SECTION 2 REMOVAL & INSTALLATION OF UNIT

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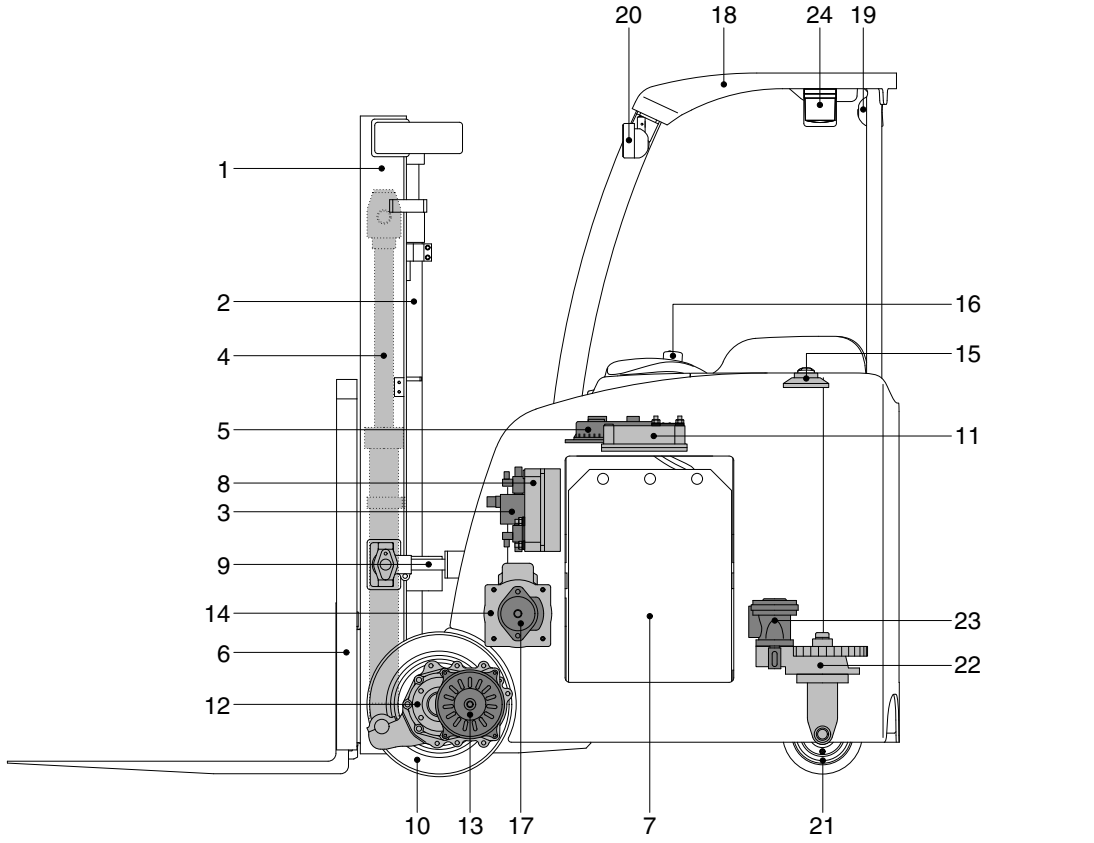
GROUP 1 MAJOR COMPONENTS



18BCS9RE01

1	Mast	9	Tilt cylinder	17	Hydraulic pump
2	Lift cylinder	10	Drive wheel	18	Overhead guard
3	Main control valve	11	Pump controller	19	Rear work lamp (opt)
4	Free lift cylinder	12	Drive unit	20	Front work lamp
5	Fingertip controller	13	Drive motor	21	Steering wheel
6	Carriage & backrest	14	Pump motor	22	Steering axle
7	Battery	15	Steering handle	23	Steering hydraulic motor
8	Drive controller	16	Joystick	24	Beacon lamp (opt)

GROUP 2 REMOVAL AND INSTALLATION OF UNIT

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

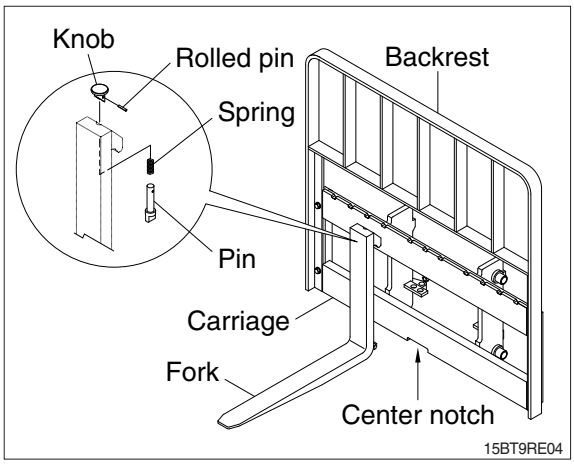
1. MAST

1) REMOVAL

18BCS9RE000

(1) Forks

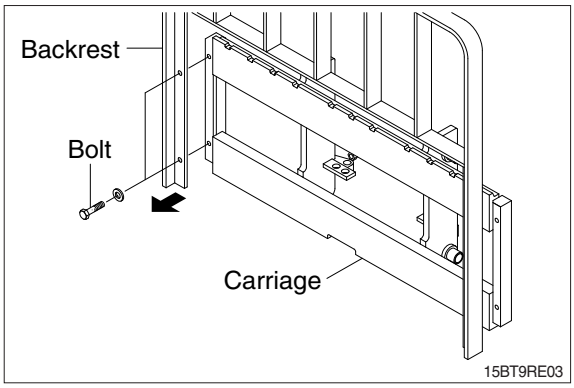
① Lower the fork carriage until the forks are approximately 25 mm (1 in) from the floor.
② Turn knob up and slide one fork at a time toward the center of the carriage where a notch has been cut in the bottom plate for easy removal.
③ Remove only one fork at a time.
※ On larger forks it may be necessary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



15BT9RE04

(2) Backrest (If necessary)

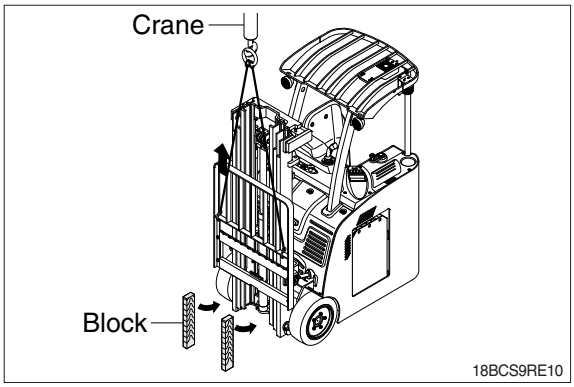
① Remove bolts securing backrest to fork carriage. Disassemble the backrest from the carriage.



15BT9RE03

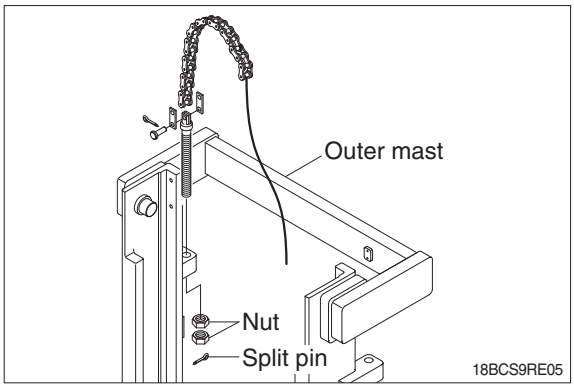
(3) Carriage

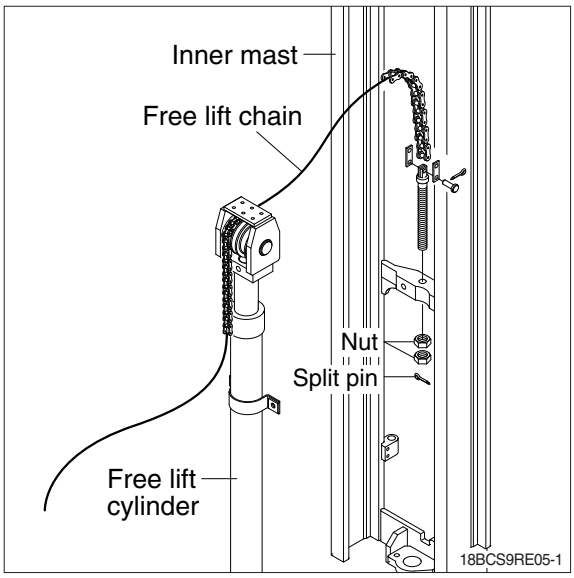
① With the mast vertical, raise the carriage high enough to place blocks under the load forks. This is done to create slack in the load chains when the carriage is lowered. Lower the carriage all the way down to the floor. Make sure the carriage is level, this will prevent any binding when the mast is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



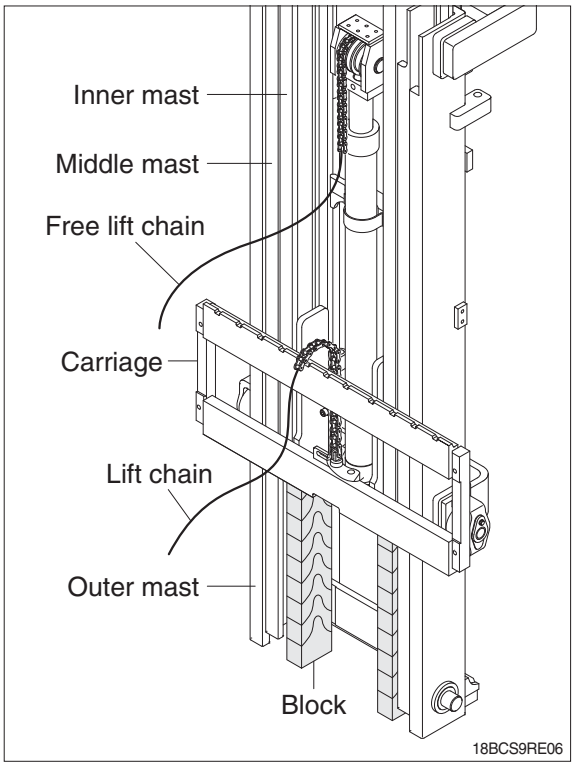
18BCS9RE10

② While supporting lift chains, remove the split pins and nuts from the anchor bolts and slide out chain anchor bolts from the chain anchors of stationary upright.





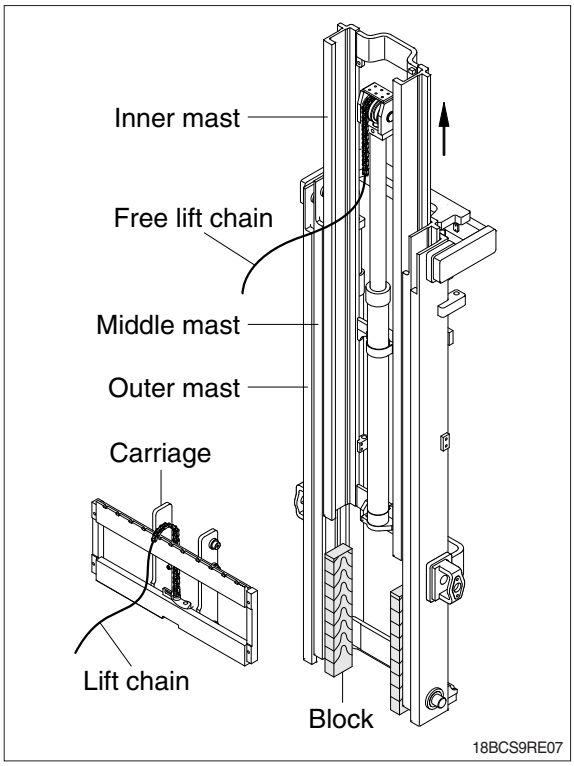
③ Pull the chains out of the sheaves and drape them over the front of the carriage.



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

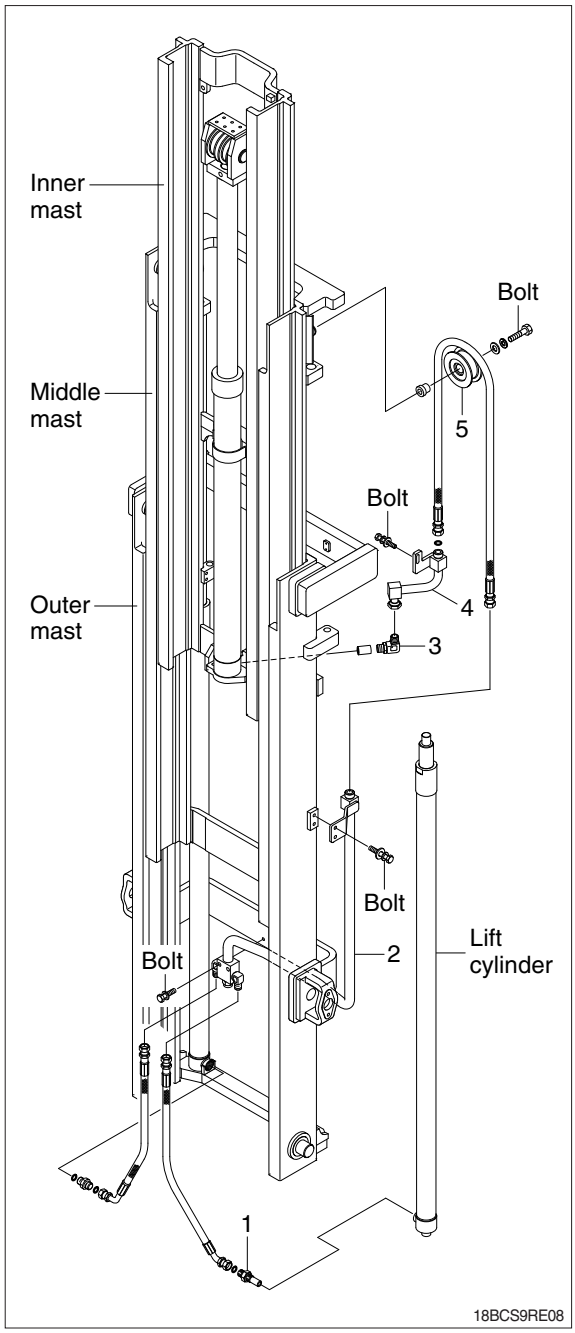
⚠ **Make sure that carriage remains on floor and does not bind while mast is being raised.**

⑤ Inspect all parts for wear or damage. Replace all worn or damaged parts.



(4) Piping

① Disconnect the return hoses attached to the lift cylinder.
② Remove the return hoses from the pipe (2).
③ Remove the velocity fuse valve (1) from the lift cylinder.
④ Disconnect and remove the free lift hose.
⑤ Loosen the bolt and remove the pipe (2) from the outer mast.
⑥ Loosen the bolt and remove the pipe (4) from the middle mast.



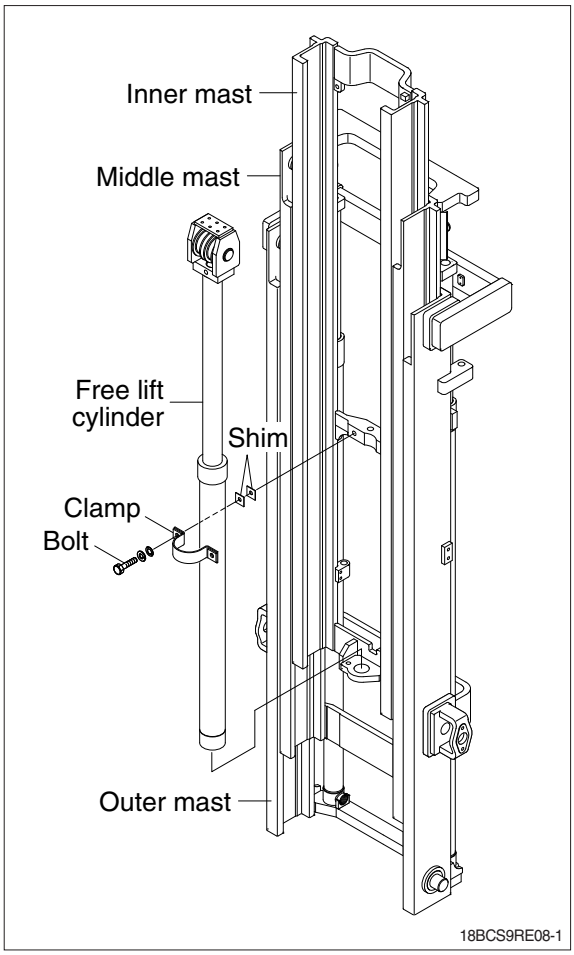
(5) Free lift cylinder

① Bind the free lift cylinder with overhead hoist rope and pull up so that the rope has no slack or binding.

② Loosen the bolts and remove clamp, shims securing the free lift cylinder to inner mast.

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

③ Using an overhead hoist draw out free lift cylinder carefully and put down on the work floor.



(6) Lift cylinder

① Loosen hexagonal bolts and remove washers securing the lift cylinders to outer mast.

② Loosen the nuts and socket set screws from the middle mast.

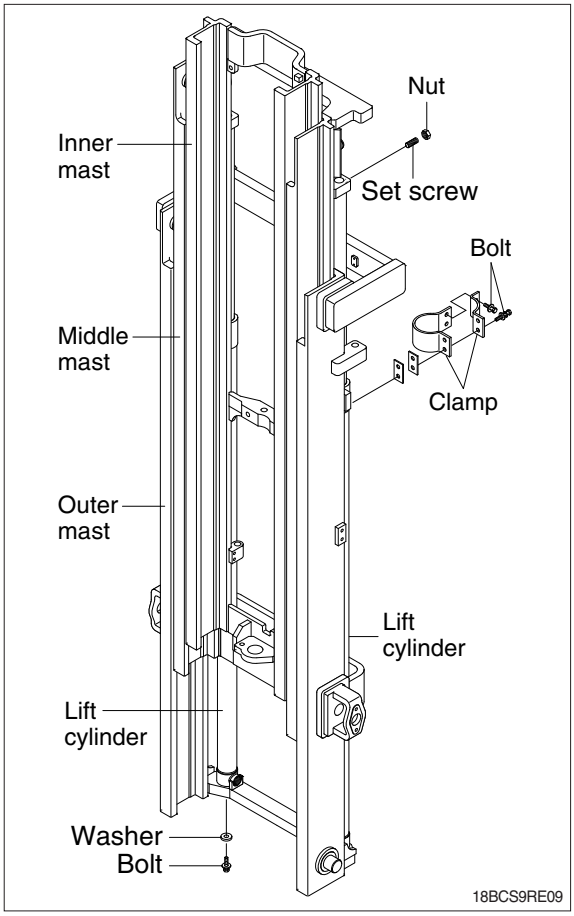
③ Bind the lift cylinder with overhead hoist rope and pull up so that the rope has no slack or binding.

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

④ Loosen and remove hexagon bolts and clamp securing the lift cylinder to outer mast.

⑤ Using an overhead hoist, slowly raise the inner mast high enough to clear lift cylinder.

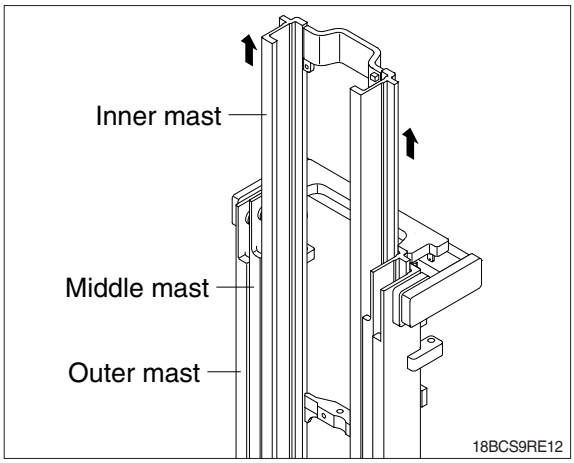
⑥ Using an overhead hoist, draw out lift cylinder carefully and put down on the work floor.



(7) Inner mast

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

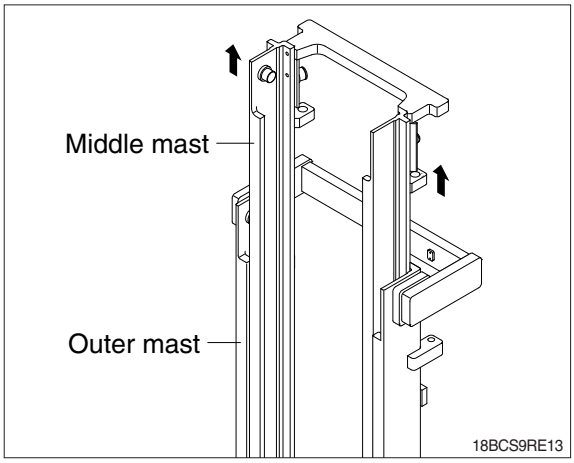
⚠ Be careful the mast not to swing or fall.



(8) Middle mast

① 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.



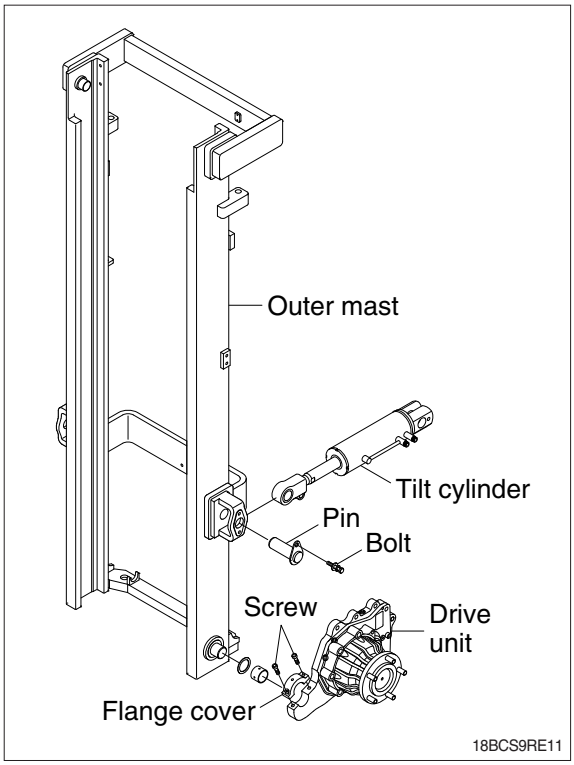
(9) Outer mast

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 truck, so use a pit, or if there is no pit, jack up the truck and loosen with on impact wrench.

② Loosen the bolts and remove the tilt cylinder mounting pins.

③ Loosen the screws and remove the flange cover from the drive units and then slowly raise up 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) Brone bushings

① Check the inside of the bronze bushings for wear which are the contact area with the mast mounting pins.

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

(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

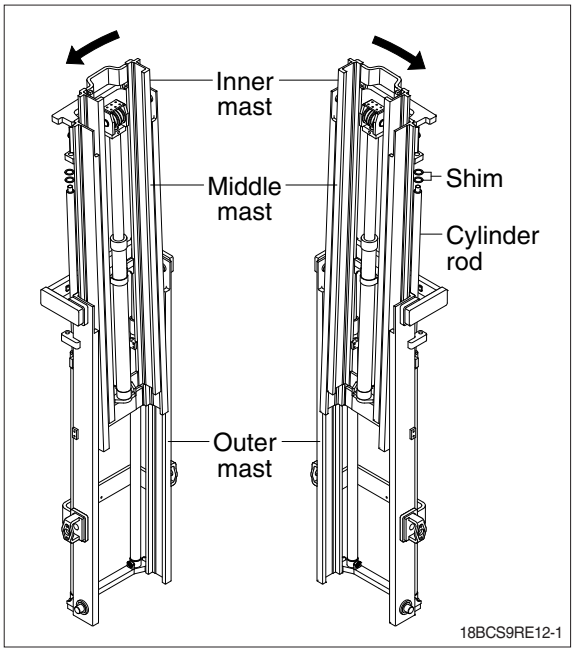
① Assemble the lift cylinder inside the outer mast, then tighten the stopper bolt. If the cylinder assembly has been replaced, adjust as follows so that the left and right cylinders are synchronized at the maximum lifting height.

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.

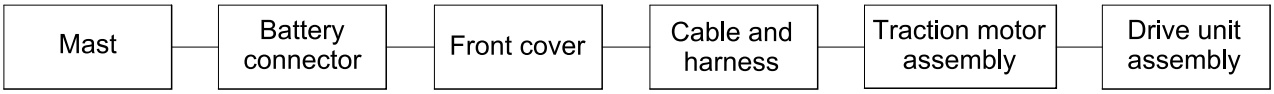
※ If play is to RIGHT, install adjustment shim to RIGHT cylinder.

· Shim thickness : 1.0 mm (0.04 in)



2. POWER TRAIN ASSEMBLY

1) REMOVAL

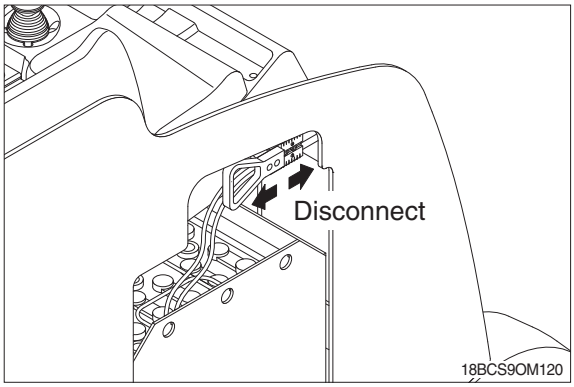


18BCS9RE001

(1) Mast

Refer to section on mast (page 2-2).

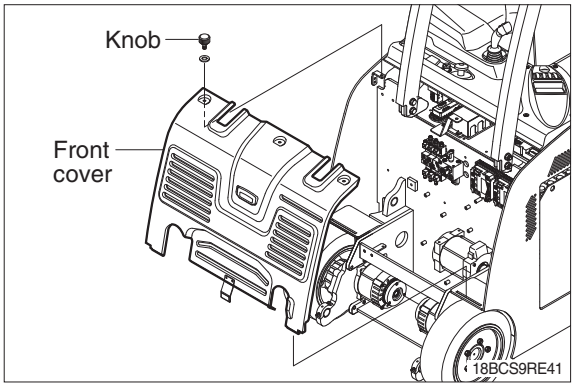
(2) Disconnect the battery cable.



(3) Front cover.

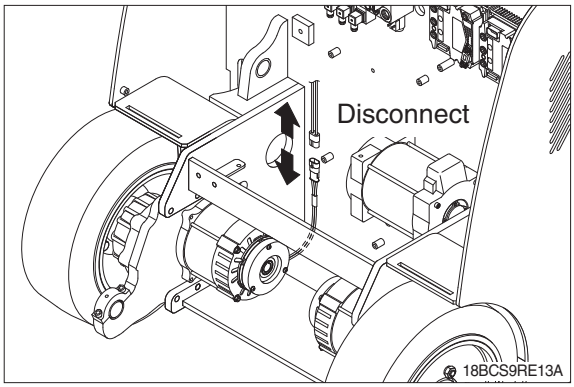
① Loosen bolt and remove the lock bracket.
· Tightening torque : 0.85~1.25 kgf · m
(6.1~9.0 lbf · ft)

② Pull out the knob and remove the front cover.

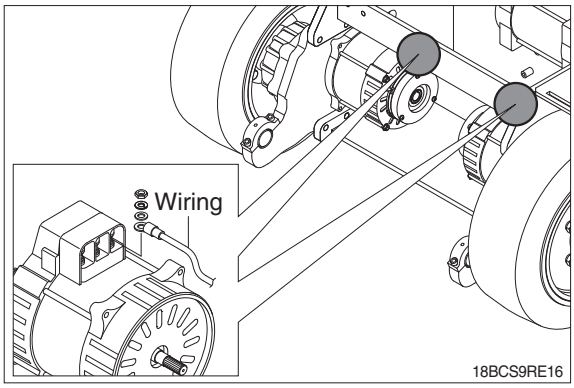


(4) Cables and harnesses.

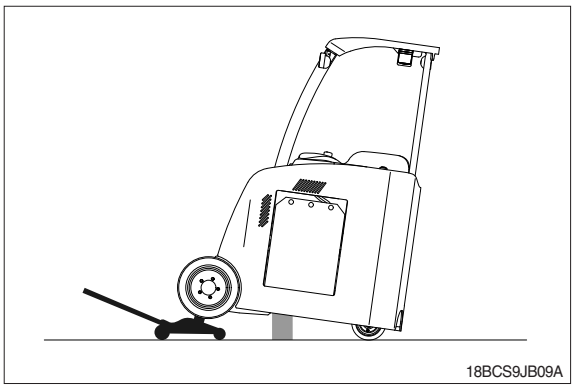
① Disconnect the harness to the electric brake assembly.



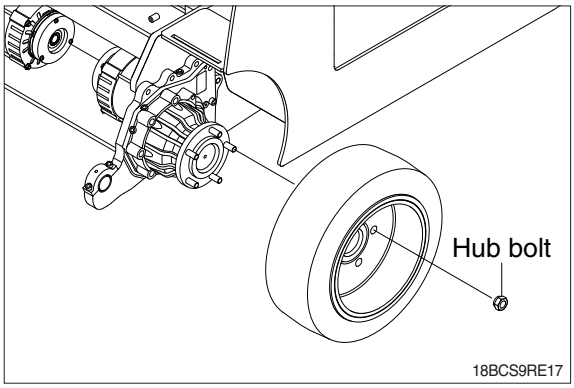
② Disconnect the cables and harness to the drive motor assembly.



(5) Jack up the frame and support both side of frame on wood block.

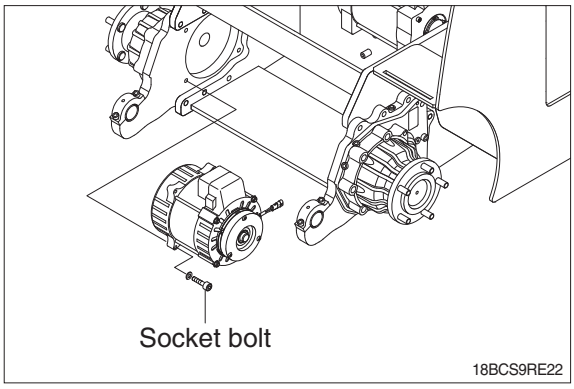


(6) Loosen hub bolt and remove the tire.



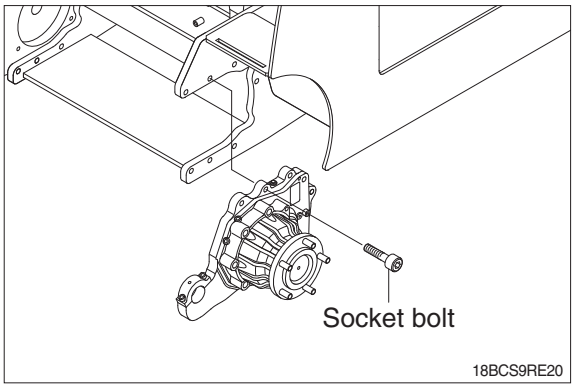
(7) Drive motor assembly

Loosen the mounting socket bolt and remove the drive motor with the electric brake from the drive unit carefully.



(8) Drive unit assembly

Loosen the mounting socket bolts and remove the drive unit carefully.



2) INSTALLATION

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

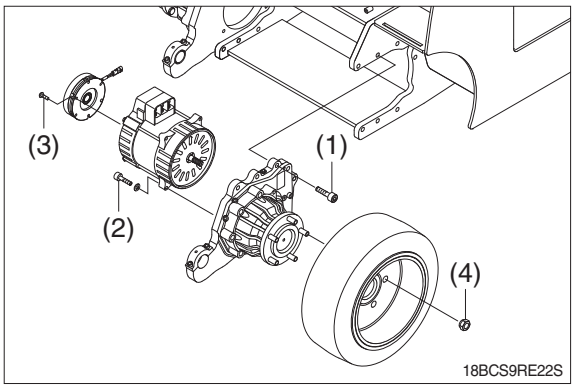
(1) Drive unit mounting bolts (M14 × 2.0)
- Tightening torque : 14~18 kgf · m (101~130 lbf · ft)

(2) Drive motor mounting bolts (M8 × 1.25)
- Tightening torque : 1.3~1.7 kgf · m (9.4~12.3 lbf · ft)

(3) Electric brake mounting bolts (M6 × 1.0)
- Tightening torque : 0.9~1.1 kgf · m (6.5~8.0 lbf · ft)

※ Apply loctite #277 all of the bolt before tightening.

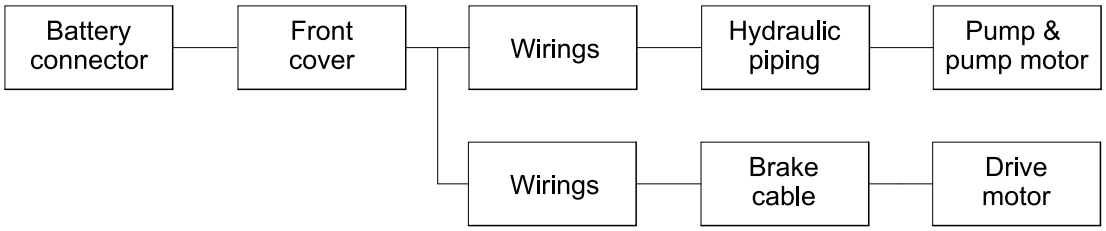
(4) Tire hub bolt
- Tightening torque : 13.4~18.0 kgf · m (28.2~29.7 lbf · ft)



3. ELECTRICAL COMPONENTS

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

1) REMOVAL

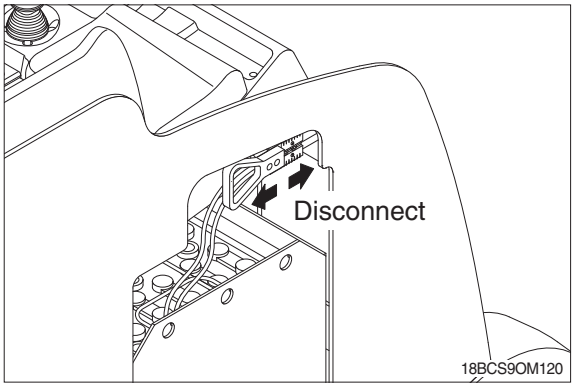


18BCS9RE002

(1) PUMP MOTOR

※ Drain the oil before disassembling the pump motor.

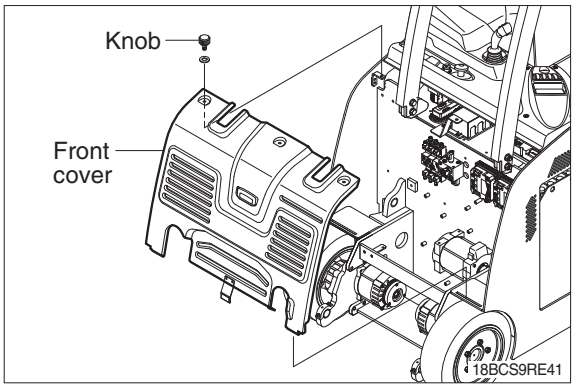
① Disconnect the battery cable.



18BCS9OM120

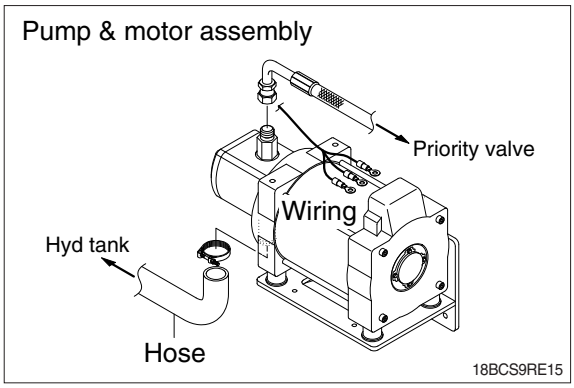
② Remove the front cover.

※ Refer to 2-7 page for details.

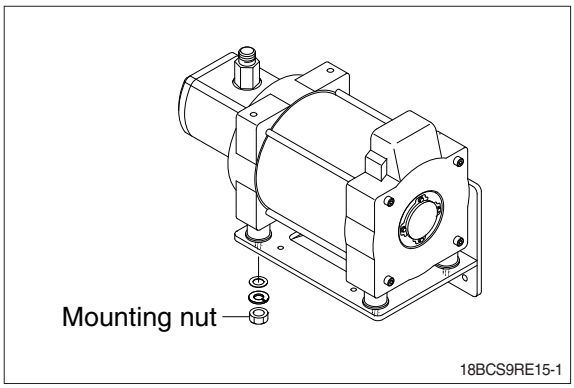


18BCS9RE41

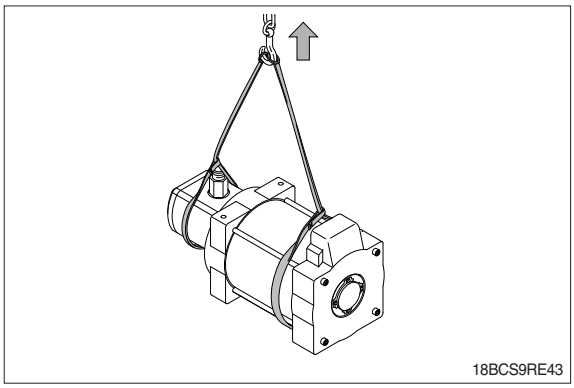
③ Disconnect the cables and wirings from pump & motor assembly.
④ Disconnect the suction hose and the hose assembly.



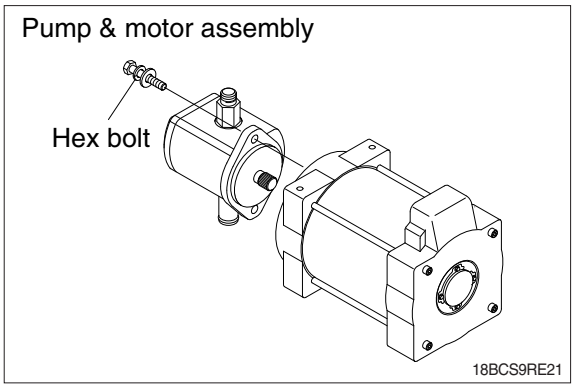
⑤ Loosen mounting nuts from the bracket.



⑥ Tire wire rope around the hydraulic pump & pump motor assembly and lift up slowly.

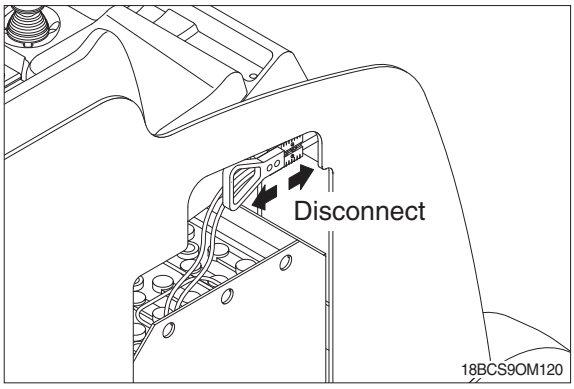


⑦ Remove 2 bolts fastening the pump & motor and then disengage the pump from motor.

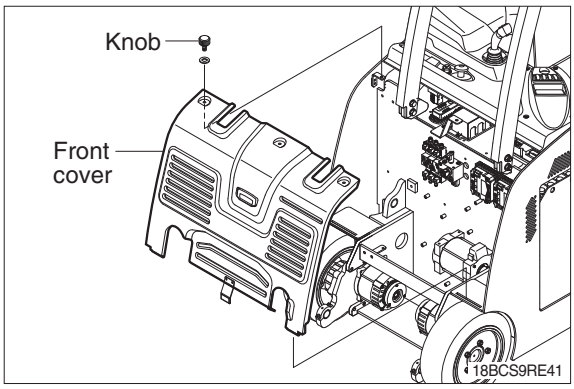


(2) DRIVE MOTOR

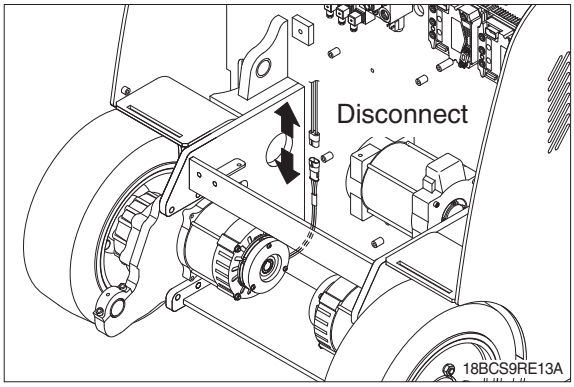
① Disconnect the battery cable.



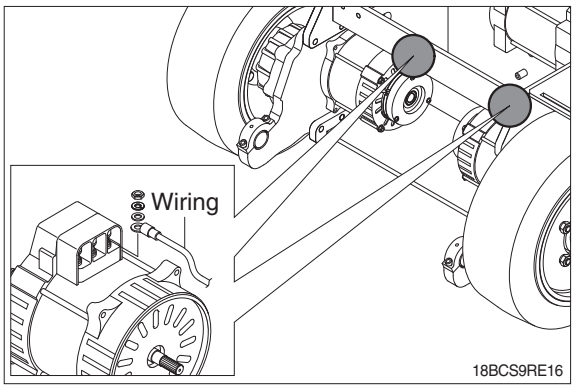
② Remove the front cover.



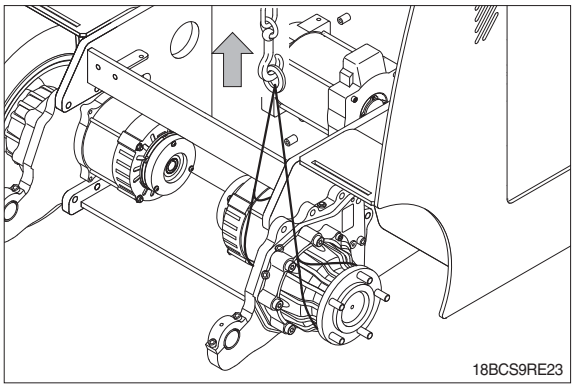
③ Disconnect the harness to the electric brake assembly.



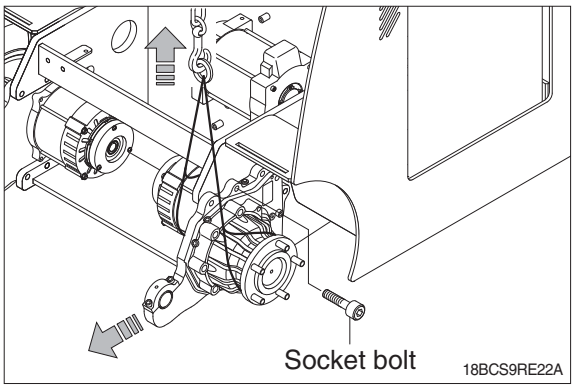
④ Disconnect the cables and harness to the drive motor assembly.



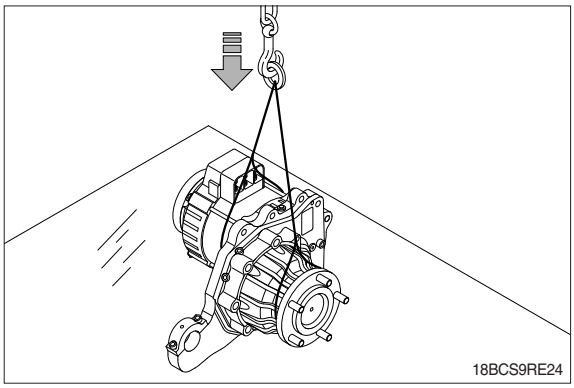
⑤ Tie wire rope around the drive motor not to drop.



⑥ Remove socket bolts connecting the motor and drive unit and lift up slowly.

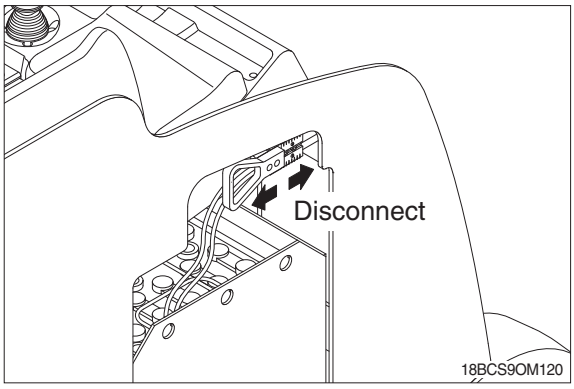


⑦ Put the motor on the clean work bench.

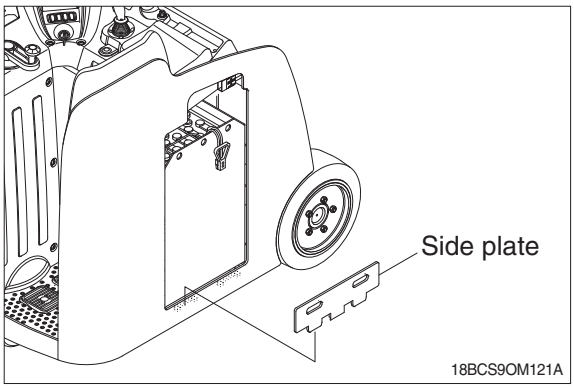


(3) BATTERY

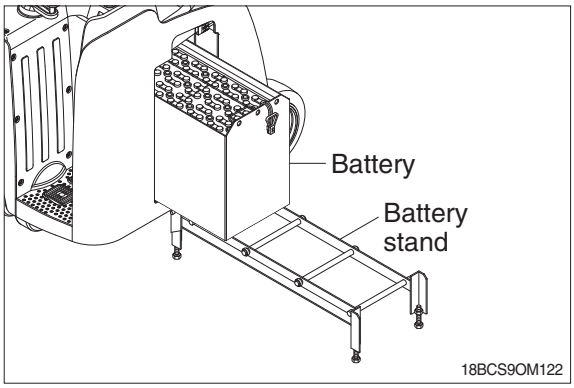
① Disconnect the battery connector.



② Pull the side plate out.



③ Adjust the height of the roller of the stand to that of the roller of the truck and pull the battery out carefully.



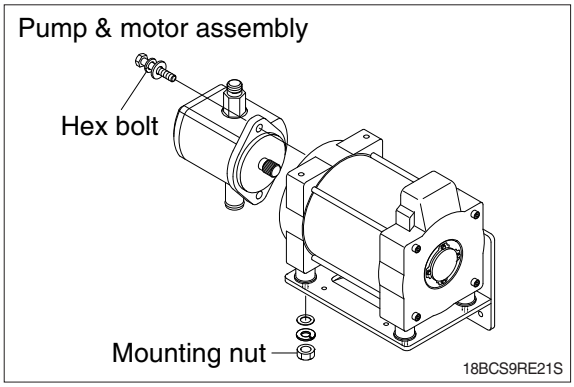
2) INSTALLATION

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

(1) PUMP MOTOR

① Pump motor mounting nut. (M8×1.25)
- Tightening torque : 2.0~3.0 kgf · m (14.5~21.7 lbf · ft)

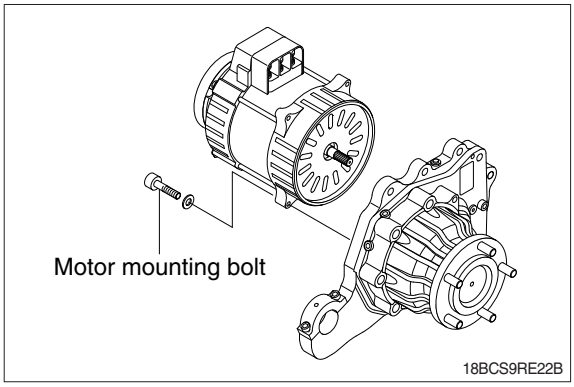
② Hydraulic pump mounting bolt. (M10×1.5)
- Tightening torque : 5.5~8.3 kgf · m (39.8~60.0 lbf · ft)



(2) DRIVE MOTOR

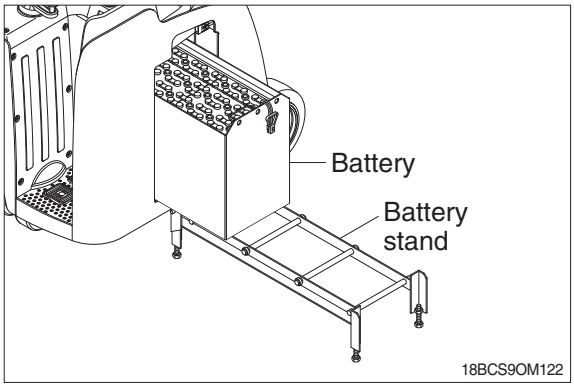
① Drive motor mounting bolt (M8×1.25) and drive unit.
- Tightening torque : 1.3~1.7 kgf · m (9.4~12.3 lbf · ft)

※ Apply loctite #277 on the thread of the bolt before tightening.

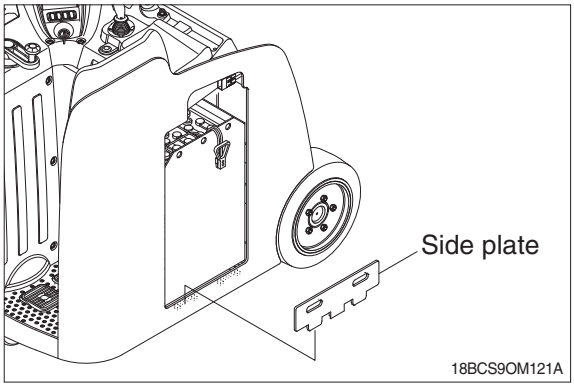


(3) BATTERY

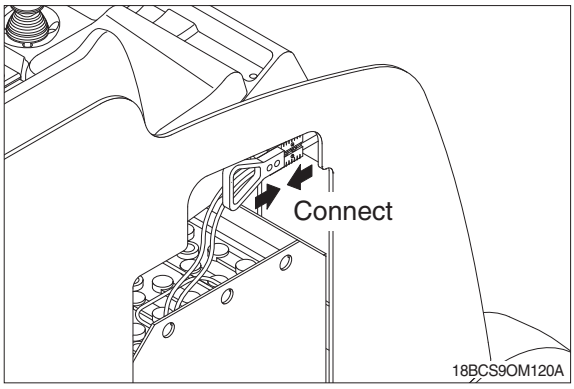
① Using a battery stand carefully put the battery assembly on the battery compartment.



② Place the side plate.



③ Connect the battery connector.



4. STEERING AXLE ASSEMBLY

Battery connector — Inner cover — Harness and hydraulic hose — Steering hyd motor — Tire and rim assy — Steering axle assy

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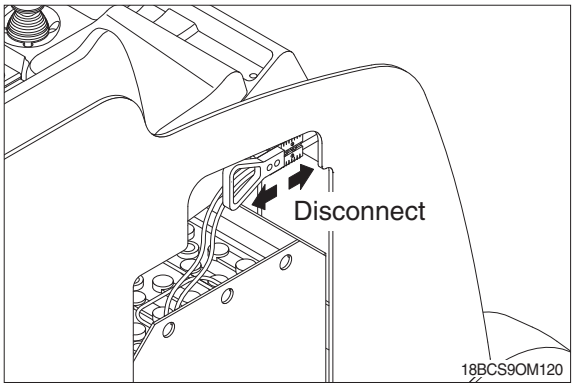
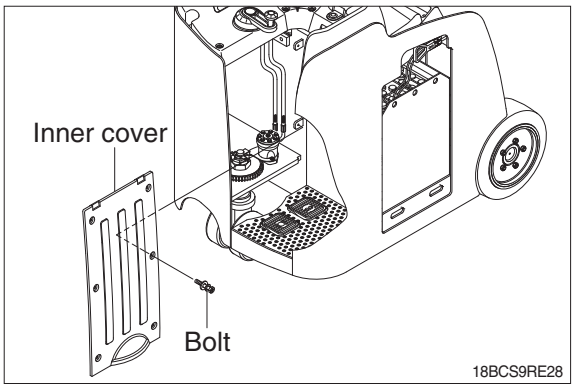
1) REMOVAL

(1) Disconnect the battery cable.



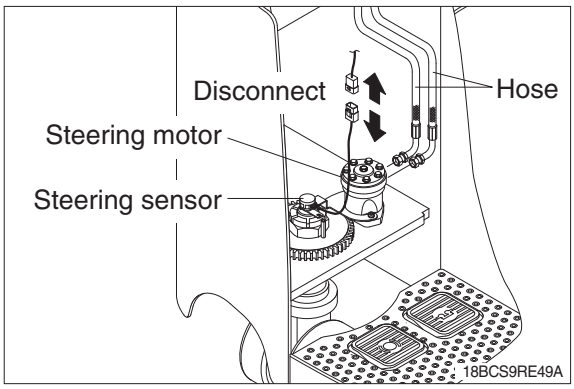
(2) Loosen the bolt and remove the inner cover.



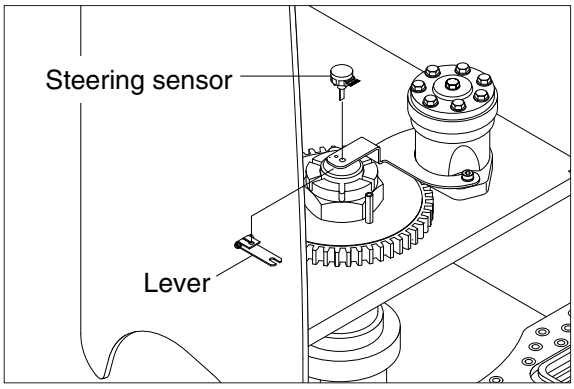
(3) Disconnect the harness from the steering sensor.

(4) Disconnect the hoses from the steering hydraulic motor.

※ Drain the oil before disassembling the steering hydraulic motor.

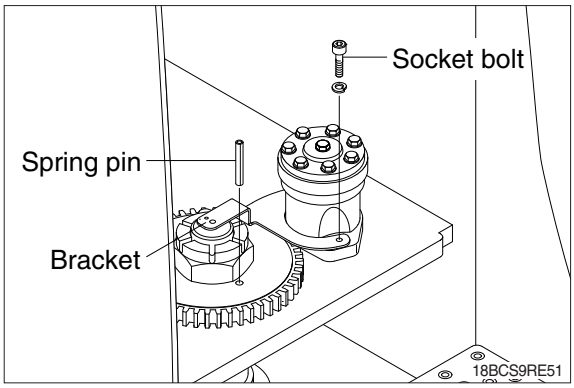


(5) Loosen the nut and remove the steering sensor and lever.



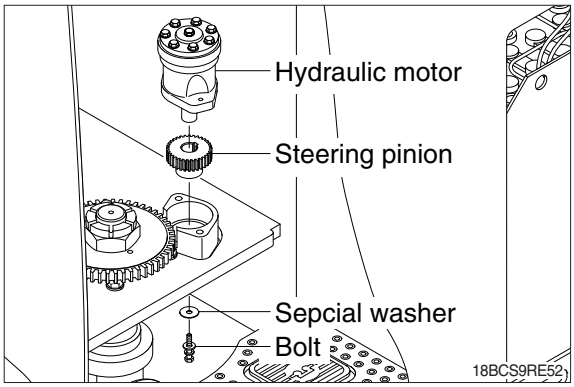
(6) Loosen the socket bolt and remove the bracket.

(7) Pull the spring pin out.

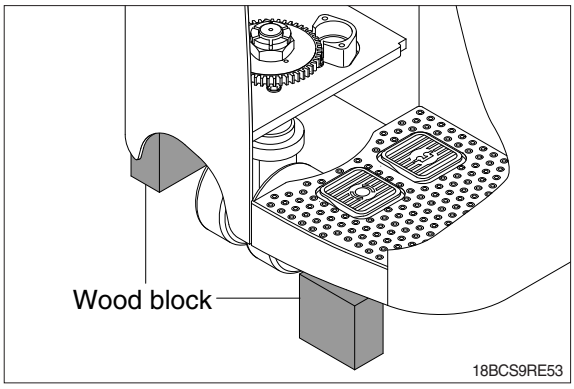


(8) Loosen the bolt and spring washer.

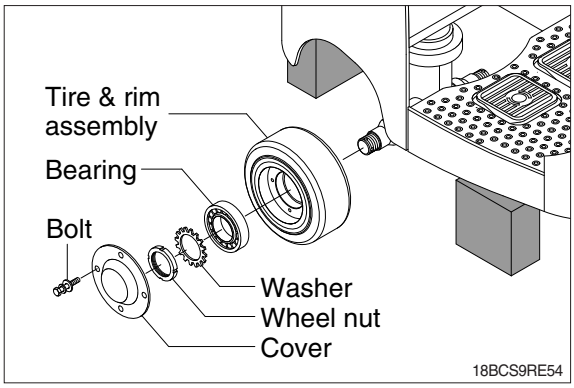
(9) Remove the steering hydraulic motor with steering pinion carefully.



(10) Jack up the frame and support both side of frame on wood block.

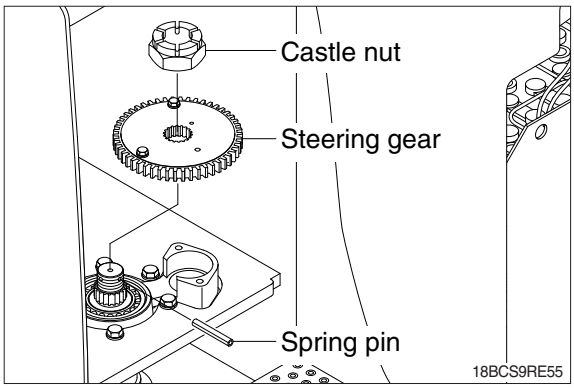


(11) Loosen the wheel nut and remove the tire and rim assembly.



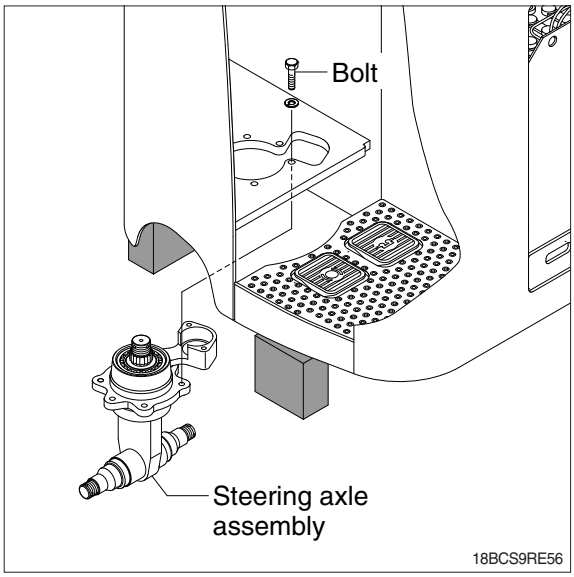
(12) Pull the spring pin out.

(13) Loosen the castle nut and remove the steering gear assembly.



(14) Loosen the bolt and remove the steering axle assembly carefully.

※ Do not use the oil seal twice.

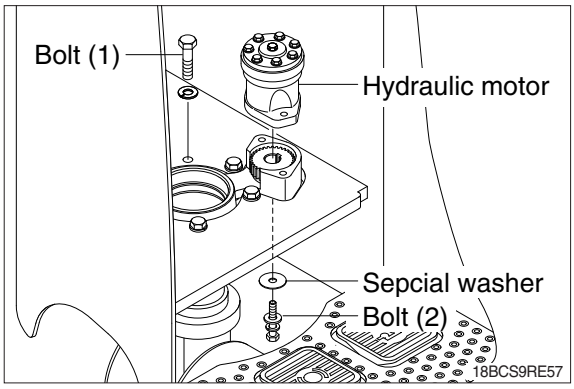


2) INSTALLATION

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

(1) Steering axle assembly mounting bolt (1).
- Tightening torque : 14~18 kgf · m (101~130 lbf · ft)

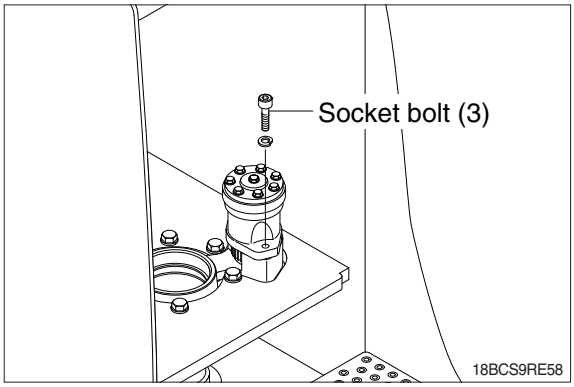
※ Apply loctite #277 on the thread of the bolt before tightening.



(2) Hex bolt (2).
- Tightening torque : 2~3 kgf · m (14.5~21.7 lbf · ft)

(3) Socket bolt (3).
- Tightening torque : 9~12 kgf · m (65.1~86.8 lbf · ft)

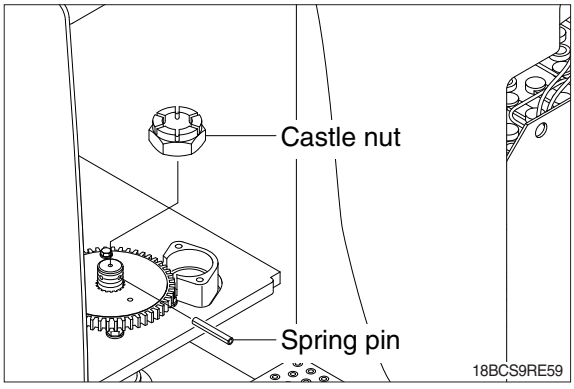
※ Apply loctite #277 on the thread of the bolt before tightening.



(4) Tightening castle nut

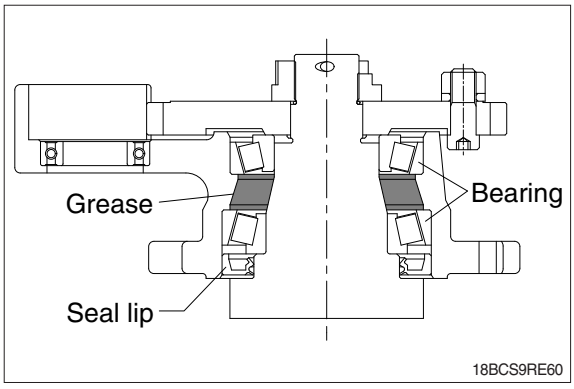
① Tightening the castle nut until the bracket is not rotated and then loosen it reverse direction until the preload becomes 30~35 kgf · cm.

② Fit the spring pin.



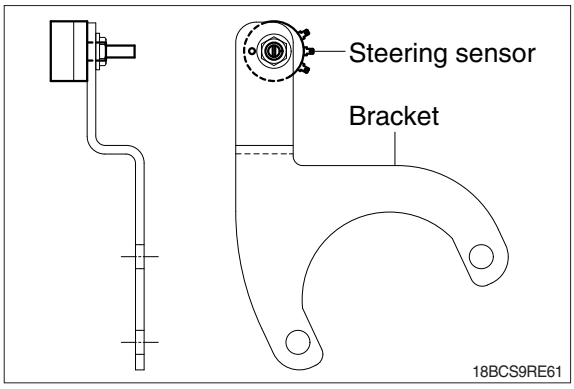
※ Fill the Shell retinax grease up to base line of the upper taper roller bearing (if disassembled).

※ Apply the grease on the surface of the seal lip.

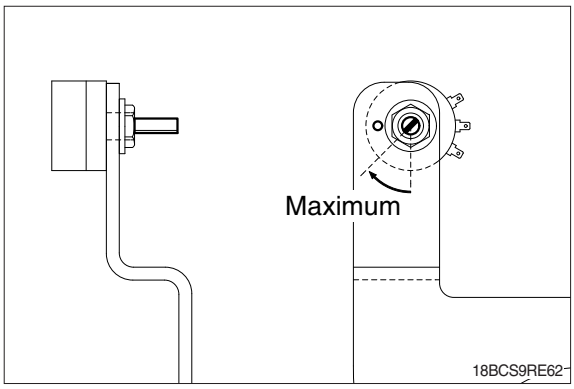


(5) Steering sensor assembling

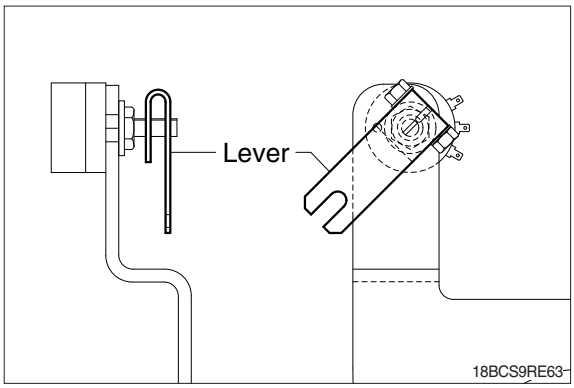
① Fit the steering sensor into the bracket.



② Turn the shaft of the steering sensor clockwise to the maximum.



③ Align the groove of the steering sensor shaft with the lever in a straight line and fit them with the bolt and nut.



④ Install the sub assembly as prepared above to the steering axle bracket.