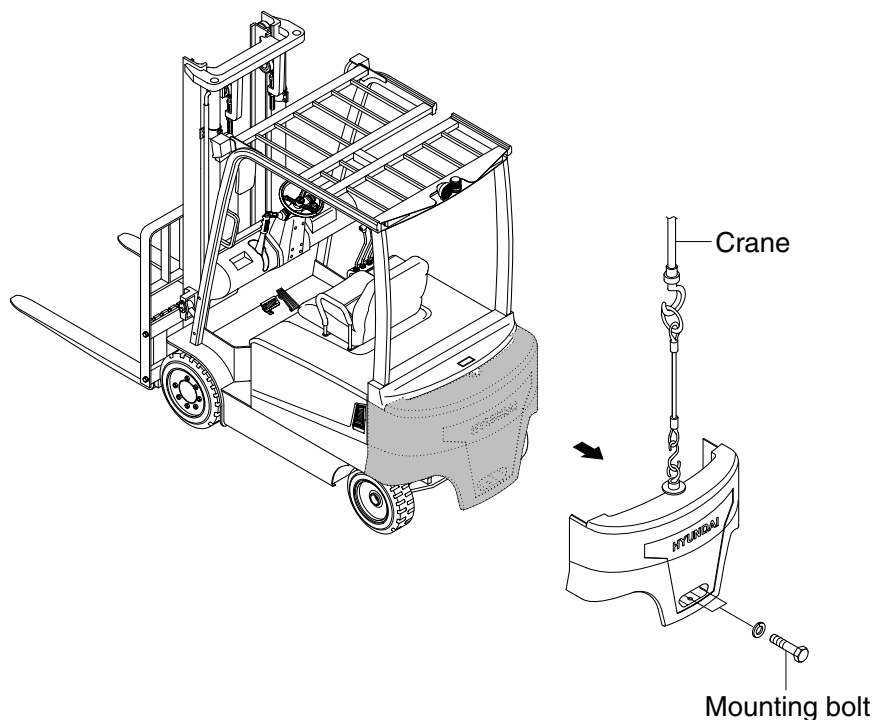


## 5. STEERING AXLE

### 1) REMOVAL



D35ARE37



20BC9RE25

#### ① Counterweight

Install a lifting tool in the counterweight, and raise with a crane.

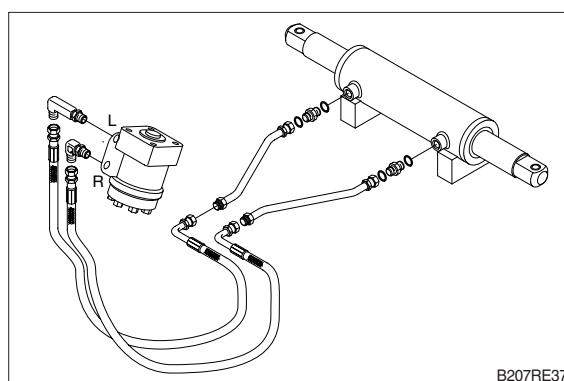
Remove the mounting bolts, raise slightly and move to the rear.

- Weight of counterweight(standard)

20BC-9	750 kg (1650 lb)	30BC-9	1025 kg (2260 lb)
25BC-9	875 kg (1930 lb)	32BC-9	1190 kg (2620 lb)

- Tightening torque : 70~90 kgf · m (506~651 lbf · ft). Apply loctite #277.

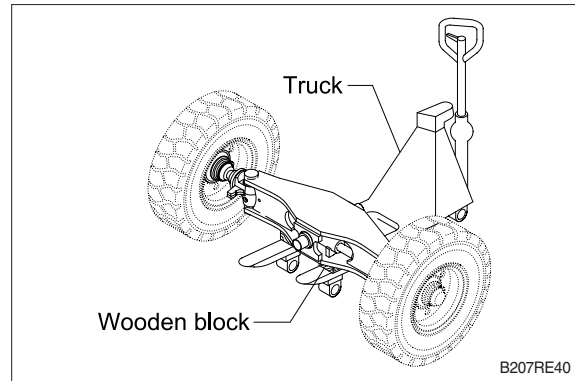
#### ② Hose



B207RE37

### ③ Mounting bolt

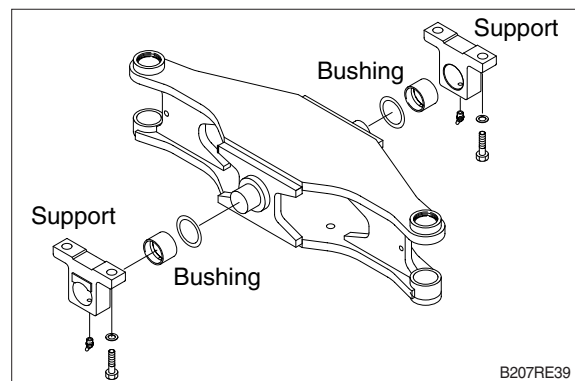
Put a block under the rear axle, support on a truck, and raise the frame with a crane. Remove the mounting bolts installed to the frame, and pull out to the rear. There are shims between the support and rear axle to prevent play.



## (2) INSTALLATION

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

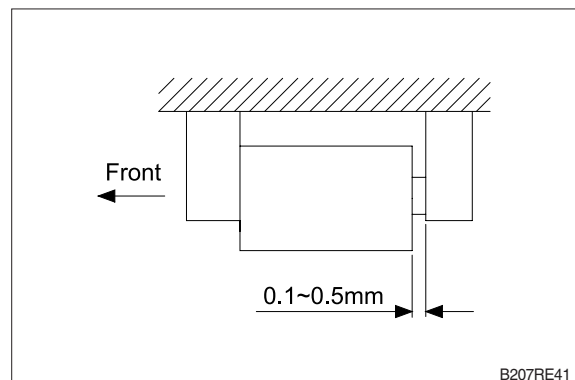
- ① When replacing the bushing at the support, install so that the hole in the bushing faces down.



- ② Install the support so that the clearance is under 0.5mm when the support is pushed fully to the rear.

Tightening torque of mounting bolt for support.

· 55~61 kgf · m (398~441 lbf · ft)



- ③ When installing the rear wheel, coat the hub bolt with molybdenum disulphide, and tighten the nut to 6~9 kgf · m (43~65 lbf · ft).
- ④ When installing the counterweight, align with the center of frame. Coat the mounting bolt with molybdenum disulphide and tighter.