SERVICE MANUAL

LOADER
403

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This manual contains original instructions, verified by the manufacturer (or their authorized representative).

Foreword

The Operator's Manual

⚠

You and others can be killed or seriously injured if you operate or maintain the machine without first studying the Operator's Manual. You must understand and follow the instructions in the Operator's Manual. If you do not understand anything, ask your employer or JCB dealer to explain it.

Do not operate the machine without an Operator's Manual, or if there is anything on the machine you do not understand.

Treat the Operator's Manual as part of the machine. Keep it clean and in good condition. Replace the Operator's Manual immediately if it is lost, damaged or becomes unreadable.

Contents

00 - General

Health and Safety

Brake Fluid

Use of incorrect brake fluid will cause serious damage to the seals of the braking system. This will result in brake failure.

Accumulators

The accumulators contain hydraulic fluid and gas at high pressure. Prior to any work being carried out on systems incorporating accumulators, the system pressure must be discharged by a JCB dealer, as the sudden release of the hydraulic fluid or gas may cause serious injury or death.

Service Brake Bleeding

Before bleeding the service brake system, park on level ground and set the park brake to on. Put blocks on both sides of the wheels on one axle to prevent the machine rolling. Stop the engine and disconnect the battery so that the engine cannot be started. If you do not take these precautions the machine could run over you.

Park Brake Maintenance

Before working on the park brake, park on level ground and put blocks on both sides of all wheels to prevent the machine rolling. Stop the engine and disconnect the battery so that the engine cannot be started. If you do not take these precautions the machine could run over you.

Working Under the Machine

Make the machine safe before getting beneath it. Make sure that any attachments on the machine are correctly attached. Engage the park brake, remove the ignition key, disconnect the battery. If the machine has wheels use blocks to prevent unintentional movement.

Brake Dust

Brake pads generate dust, which if inhaled may endanger health. Wash off the caliper assemblies before commencing work. Clean hands thoroughly after completing the work.

Brake Dust

Brake shoes generate dust, which if inhaled may endanger health. Make sure that dust is removed correctly, particularly before installing new components. Clean hands thoroughly after completing the work.

Springs

Always wear personal protective equipment when dismantling assemblies containing components under pressure from springs. This will protect against eye injury from components accidentally flying out.

Notice: *Using incorrect fluid could damage the system. See Fluids, Capacities and Lubricants for*

the correct fluid. The fluid can harm your skin. Wear rubber gloves. Cover cuts or grazes.

WARNING! *Before working on the brake system, make sure that the machine is on solid level ground. Put blocks on all wheels to prevent the machine rolling.*

WARNING! *Do not use the machine with any part of its brake system disconnected or inoperative. When the test has been completed, make sure all brake system components are installed and the system is operating correctly.*

WARNING! *Before testing the park brake make sure the area around the machine is clear of people.*

WARNING! *If the machine starts to move during the park brake test, immediately apply the foot brake and reduce the engine speed.*

WARNING! *If the machine starts to move during the service brake test, immediately reduce the engine speed and apply the park brake.*

WARNING! *Do not use a machine with a faulty park brake.*

WARNING! *Non approved modifications to drive ratios, machine weight or wheel and tyre sizes may adversely affect the performance of the park brake.*

WARNING! *Oil on the brake disc will reduce brake effectiveness. Keep oil away from the brake disc. Remove any oil from the disc with a suitable solvent. Read and understand the solvent manufacturer's safety instructions. If the pads are oily, install with the new pads.*

WARNING! *Faulty brakes can kill. If you have to top up the brake oil reservoir frequently, get the brake system checked by your JCB Dealer. Do not use the machine until the fault has been put right.*

WARNING! *The park brake must not be used to slow the machine from travelling speed, except in an emergency, otherwise the efficiency of the brake will be reduced. Whenever the park brake has been used in an emergency the brake friction components must be renewed and the other components inspected.*

Notice: *Over adjustment or failure to disengage the park brake properly will cause excessive wear of the park brake mechanism.*

Technical Data

Table 43. Brake Shoes Wear Limit

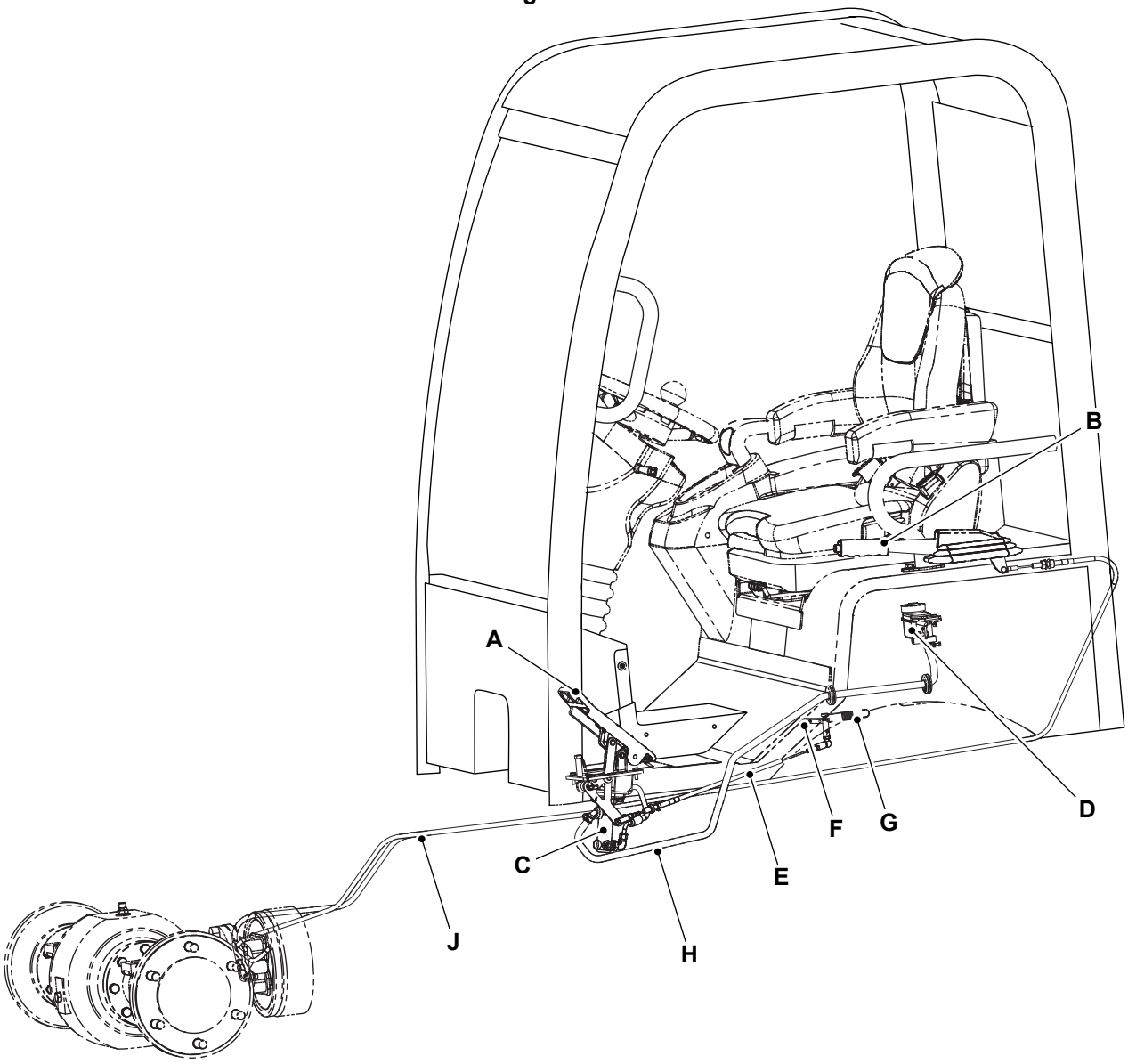
Type	Wear Limit
Riveted brake shoes	1.5 mm above rivet head at thinnest point of the lining.
Glued brake shoes	2 mm at thinnest point of the lining.

Table 44. Brake drum Wear/Machining Limit

Diameter When New	Wear/Machining Limit
203 mm	204.5 mm

Component Identification

Figure 161.



A Brake pedal
B Park brake lever
C Brake master cylinder
D Brake fluid tank
E Foot brake inching cable
F Swing arm
G Return spring
H Brake line
J Master cylinder to front axle hose

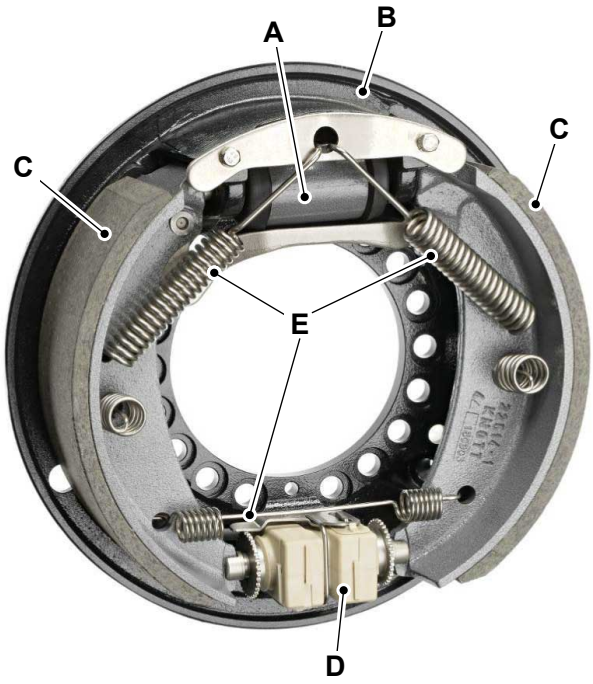
Operation

The brake is operated by pressing the foot pedal which is connected to the master cylinder. Brake fluid is forced from the master cylinder into the wheel cylinder which pushes two brake shoes against the drum. One brake shoe, (primary brake shoe) is taken in the direction of rotation of the brake drum. The second brake shoe, (secondary brake shoe) aligned by the floating power transmission of the automatic adjustment unit, is blocked against a fixed point at the top of the brake back plate or the wheel cylinder.

By the supplementary force of the primary shoe, the so-called “self-energization” (servo effect) of the brake is generated. The braking efficiency is almost the same in both directions.

When the brake pedal is released the tension springs overcome the pressure in the wheel cylinder forcing brake fluid to return to the reservoir and pulling the brake shoes away from the brake drum.

Figure 162.

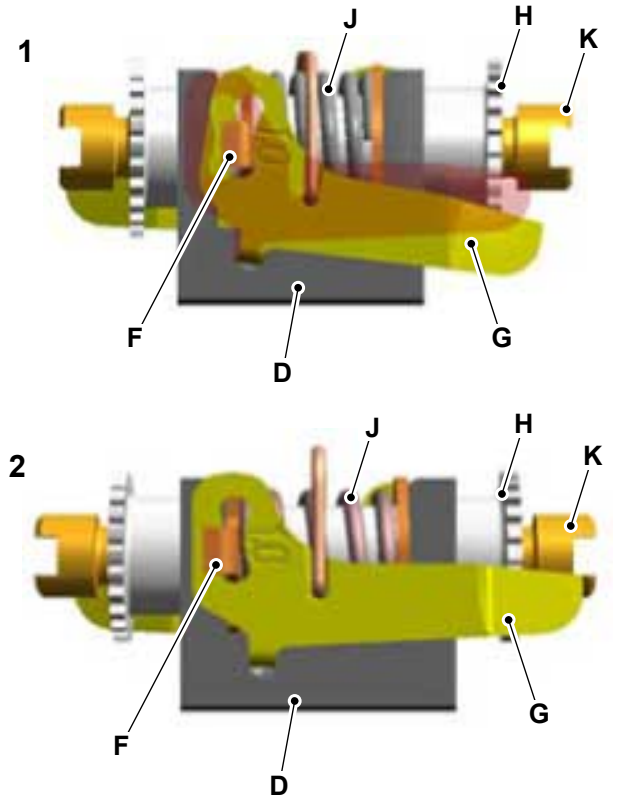


A Wheel cylinder
B Back plate
C Brake shoes
D Automatic adjustment unit (with protective cover)
E Tension springs

The brake incorporates an automatic adjustment unit in order to maintain correct clearance between the brake shoes and the brake drum.

The washer actuates the adjustment lever downward until it skips one or more teeth of the adjustment wheel, depending on the required adjustment distance. When the brake is released, the adjustment lever is returned to the neutral position (horizontal) by the force of the compression spring, turning the adjustment wheel one or more teeth further. The adjustment pin is screwed out by the thread of the adjustment wheel, adjusting the brake shoe to brake drum clearance.

Figure 163.



1 Actuated brake
2 Released Brake
D Automatic adjustment unit
F Washer
G Adjustment lever
H Adjustment wheel
J Compression spring
K Adjustment pin

Adjust

The brake assembly incorporates an automatic adjuster that maintains the correct clearance between the brake shoes and the brake drum. Adjustment is only required after component replacement.

1. Make the machine safe.

   Refer to: PIL 01-03.

2. If necessary raise and support the machine safely.

3. Release the park brake. Make sure that the machine is prevented from moving.

4. Disconnect the park brake cable.

5. Remove the propshaft.

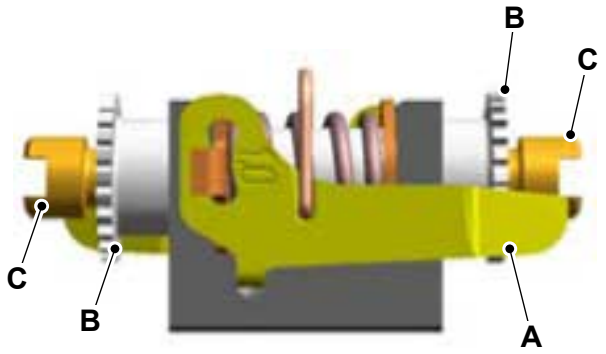
   Refer to: PIL 27-47-00.

6. Remove the brake drum and the brake shoes.

   Refer to: PIL 24-00-00.

7. Carefully lift up the adjustment lever with a suitable tool so that the adjustment wheel can easily be turned.

Figure 164.

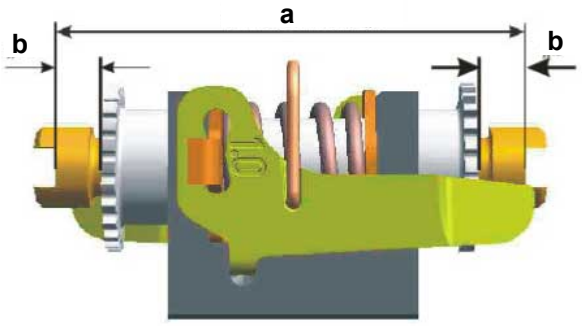


A Adjustment lever
B Adjustment wheel
C Adjustment pin

8. Turn the adjustment wheels until the dimension 'a' is at the specified distance.

   Length/Dimension/Distance: 60 mm

Figure 165.



a Dimension 'a'
b Dimension 'b'

8.1. Make sure that the dimensions 'b' are symmetrical.

9. Install the brake shoes.

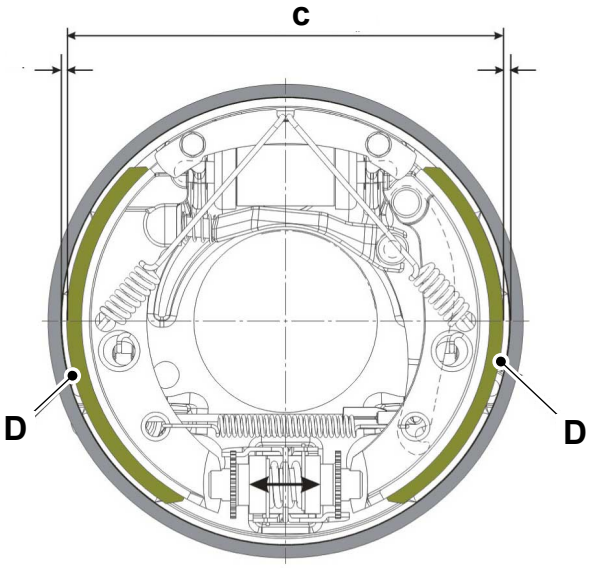
   Refer to: PIL 24-00-00.

10. Turn the adjustment wheels until the dimension 'c' is at the specified distance.

    Length/Dimension/Distance: 201.8 ± 0.2 mm

10.1. Exact adjustment of the shoe position is of critical importance for the operation of the automatic adjustment unit. If the adjustment is too small, this could result in damage to the adjustment unit.

Figure 166.



c Dimension 'c'
D Brake shoes

11. Connect the park brake cable.

11.1. The park brake cable must not be pre-tensioned as this will prevent proper operation of the automatic adjustment unit.

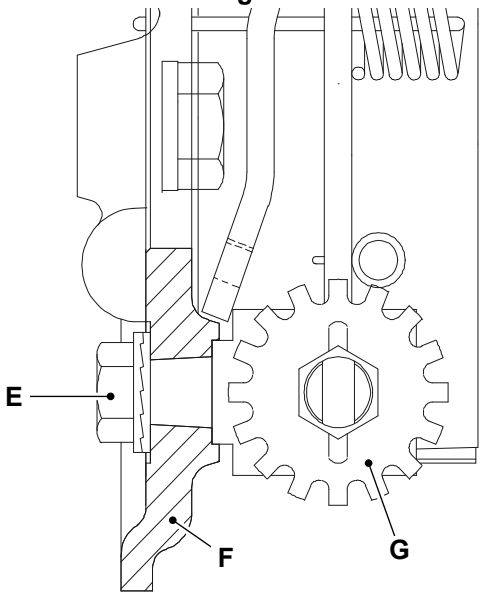
12. Install the brake drum.

    Refer to: PIL 24-00-00.

    12.1. The brake drum should be able to rotate freely.

13. Loosen the mounting bolt for the automatic adjustment unit.

Figure 167.



E Bolt
F Brake back plate
G Automatic adjustment unit

14. Operate the brake several times using either the service brake or the park brake to make sure that the brake shoes and adjustment unit are centered in the brake drum.

15. Tighten the bolt to the correct torque value.

16. Install the propshaft.

    Refer to: PIL 27-47-00.

17. If necessary, lower the machine.

18. Perform 10 braking actions using the service brake in forward and reverse directions. Do not use hard braking force.

Table 45. Torque Values

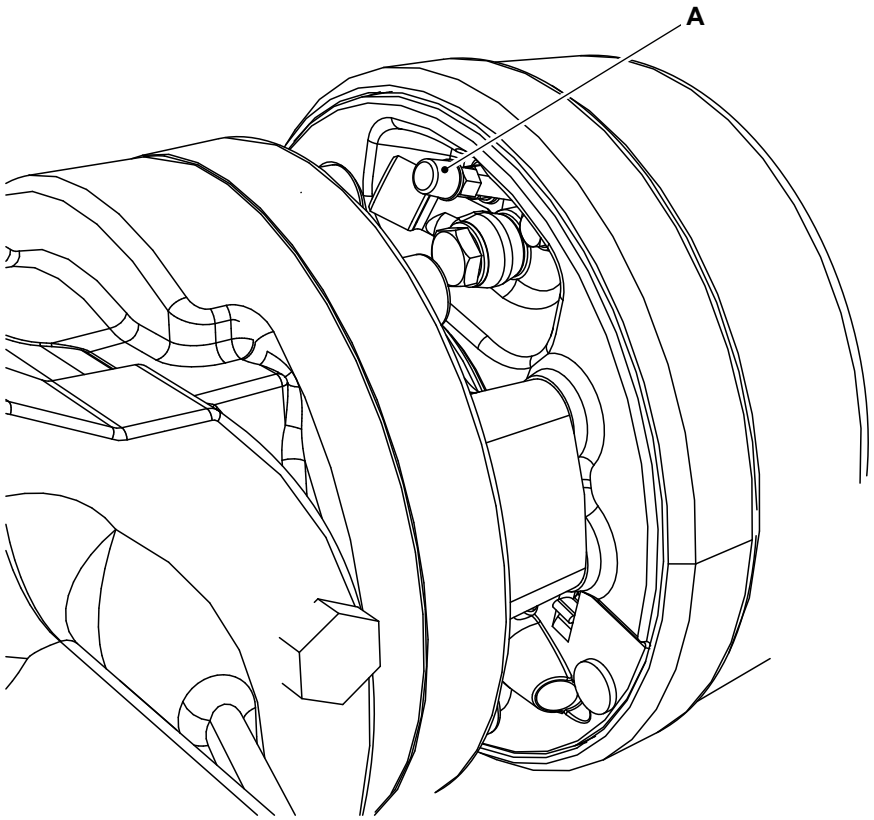
Item	Nm
E	53

Bleed

1. Make the machine safe. Refer to (PIL 01-03).
2. Chock the wheels.
3. Make sure that the fluid level is maintained above the minimum level.
4. Install bleed pipe to the bleed screw of the brake.
5. Loosen the bleed screw.
6. Fully stroke the brake pedal at a controlled rate of approximately 50 mm/sec.
7. Close the bleed screw.
8. Fully release the brake pedal at a controlled rate of approximately 50 mm/sec.
9. Open the bleed screw.
10. Do steps 6 to 9 ten times or until there are no air bubbles visible in the brake fluid return line.
11. Tighten the bleed screw to the specified torque value.

    Torque: 2.5 –4 N·m
12. Check the brake pedal travel. Refer to (PIL 24-03).
13. Fill the tank with brake fluid up to the maximum level.
14. Recharge the brake system.

Figure 168.



A Bleed screw

Disassemble and Assemble

Special Tools

Description	Part No.	Qty.
Clamping device	334/D2062	1

Disassemble

1. Make the machine safe. Refer to (PIL 01-03).
2. Remove the front axle from the machine. Refer to (PIL 27-20).
3. Identify the brake unit installed on your machine.
4. Mount the axle on a suitable stand.

Hydraulic Servo Brake

1. Remove the plastic protection caps.

Figure 169.

2. Use a screwdriver or a suitable adjusting tool to turn back the adjuster unit.

Figure 170.

3. Loosen the cylindrical screws (x2).
4. Remove the brake drum.

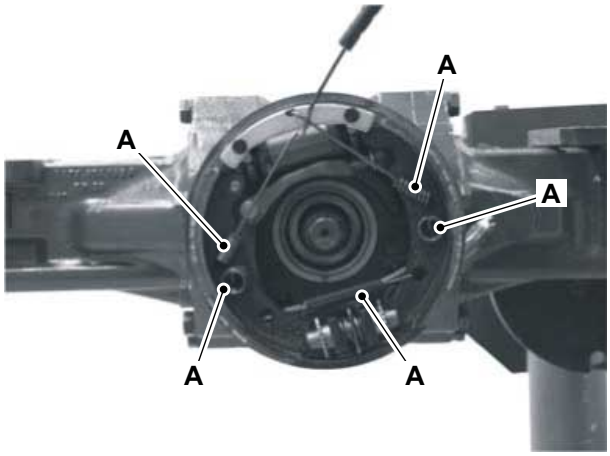
Figure 171.

5. Loosen the bolt connection.

Figure 172.

   5.1. Use the specified tool to remove the flange.
   Special Tool: Clamping device (Qty.: 1)
   5.2. The bolted connection is secured with Loctite.
6. Remove all compression and tension springs.
7. Remove the brake shoes.

Figure 173.

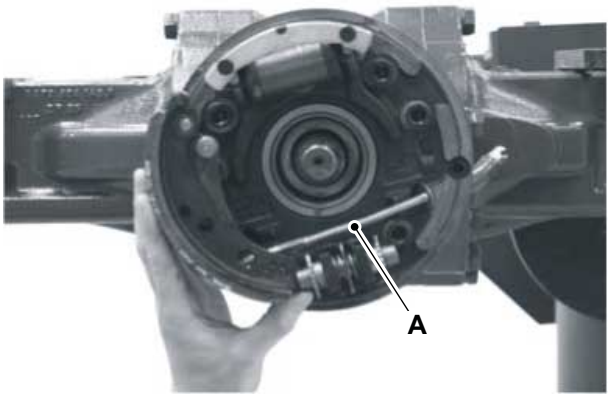


A Tension springs

7.1. Make sure that the tappet with compression spring and washer does not fall down.

8. Remove the park brake cable.

Figure 174.



A Brake cable

9. Loosen the bolts from the brake anchor plate connection.

10. Remove the brake anchor plate assembly.

Figure 175.

11. Loosen the bolted connection.

12. Remove the brake carrier.

Figure 176.

12.1. Remove the shaft seal ring from the brake carrier.

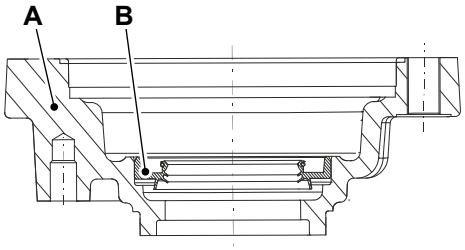
Assemble

Hydraulic Servo Brake

1. Install the shaft seal with a suitable plate.

Figure 177.

Figure 178.



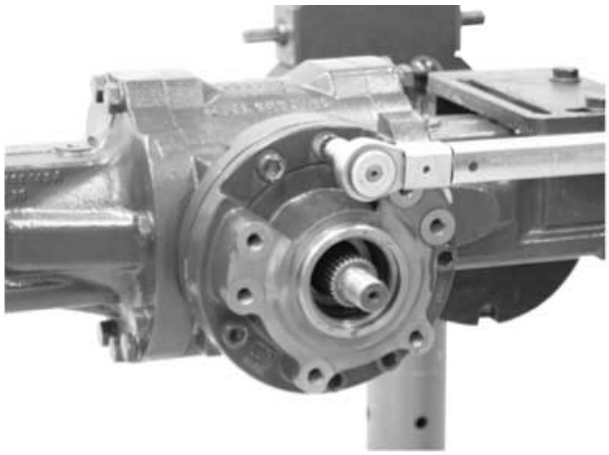
A Plate
B Shaft seal

1.1. Apply spirit to the contact face of the shaft seal.

1.2. Apply grease type PETAMO GHY 133 on the shaft seal in the area of the dust lip and sealing lip.

2. Apply grease to the O-ring.
3. Install the O-ring to the axle drive housing.
4. Install the brake carrier.
5. Install the cylindrical screws.

Figure 179.



5.1. Tighten the cylindrical screws to the correct torque value.

Torque: 125 N·m

6. Install the pre-assembled brake anchor plate with cylindrical screws.

Figure 180.

6.1. Tighten the cylindrical screws to the correct torque value.

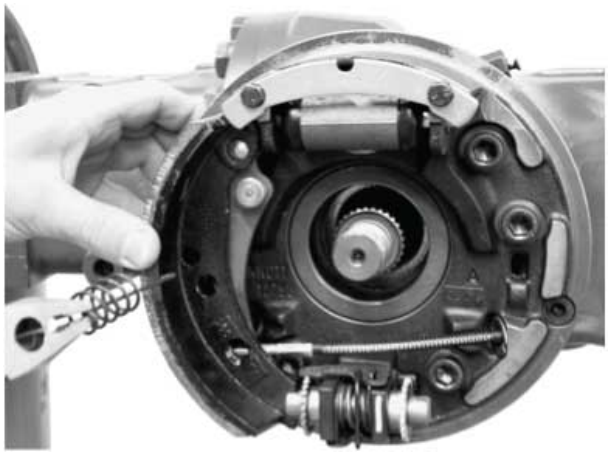
Torque: 115 N·m

7. Install the cable on the bracket of the brake shoe.

Figure 181.

8. Position the brake shoe and install it with compression spring (hold-down device).

Figure 182.



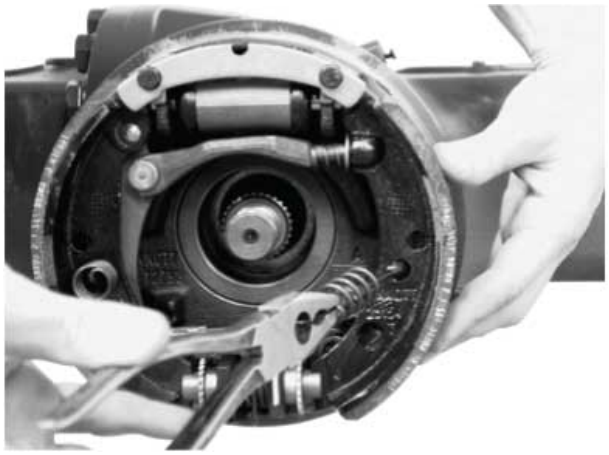
9. Position the tappet.
10. Install the compression spring and washer.

Figure 183.

10.1. Make sure that the installation position of tappet is correct. The bend must face upwards.

11. Position the second brake shoe correctly.
12. Install the brake shoe with the compression spring.

Figure 184.



12.1. Install the tappet with compression spring and washer.

13. Interlock both tension springs in the brake shoes and install them on the spring holder.

Figure 185.

13.1. Install the lower tension spring.

14. Install the stud bolts into the flange.

Figure 186.

14.1. Tighten the stud bolts to the correct torque value.

Torque: 17 N·m

15. Install the flange.

16. Install the washer and the new locknut.

Figure 187.

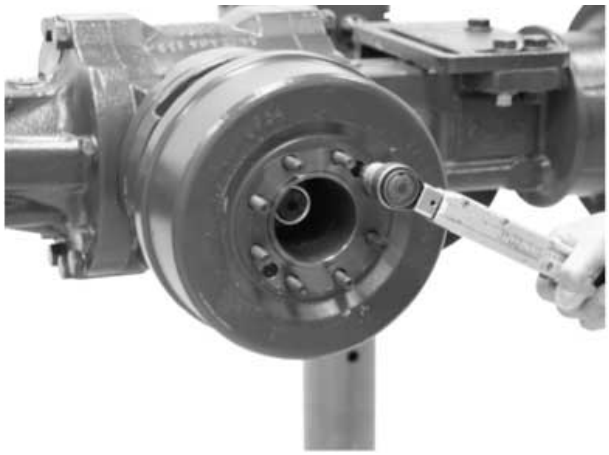
16.1. Tighten the locknut to the correct torque value.

Torque: 450 N·m

17. Install the brake.

18. Install the cylindrical screws.

Figure 188.



18.1. Tighten the cylindrical screws to the correct torque value.

Torque: 9.5 N·m

19. Adjust the setting of the adjuster unit. Refer to (PIL 24-00).

Figure 189.

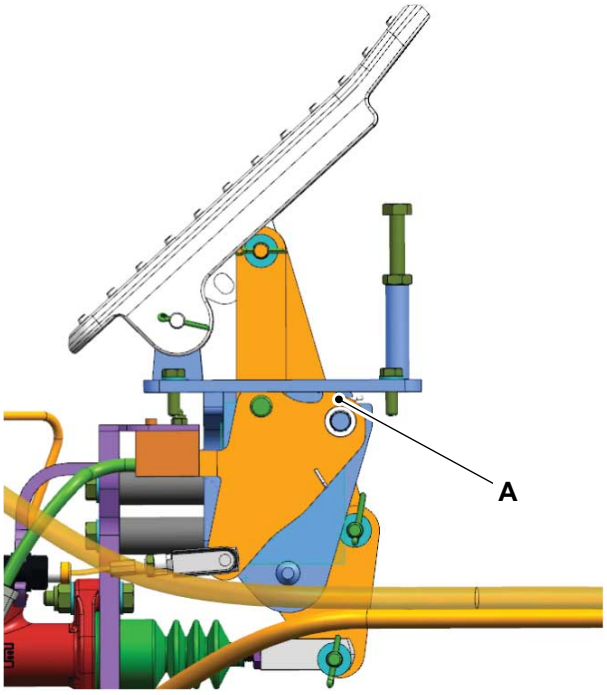
01 - Master Cylinder

Adjust

1. Make the machine safe. Refer to (PIL 01-03).
2. Remove any unwanted materials from the cab floor.
3. Remove the floor mats (if installed). Refer to (PIL 09-48).
4. Remove the brake pedal guard. Refer to (PIL 06-06-13).
5. Remove the pin and disconnect the push rod from the bell crank.
6. Lift the pedal to the off position so that the stop on the inching bell crank hits the base plate. Refer to Figure 190.
7. Make sure that the pedal is at the specified angle to the floor.

   Angle: 42 °
8. Make sure that the braking bell crank is at the bottom of the inching slot. Refer to Figure 191.

Figure 190.



A Bell crank stop

9. Adjust the push rod by turning the nut so that the holes on the bell crank and the push rod line up.
10. Tighten the nut.
11. Insert the pin through the hole.

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