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GROUP 1 STRUCTURE AND FUNCTION

1. OUTLINE

There are two brake systems, the service brake system and the parking brake system.

1) The drum type service brake and parking brake are installed at the drive motor.

2. SPECIFICATION

lt	em	Specification
Туре		Drum brake
Praka abaa	W×L×T	$40 \times 110 \times 5 \text{ mm} (1.6 \times 4.3 \times 0.2 \text{ in})$
Drake Shoe	Area	44 cm ² (6.8 in ²)
Broke drum diameter	New	120 mm (4.7 in)
Drake drum diameter	Repair limit	117 mm (4.6 in)
Broking distance	Unloaded	Less than 5.0 m (197 in)
Braking distance	Loaded	Less than 2.0 m (79 in)

3. BRAKE PEDAL AND LEVER



15P9BS02

4. DISASSEMBLY AND ASSEMBLY

1) DISASSEMBLY

(1) Front cover

① Remove front cover by loosening the bolts and screws.



(2) Dashboard cover

- ① Disconnect the wiring harness to switches and lamps etc on the dashboard cover.
- ② Loosen the screws and remove the dashboard cover.
- (3) Remove split pin and clevis pin and loosen bolts and then remove the brake pedal assembly.





2) Assembly

Perform disassembly in reverse order.

4. BRAKE SYSTEM

1) STRUCTURE



- 1 Traction motor
- 2 Brake drum
- 3 Brake shoe pin
- 4 Lock plate
- 5 Plain washer
- 6 Hexagon nut
- 7 Brake shoe lining

- 8 Bracket
- 9 Spring washer
- 10 Hexagon bolt
- 11 Adjust spring
- 12 Hexagon bolt
- 13 Hexagon bolt
- 14 Hexagon nut

- . . .
- 15 Adjust nut
- 16 Brake cam
- 17 Clevis pin
- 18 Split pin
- 19 Low castle nut
- 20 Split pin

2) DISASSEMBLY AND ASSEMBLY

(1) Disassembly

① Remove the brake cam carefully from bolt head.



② Remove spring and cam bolts after removing lock nut.



③ Remove lock nut of brake shoe support pin and take off lock plate.



④ Take off brake shoe by lifting up straightly.



⑤ Remove bracket by loosening the mount-ing bolts.



⑥ Remove lock nut and then take off brake drum.



(2) Assembly

 Assemble the brake drum (2), the nut (19) and fit the split pin (20) in order.



- ② Put the bracket (8) and tighten the washers (9) and bolts (10).
 - \cdot Tightening torque : 1.6~1.9 kgf \cdot m (11.6~13.7 lbf \cdot ft)



- ③ Assemble the brake shoe pins (3), brake shoe linings (7), lock plate (4), washers (5) and hex nuts (6) in order.
 - \cdot Tightening torque : 14.6~16.0 kgf \cdot m (106~116 lbf \cdot ft)



- Assemble the brake cam (16), bolt (13), clevis pin (17), washer (5), split pin (18), adjust springs (11) and hex nuts (14) temporary.
- (14) (14) (13) (13) (17) (16) (16) (18) (15P9BS13)
- ⑤ Assemble the bolt (12), adjust nut (15) and nuts (14).
- Adjust the clearance at point X and Y between the brake drum (2) and brake shoe linings (7) by the adjust nut (15).
 - Clearance (X, Y) : 0.5~0.8 mm
- After adjusting the clearance, tighten the nut (14) with fixing the adjust nut (15) by a spanner. Also, tighten the bolts (14, 3EA) in the center.
 - Tightening torque : 2.3~2.8 kgf · m (16.6~20.3 lbf · ft)



- ⑥ Make the assemble dimension (A) to 99 mm by tighten the bolt (14) and adjust the clearance at Z point by loosening the bolt (14), and then tighten the left side bolt (14) with fixing the right side bolt (14) by a spanner.
 - · Clearance (Z) : 0.5~1.0 mm
 - \cdot Tightening torque : 2.3~2.8 kgf \cdot m (16.6~20.3 lbf \cdot ft)
- ⑦ Confirm the clearance (X, Y) and check the operation of the brake cam (16) smoothly.



3) INSPECTION

(1) Lining inspection

- ① Contact normally?
- 2 Any damages?
- ③ Any one sided contact?
- ④ Service limit : 1.5 mm (0.059")
- * Lining should be replaced together with brake shoe.

(2) Brake drum inspection

- ① Any damage or wear?
 - If so, plane the drum for revising.
- ② Drum die should not exceed ; under 3 mm (0.012")

(3) Spring inspection

① Are the springs weakened or damaged?

5. BRAKE VALVE (NON-BOOSTER BRAKE, STD)

1) STRUCTURE



22D9BS04

1 Rod assy

Snap ring

Boot

Body

2

3

4

- Union
- 7 Elbow
- O-ring
- 8

6

- 11 Secondary cup
- 5 Piston
- 12 Primary cup
- 2) DISASSEMBLY
- (1) Remove the master cylinder boot (2) and remove the rod assy (1).
- (2) Remove the snap ring (3) and take out the piston (5), the secondary cup (11), primary cup (12), spring (13) and spring seat (14, 15).

13

14

15

Spring

Spring seat

Spring seat

- (3) Specification of master cylinder.
 - · Piston bore diameter : 22.23 mm (0.88")
 - Piston stroke : 28 mm (1.1")
 - · Max operating pressure : 150 kgf/cm² (2130 psi)

3) INSPECTION

- (1) Clean and check these components.
- * Use Isopropyl alcohol or brake fluid for washing the components. Do not use gasoline, kerosene or any other mineral oils. When using alcohol, do not leave urbber parts in the liquid for more than 30 seconds.
- (2) Inspect the inside wall of the master cylinder, and if any faults are found, replace the cylinder assembly.
- (3) Replace the boot (2), the secondary cup (11), primary cup (12) and piston (5), if deformation or any other defect is found.

4) ASSEMBLY

- * Prior to assembly make sure again of no contaminant of the components. Apply a thin coat of brake oil to the components.
- * Assembly is in opposite order to disassembly.

GROUP 2 OPERATIONAL CHECKS AND TROUBLESHOOTING

1. OPERATIONAL CHECKS

1) BRAKE PEDAL OPERATION

- (1) Once the pedal released, the machine must remain stopped.
- (2) Check the play of pedal is $30 \sim 35 \text{ mm} (1.18 \sim 1.37 \text{ in})$.
- (3) Check the pedal height is 124~127 mm (4.9~5.0 in).

2) BRAKE SYSTEM OPERATION

- (1) Check the operation of brake cam.
- (2) Measure lining at point with most wear, and check that lining thickness is at least 2.0 mm (0.08 in).
- (3) Measure inside diameter of drum and check that it is within the specification limit. (see 4-1 table)

3) BRAKING FORCE

- (1) Select a dry, flat, paved surface and drive truck at maximum speed when signal is given, stop truck immediately and measure distance from point where signal was given to point where truck stopped. (Unloaded)
 - Stopping distance : Within 5 m (16' 5")
- (2) Check that there is no pulling of steering wheel, pulling by brakes to one side or abnormal noise when making emergency stops.

4) CHECK FOR THE OIL LEVEL OF THE DRIVING GEAR CASE

Check for the oil level by taking out the oil level plug provided front side of the gear case.



5) OIL CHANGE & FILL OF DRIVE UNIT

- (1) Oil change
- ▲ Do not drain drive unit oil into the soil or the sewerage system. Pay attention to the type and quantity of debris.
- A High oil temperatures are to be expected after continuous operation of the drive unit. Wear temperature-resistant gloves!
- Position the vehicle on even ground and lock the wheels for safety purposes.
- Carefully clean the area around the oil filler and oil drain plug.
- Place a suitable big oil collecting vessel under the oil drain plug.
- Loosen the oil filler plug with a allen wrench. Remove the oil filler plug.
- Loosen the oil drain plug with a allen wrench. Remove the oil drain plug.
- Have the oil drained into the vessel completely.

(2) Fill in the drive unit oil

- Clean magnet on the oil drain plug.
- Fill in the drive unit oil. (Refer to page 1-12)
- For filling use a suction and pressure injector. This allows an easy and rapid filling of the drive unit with oil.
- The correct oil level and the correct oil quantity is achieved when the oil level is at the lower edge of the oil level plug, at least when oil penetrates at the level plug.
- Attach the oil filler plug.

6) EXTERNAL APPEARANCE CHECK OF THE VEHICLE

Check for the external appearance of vehicles. If any defect is found immediately contact the service station.





2. TROUBLESHOOTING

Problem	Probable cause	Remedy
Brake drags	 Brake spring out of adjustment. Brake spring broken. Brake drum worn or rusted. Brake switch defective. Brake pedal play excessive. Brake lining insufficient contact. Motor shaft key broken. Motor shaft damage. 	 Check and adjust. Replace. Check, and replace if defective. Check, and replace if defective. Adjust brake pedal play. Adjust and replace if defective. Replace. Replace.
Poor braking effect	 Brake spring out of adjustment. Brake spring broken or deteriorated. Brake pedal play excessive. Faulty return due to rusting of parts. Brake shoes worn. 	 Check and adjust. Replace. Adjust brake pedal play. Disassemble and clean or replace. Replace.
Brake squeaks	 Brake shoe glazed or dirty, brake shoe worn, brake dust accumlation. Brake drum warped or scored. Defective adhesion between brake shoe and lining. 	 Replace brake shoe, clean brake drum circumference. Repair or replace. Replace.
Brake shoe not releasing	Heavy tightening of stopper.	· Adjust.

GROUP 3 TEST AND ADJUSTMENT

1. BRAKE PEDAL AND CABLE

- 1) Check the pedal height and adjust the stopper bolt if the height is too high or too low.
 - · H : 124~127 mm (4.9~5.0 in)
- 2) Adjust the pedal stroke
 - · P : 30~35 mm (1.18~1.37 in)
- * There should be no play in the brake linkage.
- 3) Check the brake switch to be operating condition while the pedal is depressed.





4) To adjust brake linkage or plays, check out the adjust points as shown in the figure.

2. BRAKE SYSTEM

- 1) Check the gap between brake cam and adjusting bolt.
 - X, Y : 0.5~0.8 mm (0.02~0.03 in)

If the gap is too wide or narrow adjust the adjust nut.

- 2) After adjusting the nut fasten lock nut as following torque.
 - Lock nut tightening torque
 2.3~2.8 kgf · m (16.6~20.3 lbf · ft)
- 3) Check the distance "D" is 99 mm (3.9 in).
 If the distance is far from above dimension, adjust the nut and the fasten lock nut.
 Z: 0.5~1.0 mm (0.02~0.04 in)
- * Refer to the assembly clause for details.

