

Section G



Brakes

Service Manual - Side Engine Loadalls

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Applications

Table

Important: The machine model names are NOT referred to in the topics. You must refer to the applications table for the applicable machine models.

Table entries shaded grey indicate a topic not included in this issue of the manual.

| Topic Ref | Title | Variant | Machine models | | | | | | |
|-----------|--|--------------------------------|--------------------|--------------------|--------------------|--------------------|---------|--------------------|--------|
| | | | 531-70, 531-T70 | 535-95, 535-T95 | 536-60, 536-T60 | 541-70, 541-T70 | 533-105 | 536-70, 536-T70 | 526-56 |
| G1 | Single Axle Service Brakes SYSTEM | | ● | ● | ● | ● | ● | ● | ● |
| G2 | External Park Brake SYSTEM | PS750 and SS700 Gearbox System | ● | ● | ● | ● | ● | ● | ● |
| G3 | Internal Park Brake SYSTEM | PS760 Gearbox Systems | ● | ● | ● | ● | | ● | |
| G4 | Park Brake Calliper | PS750 and SS700 Gearbox System | ● | ● | ● | ● | ● | ● | ● |
| G5 | Park Brake Disc | PS750 and SS700 Gearbox System | ● | ● | ● | ● | ● | ● | ● |
| G6 | Park Brake Switch | | ● | ● | ● | ● | ● | ● | ● |
| G7 | Servo Exhauster Unit | | ● | ● | ● | ● | ● | ● | ● |
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| G9 | Master Cylinder | | ● | ● | ● | ● | ● | ● | ● |
| G10 | Fluid Reservoir | | ● | ● | ● | ● | ● | ● | ● |



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Single Axle Service Brakes SYSTEM

Introduction

This topic contains information about a machine SYSTEM. The system has some devices that connect either mechanically, hydraulically or electrically. Make sure you are referring to the correct system. Refer to the applications table.

Descriptions and procedures relate to the system and not the individual devices. For information about the devices refer to the relevant topics.

This topic is intended to help you understand what the system does and how it works. Where applicable it also includes fault finding, test and service procedures.

⇒ [Related Topics \(□ G1-2\)](#)

⇒ [Specifications \(□ G1-3\)](#)

⇒ [Operation Overview \(□ G1-4\)](#)

⇒ [Fault Finding \(□ G1-5\)](#)

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⇒ [Brake Light Switch - \(Proximity Type\) \(□ G1-15\)](#)

⇒ [Adjustment \(□ G1-15\)](#)

⇒ [Brake Light Switch \(Reed Type\) \(□ G1-16\)](#)

⇒ [Operation \(□ G1-16\)](#)

Related Topics

Table 1. Related Topics in This Publication

| <p>The table lists other topics in the manual that contain information related to this topic. Refer to the applicable topics to complete your procedures. Where applicable the text in this section contains cross references to this page to help you find the correct information. Some machines have different systems and devices. Make sure you refer to the correct topic, refer to <i>Section 1 - Applications</i>.</p> | | |
|--|---|--|
| Sections | Topic Titles | Sub Titles |
| 1 | Applications | ALL |
| 1 | Service Tools | ALL |
| 2 | ALL (Care and Safety) ⁽¹⁾ | ALL |
| 3 | Routine Maintenance | Checking the Foot Brake Fluid Level |
| G | ⇒ Servo Exhauster Unit (□ G7-1) | ALL |
| G | ⇒ Servo Unit, Single Axle Brakes (□ G8-1) | ALL |
| G | ⇒ Master Cylinder (□ G9-1) | ALL |
| G | ⇒ Fluid Reservoir (□ G10-1) | ALL |

(1) You must obey all of the relevant care and safety procedures.

Table 2. Related Topics in Publication 9803/8610, Transmissions

| <p>The table lists topics in another manual that contain information related to this topic. Refer to the applicable topics to complete your procedures. Where applicable the text in this section contains cross references to this page to help you find the correct information. Some machines have different systems and devices. Make sure you refer to the correct topics.</p> | | |
|---|----------------------|-------------------------------|
| Sections | Section Titles | Topic Titles |
| C | Axle Integral Brakes | 55, 70 Series Integral Brakes |

Table 3. Service Tools

| <p>The table lists the service tools you will need to do some of the procedures in this topic. Make sure you have the correct service tools BEFORE you start the procedures</p> | |
|---|---|
| Tool Part Number | Description |
| 892/00223 ⁽¹⁾ | Hand Pump and Relevant Adaptors/Hoses |
| 892/00253 ⁽¹⁾ | Hydraulic Pressure Test Kit and Relevant Adaptors |
| | Vacuum Gauge |
| | 'T' Adaptor |
| | Vacuum Hoses |

(1) Tool available from JCB Service, refer to Section 1 - Service Tools

Specifications

Table 4.

| Service Brakes: | |
|-----------------------------------|--|
| Type | Single circuit, oil-immersed multi-plate disc. |
| Actuation | Hydraulic |
| | Hydraulic, servo assisted ⁽¹⁾ |
| Location | Front axle, centre mounted (2 brake packs). |
| Master Cylinder: | |
| Type | Master cylinder |
| | Master cylinder with remote servo unit. ⁽¹⁾ |
| No. of Cylinders | 1 |
| Stroke | 35 mm (1.38 in) |
| | 25 mm (1.0 in) ⁽¹⁾ |
| Servo Unit: ⁽¹⁾ | |
| Type | Vacuum assisted hydraulic valve. |
| Vacuum cylinder diameter | 135 mm (5.33 in) |
| Hydraulic cylinder diameter | 19 mm (0.75 in) |
| Brake vacuum pressure | 0.8 - 1 bar negative (vacuum) |

⁽¹⁾ Machines with turbo intercooled engines.

Operation Overview

Service Brakes: The service brakes act on the front axle half shafts of all machines. The brakes are oil immersed, multi-disc types which are operated hydraulically by a single pedal and master cylinder arrangement. On machines with servo assisted brakes, an exhaustor (vacuum) unit is fitted on the engine to power the servo unit.

The brake cylinder reservoir is situated outside of the cab, below the front windscreen.

Auto 4 Wheel Braking: 4-wheel braking is achieved by engaging 4-wheel drive. In this way all 4 wheels are effectively braked via the machine transmission.

With 2-wheel drive selected, pressing the brake pedal will automatically select 4-wheel drive. This gives increased braking effect. The transmission will switch back to 2-wheel drive when the brake pedal is released.

Fault Finding

Note: The brakes generate a high temperature when operating, this means that the casing will be hot to touch, this condition is normal.

Fault(s)

⇒ [Table 5. One or more brakes do not apply. \(Brake travel not excessive, brakes not pulling to one side\) \(□ G1-5\)](#)

⇒ [Table 6. Pedal travel excessive \(but not touching floor\) \(□ G1-5\)](#)

⇒ [Table 7. Pedal hard to operate \(□ G1-5\)](#)

⇒ [Table 8. Pedal touches floor under constant pressure - no fluid loss \(□ G1-6\)](#)

⇒ [Table 9. Pedal touches floor under constant pressure and fluid loss \(□ G1-6\)](#)

⇒ [Table 10. Poor braking \(not pulling to one side\) \(□ G1-6\)](#)

⇒ [Table 11. Brakes not releasing \(□ G1-6\)](#)

⇒ [Table 12. Poor braking when hot \(□ G1-7\)](#)

⇒ [Table 13. Excessive brake noise in operation \(□ G1-7\)](#)

⇒ [Table 14. Fluid loss when machine standing for instance - overnight \(□ G1-7\)](#)

Table 5. One or more brakes do not apply. (Brake travel not excessive, brakes not pulling to one side)

| Possible Cause | Action |
|--------------------------------------|--|
| 1 Master cylinder fault. | Check master cylinder to identify fault area, service as required. |
| 2 Friction/counter plate distortion. | Renew friction/counter plates - Both sides of relevant axle. |

Table 6. Pedal travel excessive (but not touching floor)

| Possible Cause | Action |
|--------------------------------------|---|
| 3 Air in hydraulic system. | Check fluid reservoir level. Check for fluid/air leaks, rectify as required. Bleed the brake system. |
| 4 Leak in hydraulic system. | Check for fluid loss at master cylinder and brake piston, all pipes and fittings for loose connections. Rectify as required. Top up brake reservoir and bleed the brake system. |
| 5 Friction/counter plate distortion. | See Item 2. |

Table 7. Pedal hard to operate

| Possible Cause | Action |
|---|---|
| 6 Tightness at pedal pivot. | Inspect pedal pivot. Free-off/lubricate. |
| 7 Fluid contamination/seal damage. | Flush system and renew all hydraulic seals. Bleed the brake system. |
| 8 Misaligned push rod/pedal. | Check and rectify as required. |
| 9 Kinked or crushed brake pipes. | Check/renew brake pipework. |
| 10 Vacuum failure due to low vacuum at source. ⁽¹⁾ | Inspect/service engine mounted exhauster unit as required. |
| 11 Blocked/leaking vacuum pipe. ⁽¹⁾ | Check/renew vacuum pipe. |

| Possible Cause | Action |
|---------------------------------|-------------------|
| 12 Servo defect. ⁽¹⁾ | Renew servo unit. |

(1) Machines fitted with servo assisted brakes only.

Table 8. Pedal touches floor under constant pressure - no fluid loss

| Possible Cause | Action |
|---------------------------------------|-------------|
| 13 Master cylinder fault. | See Item 1. |
| 14 Friction/counter plate distortion. | See Item 2. |
| 15 Air in hydraulic system. | See Item 3. |

Table 9. Pedal touches floor under constant pressure and fluid loss

| Possible Cause | Action |
|--------------------------|--|
| 16 External fluid leaks. | Visually check brake circuit for fluid loss, service as required. Top up brake reservoir and bleed the brake system. |
| 17 Internal fluid leaks. | ⇒ Brake Piston Seal Leakage (□ G-11) |

Table 10. Poor braking (not pulling to one side)

| Possible Cause | Action |
|---|--|
| 18 Friction plates worn beyond limits or distorted. | Renew friction/counter plates - Both sides of relevant axle. |
| 19 Master cylinder fault. | See Item 1. |
| 20 Annular piston fault. | See Item 28. |
| 21 Incorrect/low axle oil. | Fill axle with correct type of oil. |
| 22 Vacuum failure. ⁽¹⁾ | Inspect vacuum source/pipes, service as required. |

(1) Machines fitted with servo assisted brakes only.

Table 11. Brakes not releasing

| Possible Cause | Action |
|---|--|
| 23 Brake pedal spring fault. | Fit a new spring. |
| 24 Master cylinder fault (plunger stuck in bore). | See Item 1. |
| 25 Blocked hole in master cylinder reservoir cap. | Fit a new reservoir cap. |
| 26 Brake pedal free travel incorrect. | Adjust pedal free travel. |
| 27 Fluid contamination/seal damage. | Flush system and renew hydraulic seals. Refill with clean fluid and bleed the brake system. |
| 28 Annular brake piston(s) binding in axle. | <ul style="list-style-type: none"> – Check that correct brake fluid has been used (incorrect fluid could swell the annular brake piston seals). – Check if annular brake piston seals in good condition. – Check that annular brake piston rotates freely in its housing with no seals fitted. – Check that the annular brake piston seal retracts the piston approximately 0.5 mm (0.020 in). |

| Possible Cause | Action |
|--|---|
| 29 Kinked or crushed brake pipes. | Check and renew pipes as required. |
| 30 Friction/counter plates not free on splines and/or dowels. | Check friction/counter plates for free movement, renew if required - Both sides of relevant axle. |

Table 12. Poor braking when hot

| Possible Cause | Action |
|---|--|
| 31 Moisture in system vaporising when axle is hot. | Strip axle and clean annular piston to remove moisture. Remove master cylinder and check for corrosion, service as required. Flush system refill with clean fluid. Bleed the brake system. |

Table 13. Excessive brake noise in operation

| Possible Cause ⁽¹⁾ | Action |
|--|---|
| 32 Deterioration of axle oil or wrong type of axle oil. | Change axle oil. |
| 33 Axle oil loss. | Refill axle with correct oil and check for leaks. |
| 34 Friction plates worn beyond limits. | Renew friction/counter plates - Both sides of relevant axle. |
| 35 Friction/counter plates in poor condition. | Check for distortion or surface pitting and/or roughness of friction/counter plates (annular grooving of counter plates is acceptable). |

(1) *Due to the metal to metal contact of oil immersed brakes, limited noise can be heard which is consistent with this type of design - this is normal.*

Table 14. Fluid loss when machine standing for instance - overnight

| Possible Cause ⁽¹⁾ | Action |
|--|--|
| 36 Severe damage or slight cut/nick in the brake piston seal. | Test the brake piston seals for leakage. If necessary, strip axle and renew seal(s). → Brake Piston Seal Leakage (G-11) |
| 37 External leakage through brake pipe connections, etc. | Check for and repair leaking connections. |

(1) *Confirm fault is as indicated by checking that the brake pedal does not touch the floor under constant pressure.*

Test Procedures

Brake Vacuum Test (if applicable)

The procedure explains how to determine if the brake servo vacuum system is functioning correctly.

The following test equipment is required, which can be obtained locally:

- Vacuum gauge (range up to 1 bar)
- 'T' adaptor
- Vacuum hose - 2 lengths X 75 mm (3 inch) long
- Clips - worm drive

WARNING

Before working on the brake system make sure the machine is on level ground and chock all four wheels.

BRAK-1-4

- 1 Park the machine on firm level ground, apply the parking brake. Lower the loader to the ground, switch OFF the engine and remove the starter key.
- 2 Raise the engine cover, refer to **Section 3-Maintenance**. → [Related Topics \(G1-2\)](#)
- 3 Working at the engine compartment, disconnect the brake vacuum line **1-A** at the brake vacuum pump and connect a vacuum gauge directly to the pump.
- 4 Run the engine at 1500 rev/min and note the reading on the vacuum gauge:
 - a If the vacuum is 625 mm mercury (Hg), carry out step 5.
 - b If there is little or no vacuum, renew the vacuum pump.
- 5 Remove the vacuum gauge from the pump port and reconnect it into the brake vacuum line **1-B** using a 'T' adaptor **1-B**.
- 6 Run the engine at 1500 rev/min and note the reading on the vacuum gauge:
 - a If the vacuum is 625 mm mercury (Hg), carry out step 7.

- b If there is little or no vacuum, check the vacuum hose connections for leaks. Check the security of the clips, then carry out step 7.

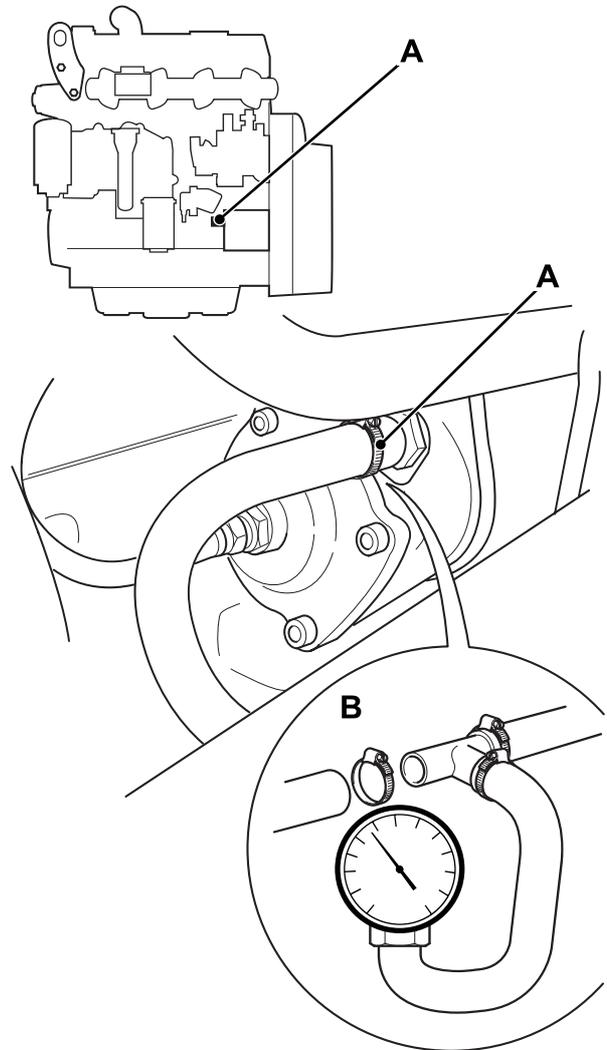


Fig 1.

C007730

- 7 Switch OFF the engine and monitor the vacuum gauge reading:
 - a Check that after 60 seconds the vacuum remains above (holds) 500 mm mercury (Hg).



- b** Check that the vacuum is sufficient for 3 or 4 pedal operations. It is expected that the vacuum will decay slowly with each pedal operation.

Note: *The brake vacuum pump and brake servo unit are non-serviceable parts. If they are suspected as being faulty they must be renewed.*

Brake Piston Seal Leakage

The most common reason for internal piston seal leakage is a build-up of axle contamination as a result of excessive brake wear caused by extended service periods.

Two types of internal leakage can occur within the axle or hub:

- Low Pressure Leaks - Seal damage, or scoring to seal component surfaces, caused by a build-up of metal particles.
- High Pressure Leaks - Mechanical leakage past a badly damaged or perished seal.

Note: The low pressure leak test should be performed first. Low pressure leaks are difficult to find using a high pressure test - seals and other components can distort and form a seal under pressure.

The following procedures explain how to check for low or high pressure leaks without the need to dismantle the axle first. The test must only be done when the axle is COLD.

Front Axles

WARNING

Before working on the brake system make sure the machine is on level ground and chock all four wheels.

BRAK-1-4

WARNING

Do not drive the machine with any part of its brake system disconnected. When the following test has been completed reconnect all brake pipes and bleed the brake system using the recommended procedure.

BRAK-2-1

- 1 Disconnect and cap the brake piston feed pipe (or hose, as applicable) at port **2-A**.
- 2 Completely remove pipe **2-B** and plug port **2-C**.
- 3 Fill both brake piston housings with JCB Light Hydraulic Fluid through ports **2-A** and **2-D**.

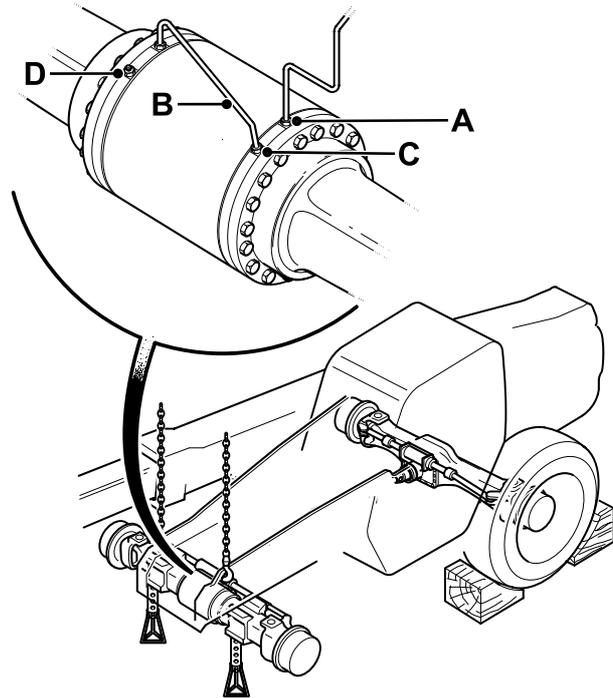


Fig 2.

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- 4 Test for a Low Pressure Leak:
 - a Install an adaptor fitted with a piece of clear tube to the brake piston port **3-A**.

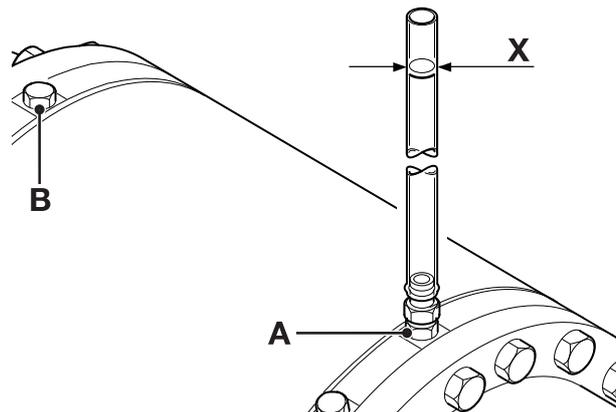


Fig 3.

768720-1

Note: The tube must be kept vertical during the test, use tape to attach the tube to the side of the machine.

- b** Fill the tube until approximately three quarters full with JCB Light Hydraulic Fluid.
- c** Using a suitable pen, mark the level line of the brake fluid **3-X** on the tube.
- d** After approximately 1/2 hour, check if the level has dropped below the original marked line. If it has, check the brake piston seal for slight nicks, cuts or generally for wear.
- e** Repeat steps a to d at port **3-B**.

5 Test for a High Pressure Leak:

- a** Install a hand pump fitted with a 0 - 40 bar (0 - 600 lbf/in²) pressure gauge to brake piston port **4-A**.

Note: The hand pump must be filled with JCB Light Hydraulic Fluid. Do not exceed 69 bar (1000 lbf/in²).

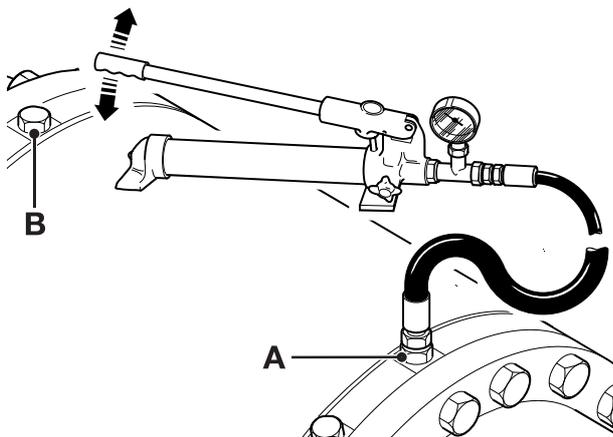


Fig 4.

768710-1

- b** Use the hand pump to generate a pressure in the brake piston housing.
- c** If the pressure falls off rapidly, or if no pressure reading can be obtained, the seal is severely damaged and needs replacing with a new one.
- d** Repeat steps a to c at port **4-B**.

6 Re-instate the brake system:

Reconnect all brake pipes and bleed the brake system. → [Bleeding \(□ G1-13\)](#)

Alternately, proceed to rear axle, if applicable.

Axle Breather (Braked Axles) - Inspection

Breathers are fitted to axles to relieve pressure build up, due to braking and prolonged roading.

If breathers are not kept clear, seal leakage and brake problems can result due to pressure build up. Most axles are fitted with long stem breather type **5-A**.

Ensure there is adequate clearance around the breather and if it should be dislodged or removed, ensure it is refitted with hole **5-C** pointing outwards towards the wheel.

The breather is always fitted on the opposite side to the crownwheel (in less turbulent oil) avoiding oil seepage.

Plug **5-B** is fitted in the crownwheel side.

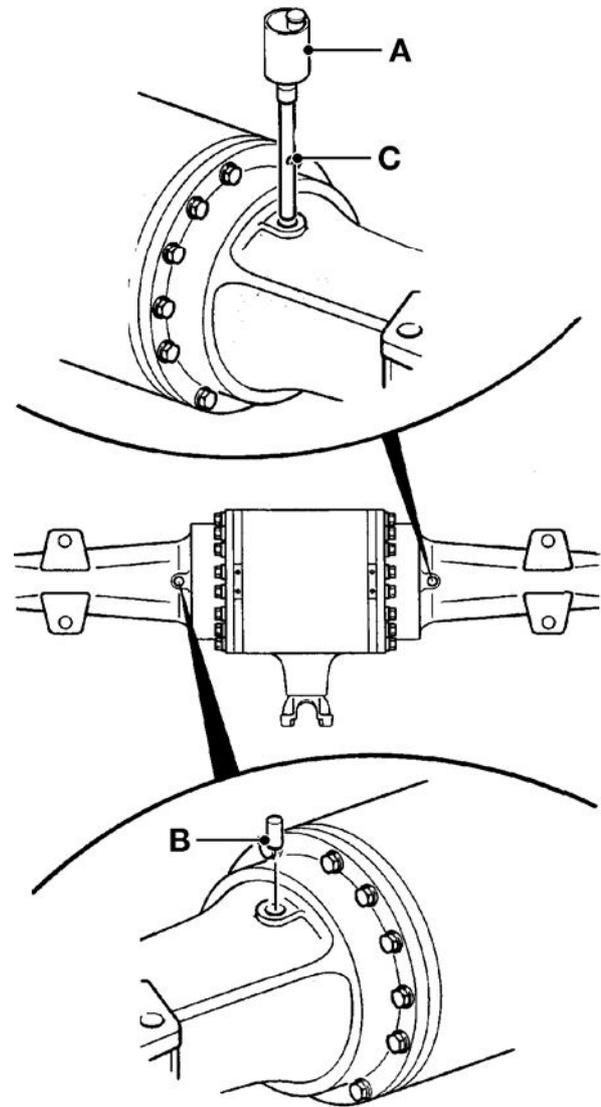


Fig 5.

335302-1

Bleeding

WARNING

Before proceeding with the bleeding procedure it is important to ensure that the park brake is engaged and that one pair of wheels is blocked on both sides.

BRAK-1-2

- 1 Fill the reservoir with correct fluid (see **Lubricants and Capacities**, Section 3) and ensure that throughout the bleeding procedure the level is not allowed to fall below the MINIMUM mark.

WARNING

Use of incorrect fluid will cause serious damage to the seals which could in turn cause brake failure.

BRAK-1-1

- 2 Attach a tube to the appropriate bleed screw, ensuring that the free end of the tube is immersed in fluid in a suitable container.
- 3 Open the bleed screw and apply one rapid full stroke of the brake pedal followed by three rapid short strokes from the halfway pedal position. After the third short stroke, allow the pedal to return quickly to its stop.
- 4 Continue bleeding normally until all air is expelled, closing the bleed screw with the pedal fully depressed.
- 5 Bleed the brake system, in the appropriate sequence, as follows:
 - a Machines without servo brakes - Bleed at point **6-A** on the front axle.
 - b Machines with servo brakes - Bleed in turn at point **7-A** on the servo unit and point **6-A** on the front axle.
- 6 Top up reservoir to the full mark.

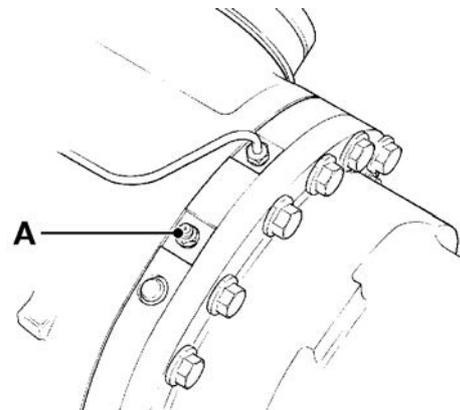


Fig 6. Front Axle

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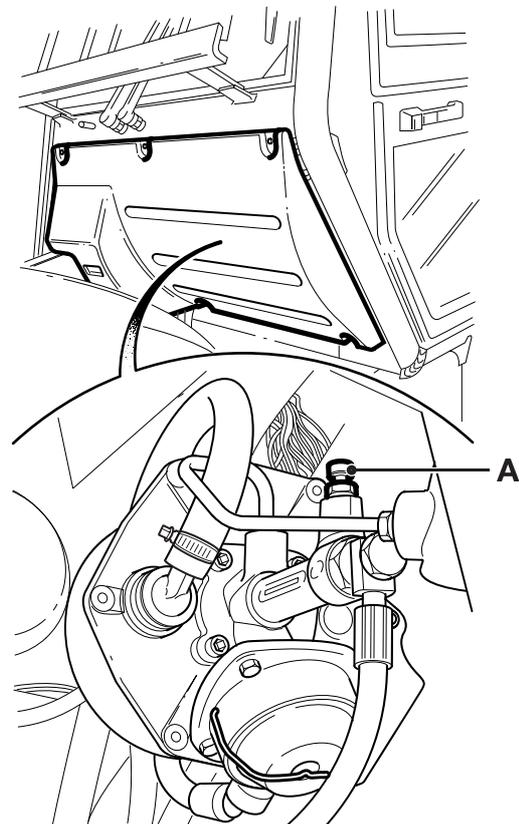


Fig 7. Servo Unit

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Dismantling and Assembly

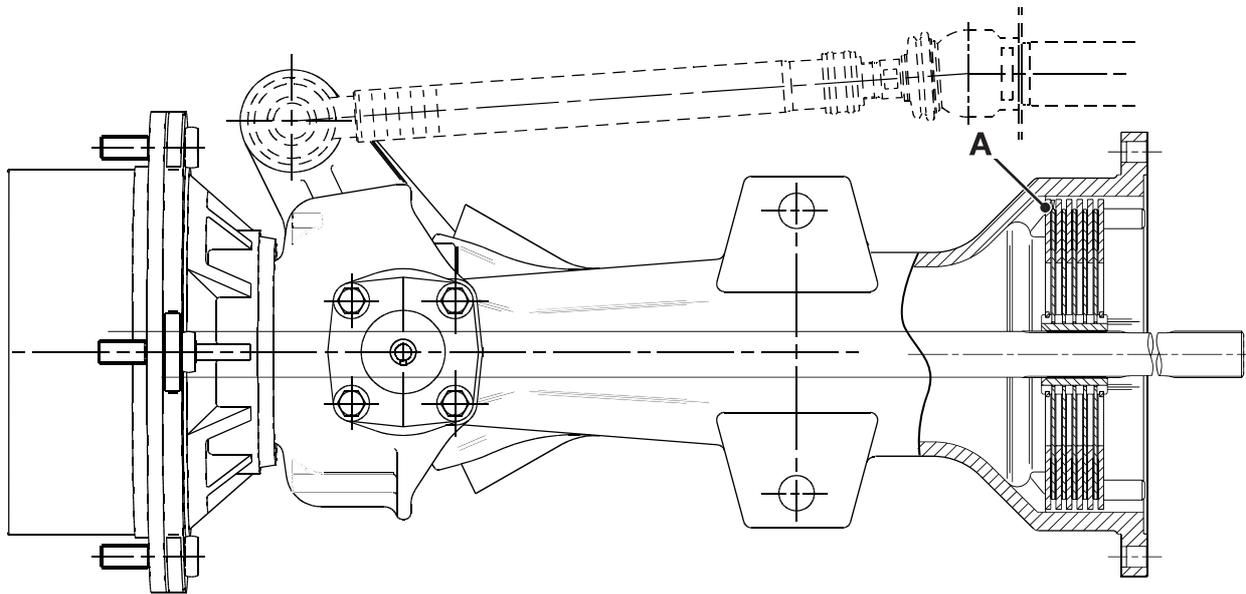


Fig 8.

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The service brakes are located in the front axle, as shown at **8-A**. The procedures for dismantling and assembly are described in a separate publication, see **Transmissions Service Manual** (Publication No. 9803-8610) which includes procedures for the axle sub-assemblies.
[⇒ Related Topics \(□ G1-2\)](#)

Brake Light Switch - (Proximity Type)

Adjustment

- 1 Select the starter key switch to the ON position, do not start the engine.
- 2 Adjust the proximity sensor **9-A** to give a clearance of 2.0 to 3.0 mm (0.08 to 0.12 in) between the sensor face and the edge of the brake lever **9-B**. Torque tighten the locknuts **9-C** to 20 Nm (14.7 lbf ft).
- 3 Depress the brake pedal and check that the sensor operates (L.E.D. illuminates) when the brake pedal has travelled between 10 and 15 mm, and check that the sensor remains operated throughout the remaining brake travel.
- 4 Check that the brake lights come on when the brake pedal is depressed.

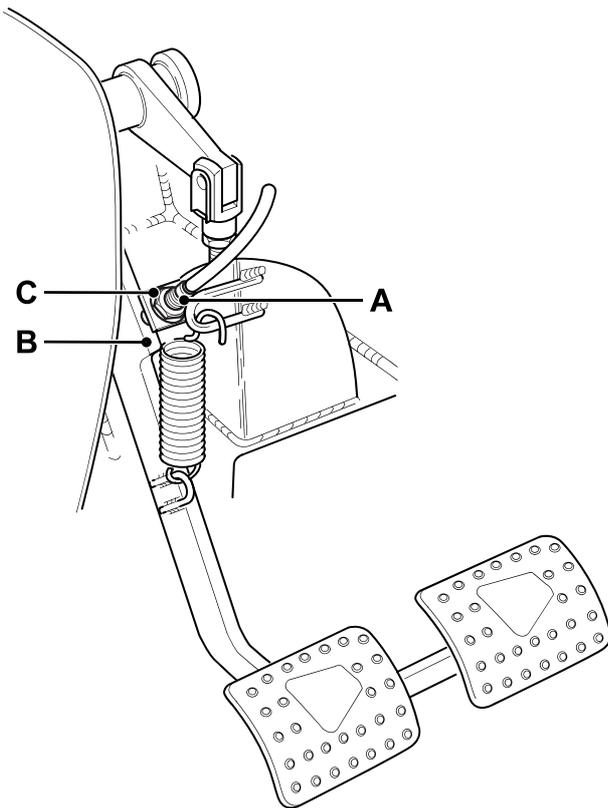


Fig 9.

C029780

Brake Light Switch (Reed Type)

Operation

The brake light switch **A** is a reed type. It operates when the metal vane **B** moves between the switch faces **C**. The switch is not adjustable.

If switch failure is suspected check all the associated wires and connectors for damage. Ensure that the vane **B** moves between the switch faces **C** when the brake pedal is pressed. If the switch has failed it must be renewed.

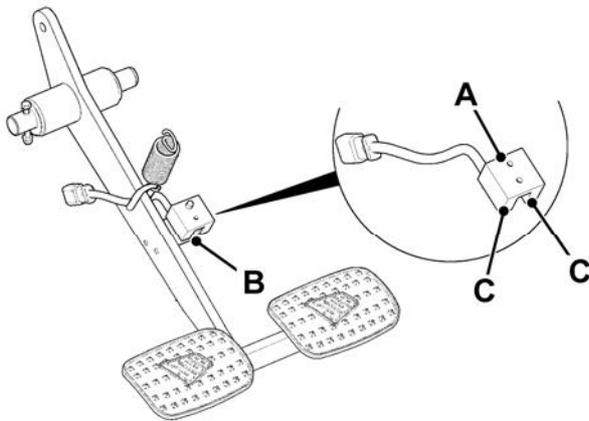


Fig 10.

C089500

External Park Brake SYSTEM

Introduction

This topic contains information about a machine SYSTEM. The system has some devices that connect either mechanically, hydraulically or electrically. Make sure you are referring to the correct system. Refer to the applications table.

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This topic is intended to help you understand what the system does and how it works. Where applicable it also includes fault finding, test and service procedures.

[⇒ *Related Topics* \(□ G2-2\)](#)

[⇒ *Specifications* \(□ G2-3\)](#)

[⇒ *Operation Overview* \(□ G2-4\)](#)

[⇒ *Test Procedures* \(□ G2-5\)](#)

[⇒ *Adjustment* \(□ G2-6\)](#)

[⇒ *Switch Adjustment* \(□ G2-8\)](#)

[⇒ *Renewing the Brake Pads* \(□ G2-9\)](#)

[⇒ *Renewing the Parkbrake Cable* \(□ G2-11\)](#)

Related Topics

Table 1. Related Topics in This Publication

| The table lists other topics in the manual that contain information related to this topic. Refer to the applicable topics to complete your procedures. Where applicable the text in this section contains cross references to this page to help you find the correct information. Some machines have different systems and devices. Make sure you refer to the correct topic, refer to <i>Section 1 - Applications</i> . | | |
|--|---|------------|
| Sections | Topic Titles | Sub Titles |
| 1 | <i>Applications</i> | ALL |
| 2 | ALL (Care and Safety) ⁽¹⁾ | ALL |
| G | ⇒ <i>Park Brake Calliper (□ G4-1)</i> | ALL |
| G | ⇒ <i>Park Brake Disc (□ G5-1)</i> | ALL |

(1) You must obey all of the relevant care and safety procedures.



Specifications

| | |
|---|---|
| Park Brake: Independent cable operated parking brake in the drive to the front axle. | |
| Type | Disc brake, manually adjusted calliper. |
| Actuation | Cable operated. |
| Location | Mounted on the gearbox. |
| Disc diameter | 279.4 mm (11 in) |

Operation Overview

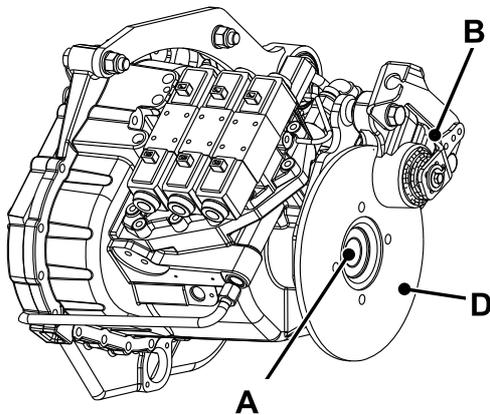


Fig 1.

C084690-C1

The park brake is Independent of the service brakes. It operates on the drive to the front axle by means of a disc mounted on the gearbox output shaft **A**.

When the operator moves the park brake lever to the vertical position, the cable causes the calliper mounted brake pads **B** to hold the brake disc **D**.

The lever has a simple system for adjustment of the cable when necessary.

An electrical switch senses if the park brake lever is set to the brake ON or brake OFF position. The switch controls operator warnings and transmission interlocks.

Test Procedures

SAFETY NOTICE: Ensure all routine health and safety precautions are observed before operating machines.

WARNING

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

2-2-4-5

- 1 Enter the machine. Fasten your seat belt and park the machine on a level dry surface.
- 2 Fully apply the parking brake **2-A**.
- 3 Start the engine and raise the attachments to the appropriate travelling position.
- 4 Select fourth gear **2-B**.
- 5 Push down hard on foot brake pedal **2-C**.
- 6 Select forward drive **2-B**.

WARNING

If the machine starts to move during the following test, immediately apply the foot brake and reduce the engine speed.

2-2-5-1

Test the parking brake as follows:

- 7 Move the parking brake lever fractionally forward until the warning light **2-D** is just extinguished.
- 8 Slowly release the foot brake pedal **2-C**.
- 9 If the machine has not moved, use the accelerator pedal to gradually increase the engine speed to 1500 RPM. The machine should not move.
- 10 Do not do this test for longer than 20 seconds.
- 11 Reduce the engine speed to idle and select neutral **2-B**.
- 12 Return the park brake lever **2-A** to the fully on position from its partially applied position.
- 13 Lower attachments and stop the engine.

- 14 If the machine moved during this test, adjust the parking brake and repeat the test.
[⇒ Adjustment \(G2-6\)](#)

If you have any queries concerning this test procedure or parking brake adjustment, consult your local JCB distributor.

WARNING

Do not use a machine with a faulty park brake.

3-2-3-10_2

WARNING

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

3-2-3-11

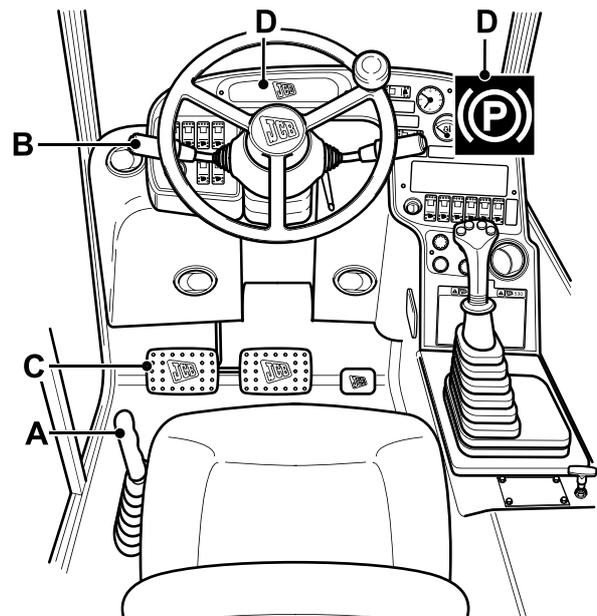


Fig 2.

C022290

Adjustment

CAUTION

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, always renew both brake pads.

4-2-1-1_2

WARNING

Before adjusting the park brake, make sure that the machine is on level ground. Put blocks each side of all four wheels. Disconnect the battery so that the engine cannot be started. If you do not take these precautions the machine could run over you.

2-3-2-4

WARNING

Over adjustment of the park brake could result in the park brake not fully releasing.

0011

Note: Before attempting to adjust the park brake after an emergency stop remove and inspect the brake friction components. Renew components if necessary.

Lever Adjustment

The parking brake should be fully engaged when the lever is vertical. The parking brake indicator light should illuminate when the brake is engaged with the forward and reverse lever away from neutral (starter switch at IGN).

- 1 Disengage the parking brake (lever horizontal).
- 2 Pull and turn handle grip **A** clockwise, half a turn.
- 3 Test the parking brake. [⇒ Test Procedures \(□ G2-5\)](#)

If the brake fails the test, repeat steps 1, 2 and 3. If there is no more adjustment and pin **B** is at the end of its travel adjust the cable at the calliper. [⇒ Renewing the Parkbrake Cable \(□ G2-11\)](#)

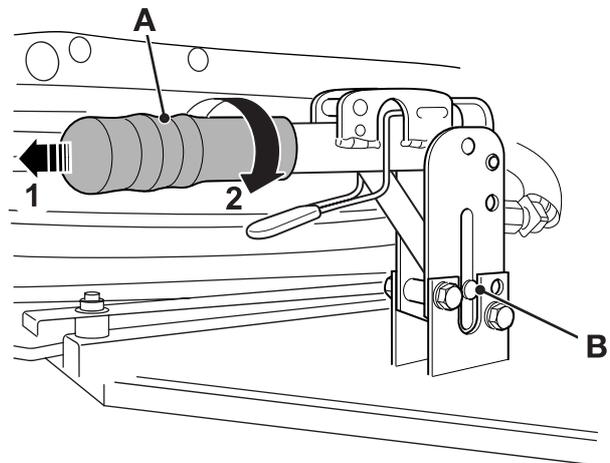


Fig 3.

A347580A-5

Cable Adjustment

Adjust the cable at the calliper if there is insufficient adjustment at the parking brake lever.

If there is no adjustment at the lever or the calliper, change the brake pads. → [Renewing the Brake Pads \(G2-9\)](#)

Always renew a worn or damaged cable.

- 1 Disengage the parking brake (lever horizontal).
- 2 Turn hand grip **4-E** anti-clockwise to centre the pin **4-F** in its slot.
- 3 Release the two locknuts at **4-G** and adjust the cable length as required.

Note: If a new cable is being fitted, position the threaded section of the cable with approximately four threads visible below the bottom adjusting nut.

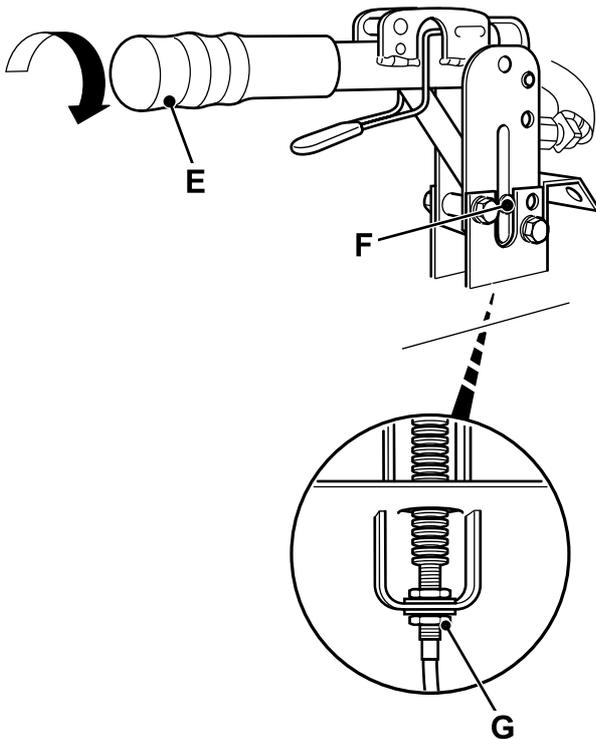


Fig 4.

C022470

- 4 Make sure there is adequate freedom of movement of operating lever **5-A** to ensure a positive brake

application, and that the lever returns to the rest position when the parking brake is released. The total clearance between the brake pad to brake disc should be 0.5 to 0.75 mm (0.02 to 0.3 in).

- 5 Test the parking brake. → [Test Procedures \(G2-5\)](#)

Make final adjustments at the park brake lever if the brake fails the test. → [Adjustment \(G2-6\)](#)

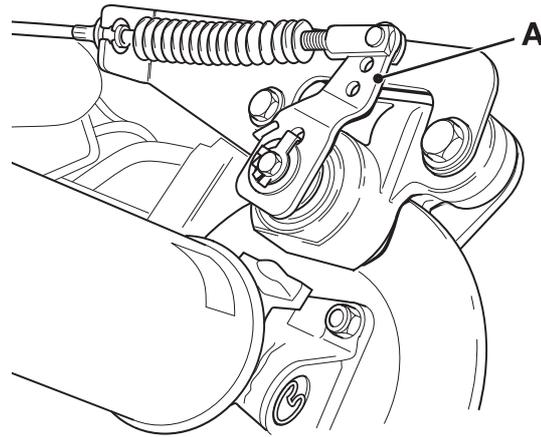


Fig 5.

A326153-2

Switch Adjustment

The park brake switch **6-A** is a reed type. It operates when the metal vane **6-B** moves between the switch faces **6-C**. The switch is not adjustable.

If switch failure is suspected check all the associated wires and connectors for damage. Ensure that the vane **6-B** moves between the switch faces **6-C** when the park brake is operated. If the switch has failed it must be renewed.

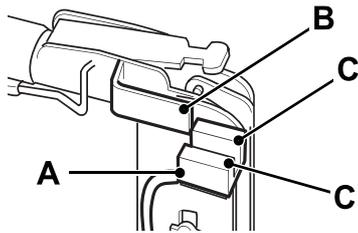


Fig 6.

C030040

Renewing the Brake Pads

⇒ [Fig 7.](#) ([□ G2-10](#))

WARNING

This is a safety critical installation. Do not attempt to do this procedure unless you are skilled and competent to do so.

Installation and mounting of the park brake caliper requires tightening of the mounting bolts to a specific torque figure. Do not attempt to do this job unless you have the correct tools available.

0010

WARNING

Before working on the park brake, park on level ground and put blocks on each side of all four wheels. 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.

BRAK-8-8

WARNING

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

13-3-1-3

Pad Removal

- 1 Remove the parking brake caliper from the axle mounting bracket. ⇒ [Removal and Replacement](#) ([□ G4-3](#))
- 2 Press carrier side pad **1** into housing **15** and remove. Ensure any residual silicone used for pad retention during assembly is removed.
- 3 Carefully lever pad **2** from the rotor inside the housing using a flat blade screwdriver. Take care to prevent damage to the plastic clip in the centre of the rotor **9** (there is no need to remove the rotor from the calliper).

Pad Inspection

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, new ones must be fitted.

2-3-2-3_3

- 1 The minimum thickness of the friction material on either pad is 1mm (0.04 in), but it is recommended new pads are fitted as pads worn to this limit may not be able to be adjusted.
- 2 Check the condition of the disc surface. Renew the disc if badly warped, pitted or worn.
- 3 Renew the cable if worn or damaged.

Pad Replacement

- 1 Fit the pad **2** to the lever side of the calliper. Position the pad inside housing **15**. Locate the plastic clip in the centre of the rotor **9** into the hole **X**, and press the pad into place.
- 2 Make sure the plastic anti-rattle pad **Y** is correctly located. Fit the pad **1** to the carrier side of the calliper. Add a small amount of silicone sealant to the back outer edge of the backing plate to hold the pad in place within the housing.
- 3 Replace the calliper. ⇒ [Removal and Replacement](#) ([□ G4-3](#))

Note: If there is insufficient adjustment after fitting new pads change the brake cable.

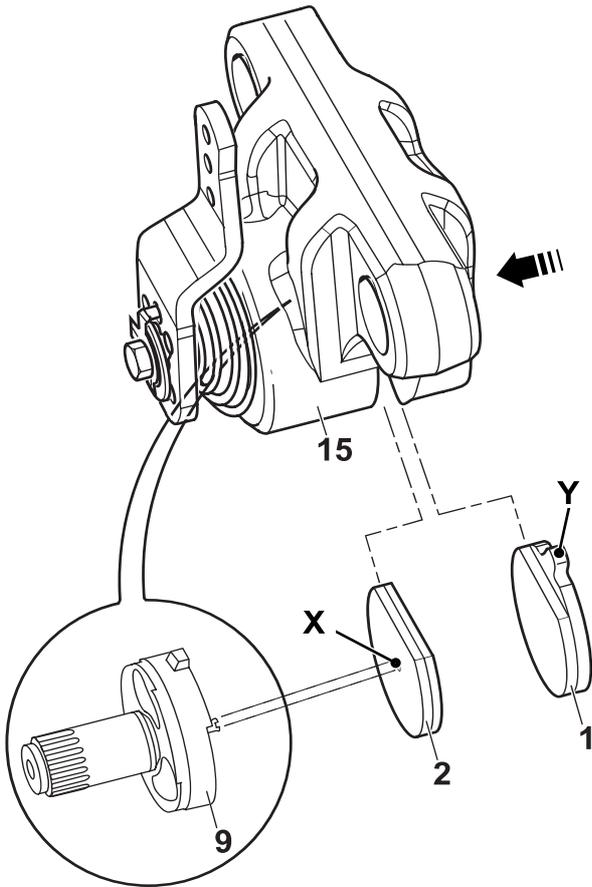


Fig 7. Brake Pads

Renewing the Parkbrake Cable

⚠ WARNING

Before working on the park brake, park on level ground and put blocks on each side of all four wheels. 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.

BRAK-8-8

Removal

- 1 Release the parking brake lever **9-A** (lever horizontal).

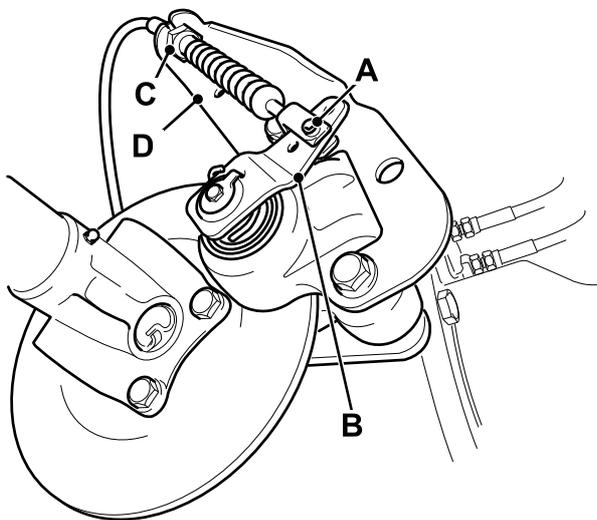


Fig 8.

A396181-C3

- 2 Working at the park brake caliper, disconnect clevis **8-A**, note which of the three holes on the actuating lever **8-B** is used.
- 3 Remove clip or loosen locknut **8-C** as applicable. Disconnect the cable from the bracket **8-D**. Note the cable routing to the underside of the cab.
- 4 Working at the park brake lever, undo the gaiter fixings and pull up the gaiter (not shown).
- 5 Uncouple the park brake switch electrical connector **9-C**.

- 6 Undo the lever fixing bolts **9-D** and withdraw the lever assembly together with the cable **9-E**.
- 7 Measure and record dimension **9-X**.
- 8 Undo the 2 buffer bracket fixing bolts **9-F**.

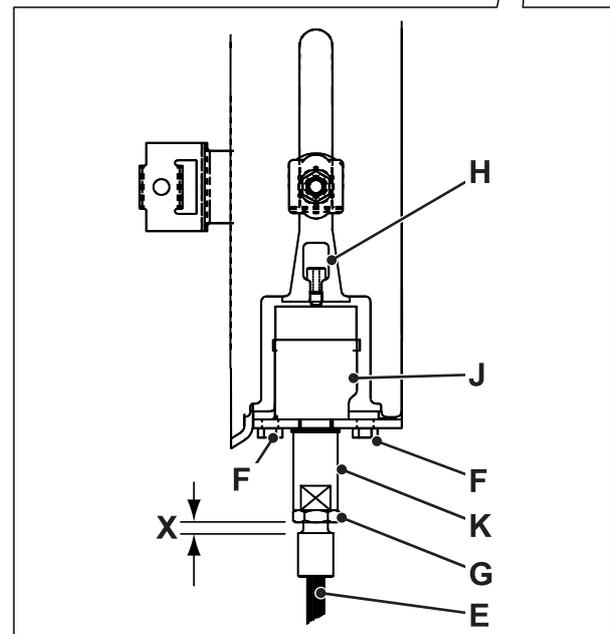
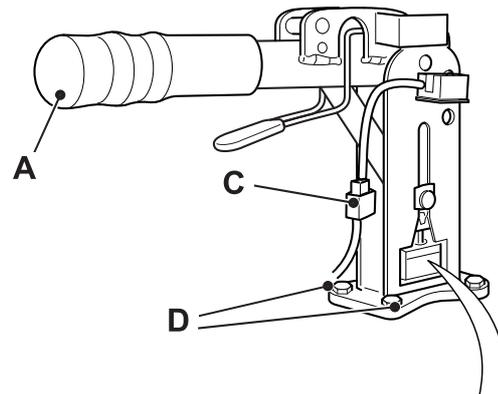


Fig 9.

C053140

- 9 Withdraw the cable sideways from the lever, disengaging the cable nipple from the clevis **9-H**. Remove the buffer assembly **9-J** from the cable.

Replacement

Replacement is the opposite of the removal procedure.

During the replacement procedure do this work also:

- Be sure to route the cable correctly.
- Ensure that the locknut **9-G** is screwed fully down. Adjust sleeve **9-K** to allow cable location to the lever assembly.
- Apply JCB Threadlocker to the buffer bracket fixing bolts **9-F**.
- Ensure that the buffer bracket assembly **9-J** is located correctly. Torque tighten the bolts **9-F**.
- Adjust the sleeve **9-K** and locknut **9-G** until dimension **9-X** is achieved (recorded during removal). Tighten the locknut.
- Ensure that the cable clevis **8-A** is connected at the correct hole in the caliper actuating lever **8-B**.
- Ensure that the actuating lever **8-B** is not being pulled by the cable when the parking brake lever is in the OFF (horizontal) position. If necessary adjust sleeve **9-K** until the actuating lever is allowed to return fully to its OFF position.
- Adjust the cable. [⇒ Adjustment \(□ G2-6\)](#)

Table 2. Torque Settings

| Item | Nm | kgf m | lbf ft |
|-----------|----|-------|--------|
| 9F | 3 | 0.3 | 2.2 |

Internal Park Brake SYSTEM

Introduction

This topic contains information about a machine SYSTEM. The system has some devices that connect either mechanically, hydraulically or electrically. Make sure you are referring to the correct system. Refer to the applications table.

Descriptions and procedures relate to the system and not the individual devices. For information about the devices refer to the relevant topics.

This topic is intended to help you understand what the system does and how it works. Where applicable it also includes fault finding, test and service procedures.

[⇒ *Related Topics* \(□ G3-2\)](#)

[⇒ *Specifications* \(□ G3-3\)](#)

[⇒ *Operation Overview* \(□ G3-4\)](#)

[⇒ *Test Procedures* \(□ G3-5\)](#)

[⇒ *Adjustment* \(□ G3-6\)](#)

[⇒ *Switch Adjustment* \(□ G3-9\)](#)

[⇒ *Renewing the Parkbrake Cable* \(□ G3-10\)](#)

[⇒ *Dismantle, Inspection and Assemble* \(□ G3-13\)](#)



Related Topics

Table 1. Related Topics in This Publication

| The table lists other topics in the manual that contain information related to this topic. Refer to the applicable topics to complete your procedures. Where applicable the text in this section contains cross references to this page to help you find the correct information. Some machines have different systems and devices. Make sure you refer to the correct topic, refer to <i>Section 1 - Applications</i>. | | |
|--|--------------------------------------|-------------------|
| Sections | Topic Titles | Sub Titles |
| 1 | <i>Applications</i> | ALL |
| 2 | ALL (Care and Safety) ⁽¹⁾ | ALL |

(1) *You must obey all of the relevant care and safety procedures.*



Specifications

| | |
|---|-----------------------------------|
| Park Brake: Independent cable operated parking brake acting on the gearbox layshaft. | |
| Type | JCB Oil-immersed multi-plate disc |
| Actuation | Cable operated |
| Location | Housed inside the gearbox |
| Brake Pack Overall Thickness | |
| New (Max.) | 38.9 mm (1.531 in) |
| Service Limit (Min.) | 37.1 mm (1.460 in) |

Operation Overview

The park brake is Independent of the service brakes. It operates on the drive to the front axle via an oil immersed, multi-plate brake pack **A** housed inside the gearbox. The brake assembly is mounted on the gearbox layshaft.

When the operator moves the park brake lever to the vertical position, the cable causes the brake plates to be pressed together.

The lever has a simple system for adjustment of the cable when necessary.

An electrical switch senses if the park brake lever is set to the brake ON or brake OFF position. The switch controls operator warnings and transmission interlocks.

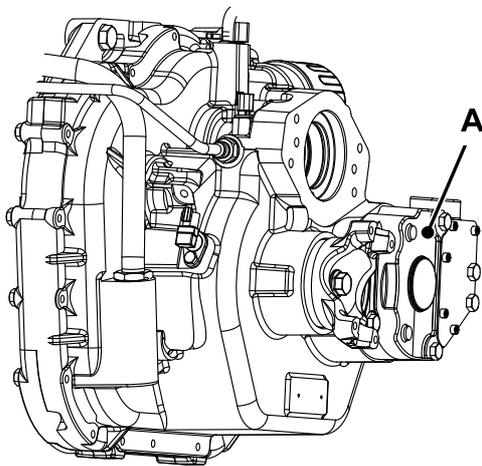


Fig 1.

C084690-C2

Test Procedures

SAFETY NOTICE: Ensure all routine health and safety precautions are observed before operating machines.

WARNING

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

2-2-4-5

- 1 Enter the machine. Fasten your seat belt and park the machine on a level dry surface.
- 2 Fully apply the parking brake **2-A**.
- 3 Start the engine and raise the attachments to the appropriate travelling position.
- 4 Select fourth gear **2-B**.
- 5 Push down hard on foot brake pedal **2-C**.
- 6 Select forward drive **2-B**.

WARNING

If the machine starts to move during the following test, immediately apply the foot brake and reduce the engine speed.

2-2-5-1

Test the parking brake as follows:

- 7 Move the parking brake lever fractionally forward until the warning light **2-D** is just extinguished.
- 8 Slowly release the foot brake pedal **2-C**.
- 9 If the machine has not moved, use the accelerator pedal to gradually increase the engine speed to 1500 RPM. The machine should not move.
- 10 Do not do this test for longer than 20 seconds.
- 11 Reduce the engine speed to idle and select neutral **2-B**.
- 12 Return the park brake lever **2-A** to the fully on position from its partially applied position.
- 13 Lower attachments and stop the engine.

- 14 If the machine moved during this test, adjust the parking brake and repeat the test. See [⇒ Adjustment \(□ G3-6\)](#)

If you have any queries concerning this test procedure or parking brake adjustment, consult your local JCB distributor.

WARNING

Do not use a machine with a faulty park brake.

3-2-3-10_2

WARNING

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

3-2-3-11

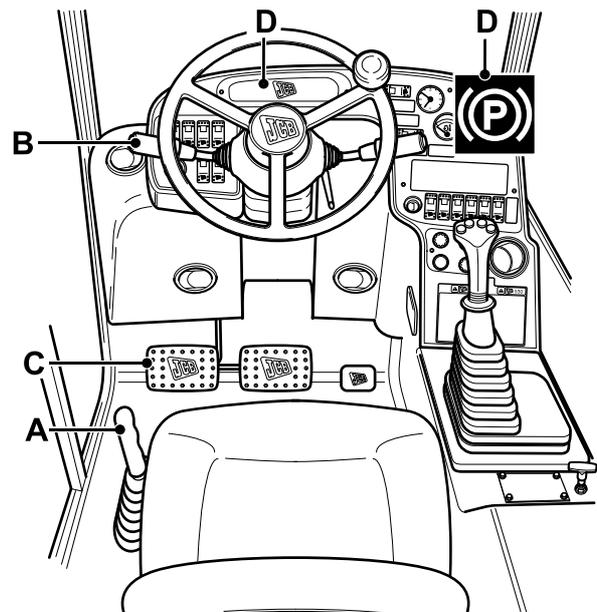


Fig 2.

C022290

Adjustment

During normal operation little or no adjustment of the brake cable at the lever is required. In the event of poor brake performance it is likely that components have failed or, after extended service, friction material is worn away. Dismantle, inspect and renew components as required.

⇒ [Dismantle, Inspection and Assemble \(G3-13\)](#)

CAUTION

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, always renew both brake pads.

4-2-1-1_2

WARNING

Before adjusting the park brake, make sure that the machine is on level ground. Put blocks each side of all four wheels. Disconnect the battery so that the engine cannot be started. If you do not take these precautions the machine could run over you.

2-3-2-4

WARNING

Over adjustment of the park brake could result in the park brake not fully releasing.

0011

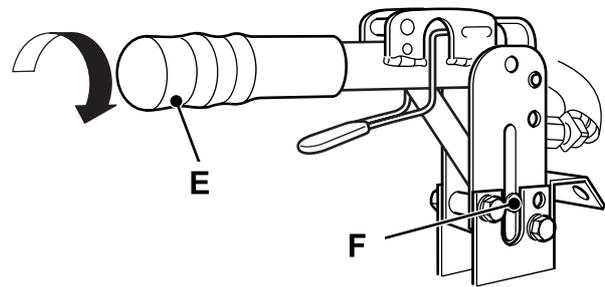
Adjustment at the park brake lever should only be required after renewal of the cable, brake components or extended service. Proceed as follows:

Note: Before attempting to adjust the park brake after an emergency stop remove and inspect the brake friction components. Renew components if necessary.

Lever Adjustment

The parking brake should be fully engaged when the lever is vertical. The parking brake indicator light should illuminate when the brake is engaged with the forward and reverse lever away from neutral (starter switch at IGN).

- 1 Disengage the parking brake (lever horizontal)
- 2 Turn the hand grip **3-E** clockwise, half a turn.



A390850-C1

Fig 3.

- 3 Test the park brake. ⇒ [Test Procedures \(G3-5\)](#) If the brake fails the test repeat steps 1 and 2. If there is no more adjustment and pin **3-F** is at the end of its travel, dismantle, inspect and renew park brake components as required.

Note: After adjusting the park brake lever the following steps **MUST** be carried out to confirm correct brake operation. Incorrect adjustment can result damage to the brake components and excessive overheating of the brake assembly.

- 4 Remove 5 screws **4-A** and 2 bolts **4-B**. Using a flat blade screwdriver located in the housing cut out **4-C**, lever off the cover plate **4-D**.

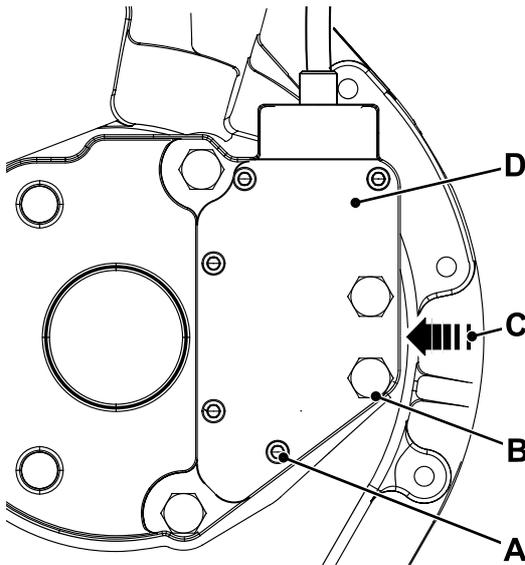


Fig 4.

C014170

- 5 Use the cover plate 5-A as a wear indicator. Use a bolt 5-B to fit the plate at right angles to the housing as shown. [⇒ Fig 5. \(□ G3-7\)](#) Pull the plate down when tightening the bolt to take up the clearance in the bolt hole.

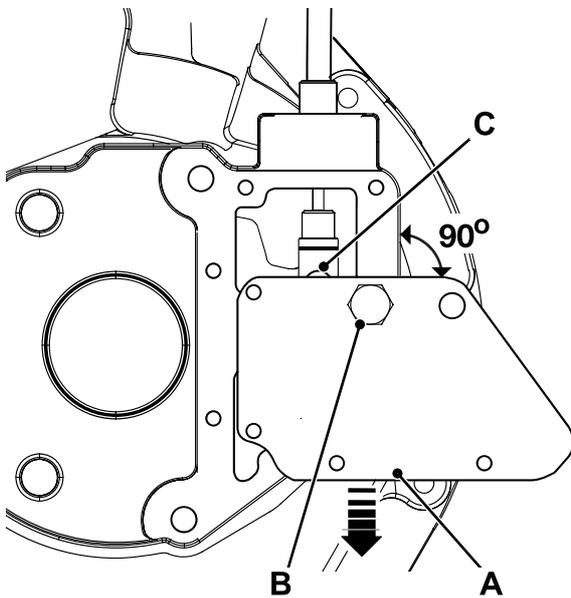


Fig 5.

C014180

- 6 Fully apply the park brake (lever vertical). If the brake is within service limits the clevis pin 5-C hexagon MUST NOT BE VISIBLE above the cover plate. Renew the friction pack if any of the clevis pin hexagon is visible.

Note: If friction pack components are distorted (typically after performing an emergency stop) the clevis pin may not be visible in the check described. If the park brake performance is poor it may be due to distorted components. Dismantle and inspect the park brake assembly.

- 7 Disengage the park brake (lever horizontal). Make sure that the brake is fully released. Remove the cover plate 5-A and feel the edge of the brake pack plates. When the brake is released free play between the plates should be easily detectable. [⇒ Fig 10. \(□ G3-11\)](#) If the plates are not free DO NOT OPERATE THE MACHINE. Dismantle, inspect and renew park brake components as required.

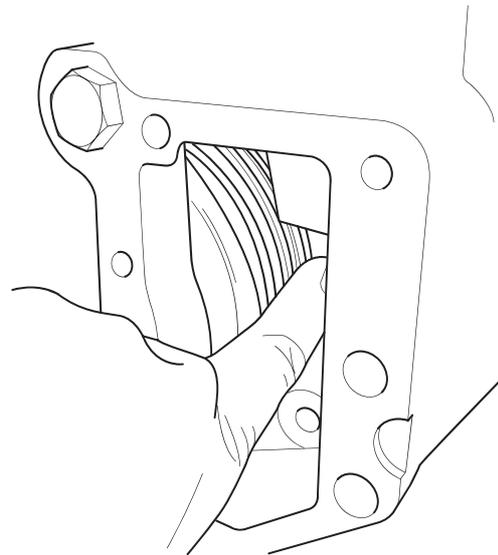


Fig 6.

- 8 If the brake pack is serviceable, clean off all traces of old sealant from the cover plate and brake housing. Make sure that no sealant enters the gearbox. Apply a bead of JCB Multigasket to the brake housing. [⇒ Dismantle, Inspection and Assemble \(□ G3-13\)](#). Fit the cover plate. Torque tighten the bolts.



Section G3 - Brakes Internal Park Brake SYSTEM

Adjustment

Table 2. Torque Settings

| Item | Nm | kgf m | lbf ft |
|------|----|-------|--------|
| 4-A | 16 | 1.6 | 12 |
| 4-B | 56 | 5.7 | 41 |

Switch Adjustment

The park brake switch **7-A** is a reed type. It operates when the metal vane **7-B** moves between the switch faces **7-C**. The switch is not adjustable.

If switch failure is suspected check all the associated wires and connectors for damage. Ensure that the vane **7-B** moves between the switch faces **7-C** when the park brake is operated. If the switch has failed it must be renewed.

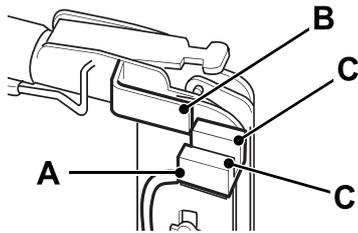


Fig 7.

C030040

Renewing the Parkbrake Cable

⚠ WARNING

Before working on the park brake, park on level ground and put blocks on each side of all four wheels. 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.

BRAK-8-8

⚠ WARNING

Before working on the park brake, park on level ground and put blocks on each side of all four wheels. 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.

BRAK-8-8

Removal

- 1 Release the parking brake lever 9-A (lever horizontal).

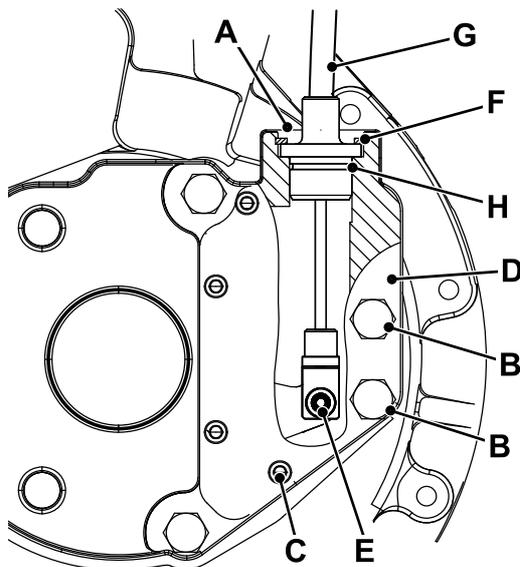


Fig 8.

- 2 Clean off all dirt from the gearbox brake housing. Make sure there is no dirt or debris trapped in the housing at the cable entry 8-A.

- 3 Undo 2 bolts 8-B and 5 screws 8-C. Remove the cover plate 8-D.
- 4 Undo clevis screw 8-E. Remove circlip 8-F. Withdraw the cable assembly 8-G from the housing.
- 5 Working at the park brake lever, undo the gaiter fixings and pull up the gaiter (not shown).
- 6 Uncouple the park brake switch electrical connector 9-C.
- 7 Undo the lever fixing bolts 9-D and withdraw the lever assembly together with the cable 9-E.
- 8 Measure and record dimension 9-X.
- 9 Undo the 2 buffer bracket fixing bolts 9-F.
- 10 Withdraw the cable sideways from the lever, disengaging the cable nipple from the clevis 9-H. Remove the buffer assembly 9-J from the cable.

Renewing the Parkbrake Cable

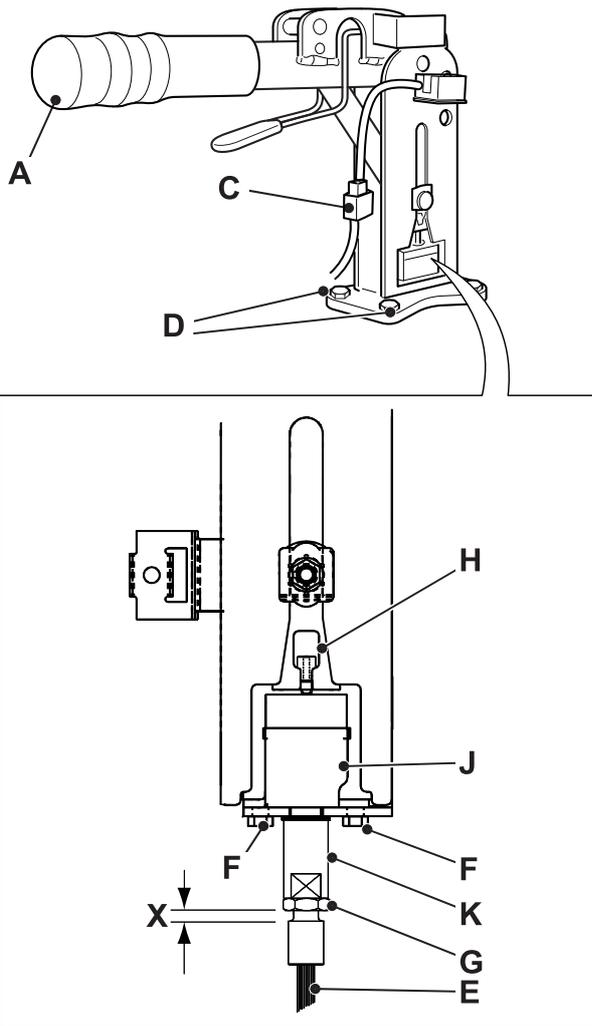


Fig 9.

C053150

Replacement

Replacement is the opposite of the removal procedure.

During the replacement procedure do this work also:

- Be sure to route the cable correctly.
- Ensure that the locknut **9-G** is screwed fully down. Adjust sleeve **9-K** to allow cable location to the lever assembly.
- Apply JCB Threadlocker to the buffer bracket fixing bolts **9-F**.
- Ensure that the buffer bracket assembly **9-J** is located correctly. Torque tighten the bolts **9-F**.
- Adjust the sleeve **9-K** and locknut **9-G** until dimension **9-X** is achieved (recorded during removal). Tighten the locknut.
- Make sure that 'O' ring **8-H** is undamaged and correctly fitted.
- After connecting both ends of the cable set the parking brake lever to the OFF (horizontal) position. Feel the edge of the brake pack plates. When the brake is released free play between the plates should be easily detectable. → Fig 10. (□ G3-11) If necessary adjust sleeve **9-K** until the plates are free.

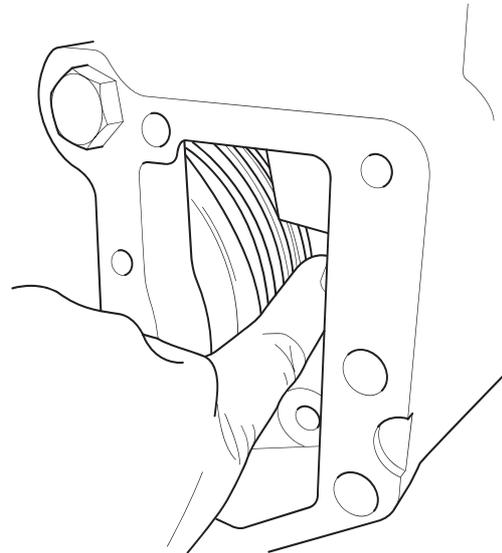
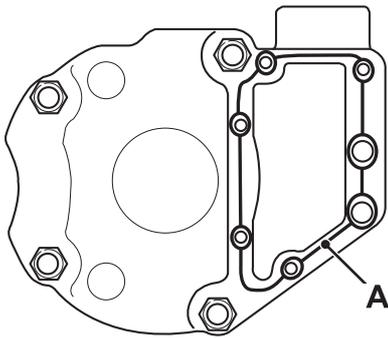


Fig 10.



C033460

Fig 11.

- Clean off all traces of old sealant from the cover plate and brake housing. Make sure that no sealant enters the gearbox. Apply a bead of JCB Multigasket **11-A** to the brake housing. Fit the cover plate. Torque tighten the bolts.

Important: DO NOT operate the machine until the cable adjustment procedure has been carried out.

- Adjust the cable. → [Adjustment \(G3-6\)](#)

Table 3. Torque Settings

| Item | Nm | kgf m | lbf ft |
|-----------|----|-------|--------|
| 8B | 56 | 5.7 | 41 |
| 8C | 16 | 1.6 | 12 |
| 8E | 9 | 0.9 | 6.6 |
| 9F | 3 | 0.3 | 2.2 |

Dismantle, Inspection and Assemble

The integral park brake consists of a wet multi plate friction pack and a mechanical actuator assembly. A separate dismantling procedure is given for each sub-assembly.

WARNING

Before working on the park brake, park on level ground and put blocks on each side of all four wheels. 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.

BRAK-8-8

Dismantle the Multi-Plate Brake Pack

⇒ [Fig 14.](#) ([□ G3-14](#))

- 1 Working inside the cab, disengage the parking brake (lever horizontal). Rotate the park brake lever to fully slacken the cable.
- 2 Remove the rear propshaft, see **Section F, Propshafts.** ⇒ [Related Topics](#) ([□ G3-2](#))
- 3 Position the output yoke **13-A** as shown.
- 4 Working beneath the machine at the gearbox, undo 2 off bolts **14-A** at positions **14-X** and screws **14-B**. Using a flat bladed screwdriver located in the cover cutout, lever off cover plate **14-C**.
- 5 Undo the remaining 4 off bolts **14-A** and carefully pull off cover **14-D**, keeping it square to the mating face on the gearbox (Note that the park brake cable is still attached at this stage).

Note: If the cover does not come free one or more reaction pins **14-F** will have remained in the cover. Use a pair of long nosed pliers to push the pins back into the gearbox casing. Be sure not to damage the surface of the pins.

- 6 Remove the needle roller thrust bearing **14-E**, thrust plate **14-G**, friction plates **14-H** (5 off) and counter plates **14-J** (5 off).

Note: If the brake actuator is to be dismantled, or the cable renewed, then remove the park brake cable **12-A**. Undo screw **12-C**, remove circlip **12-B** and withdraw the cable from the housing.

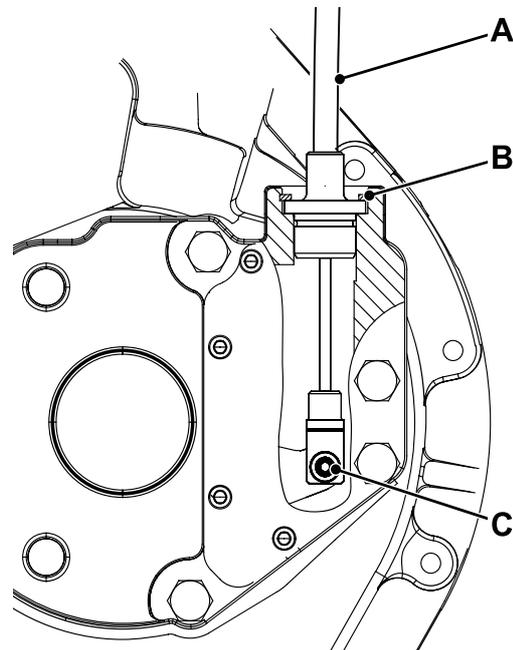


Fig 12.

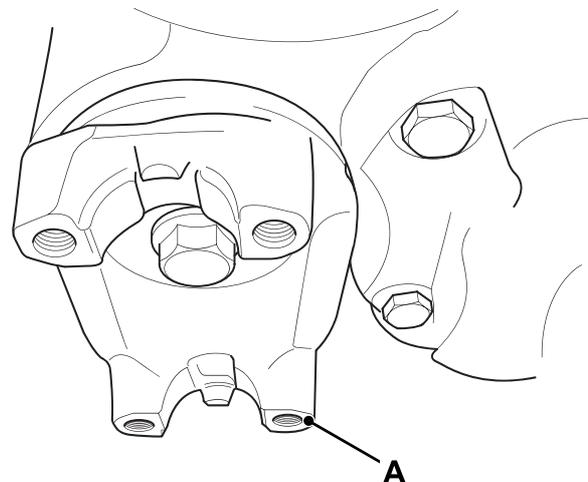


Fig 13.

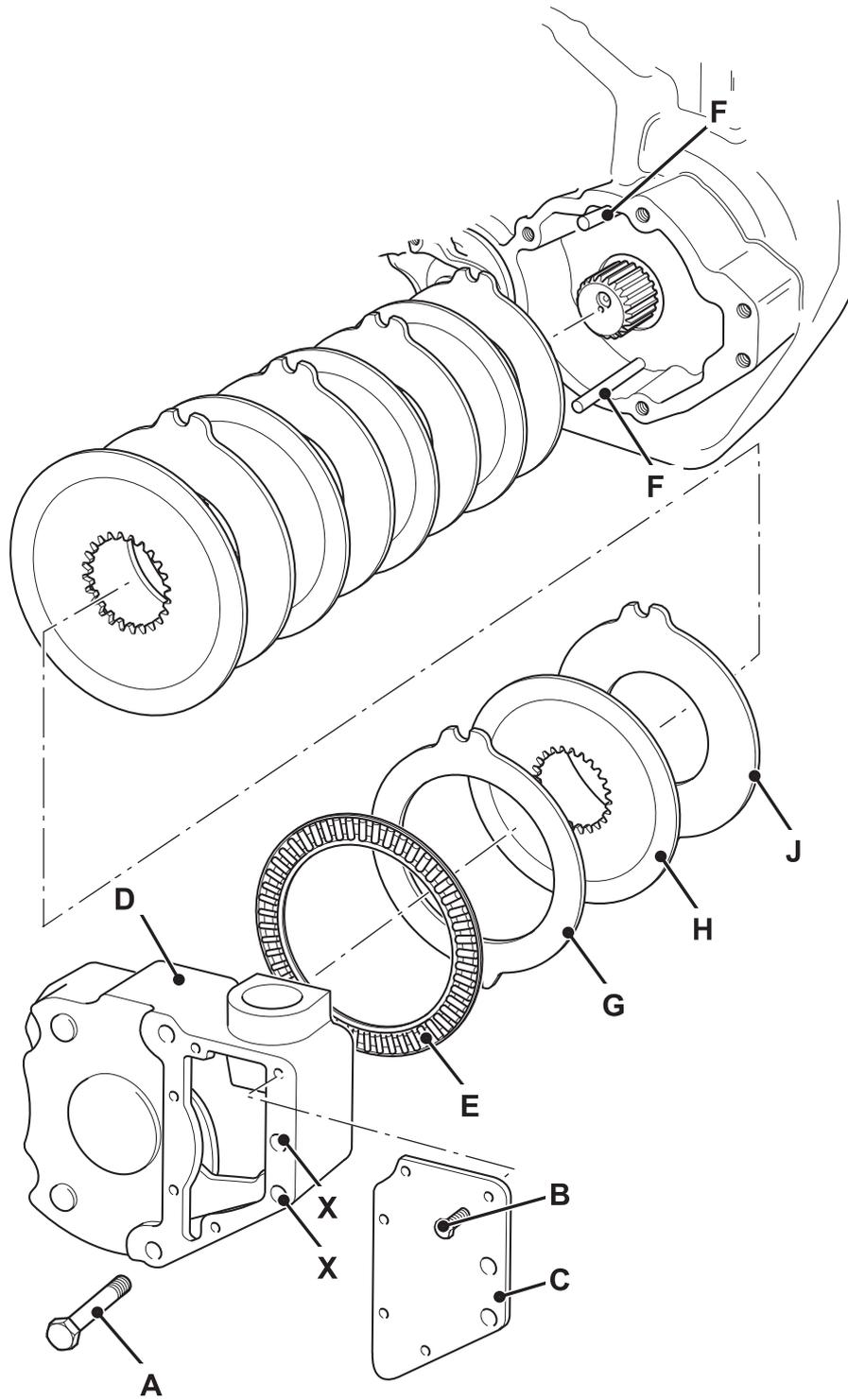


Fig 14. Multi-Plate Brake Pack

C002180-C8

Dismantle the Brake Actuator

- 1 Carefully undo screw **15-A**, note that the screw is under tension from springs **15-B** and **15-C**.
- 2 Remove washers **15-D** and **15-E**, followed by springs **15-B** and **15-C**.
- 3 Lift out the brake actuator plate **15-F** followed by balls **15-G** (5 off).

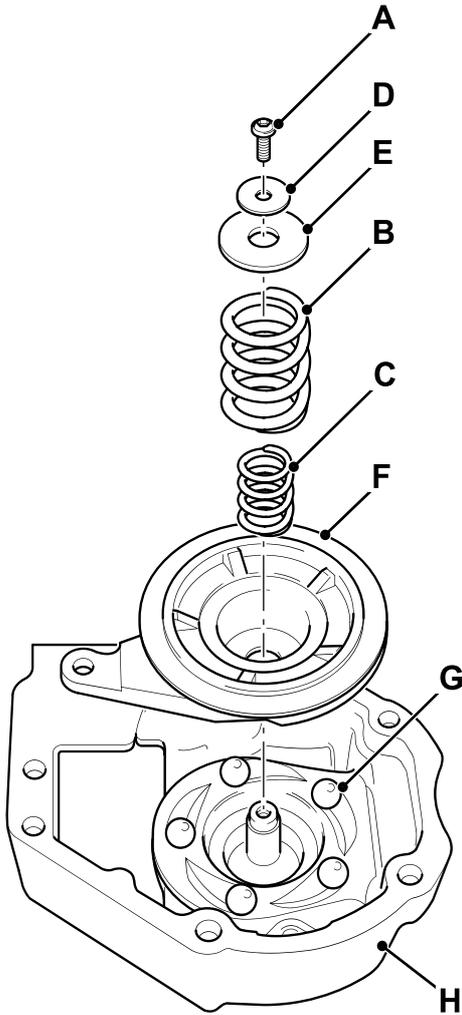


Fig 15.

Inspection

Before inspecting the brake components carefully remove all traces of sealing compound from component mating faces. Using a suitable degreaser clean the brake components including the brake housing in the gearbox rear casing.

- 1 Carefully inspect the friction plates **17-A** and counter plates **17-B**. If any of the plates show signs of damage or distortion, renew the complete friction pack.
- 2 Assemble the friction and counter plates (including the thrust plate **17-C**) on a suitable datum table. Measure the overall thickness of the assembled friction pack. The thickness **16-X** must be between 39.6 mm and 37.1mm. If the pack is out side these limits the complete friction pack assembly must be renewed.

Note: The friction pack may be outside the maximum thickness value if the plates are distorted, typically after the brake has performed an emergency stop.

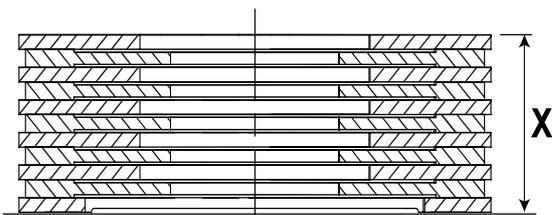


Fig 16.

- 3 Inspect the following components for signs of excessive wear or damage: Balls **17-D** and their tapered locating slots (cover **17-E** and actuator plate **17-F**), needle roller thrust bearing **17-G** and the corresponding bearing surfaces (actuator plate **17-F** and thrust plate **17-C**).

Note: Some discolouration of the needle rollers is acceptable providing the surface of the rollers is otherwise undamaged.

- 4 Make sure that the park brake cable is smooth and free in operation. Inspect the cable outer for signs of damage. Renew the cable if it is damaged or stiff to operate.

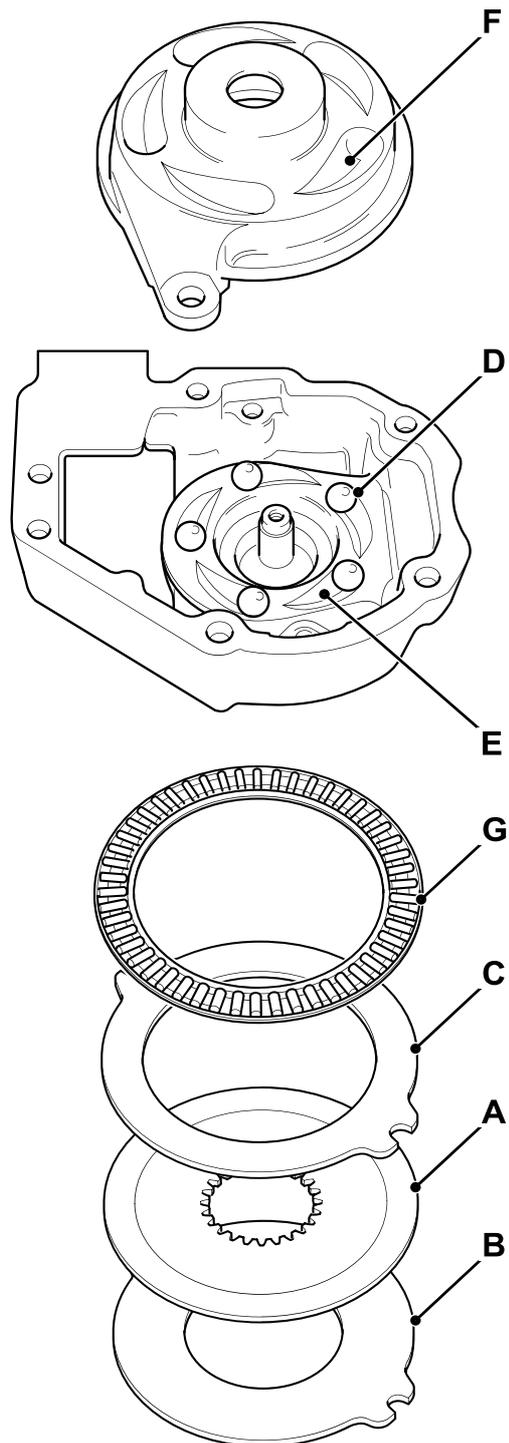


Fig 17.

Assemble the Brake Actuator

- 1 Apply a little grease to the ball locating slots in cover **18-H** and actuator plate **18-F**. Locate balls **18-G** in their slots in cover **18-H**.
- 2 Fit actuator plate **18-F** followed by springs **18-B** and **18-C**.
- 3 Locate washers **18-D** and **18-E**. Compress the springs **18-B** and **18-C**, then fit screw **18-A** and tighten.

Table 4. Torque Settings

| Item | Nm | kgf m | lbf ft |
|-------------|----|-------|--------|
| 18-A | 16 | 1.6 | 12 |

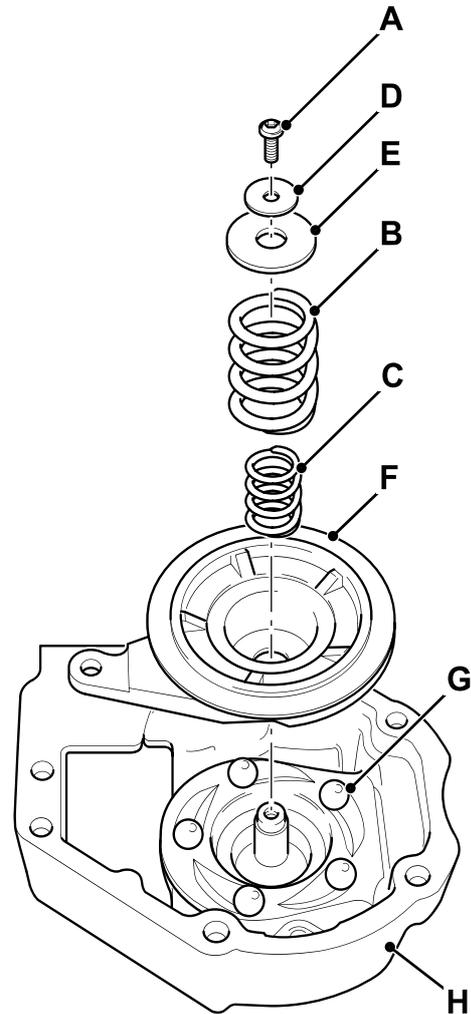


Fig 18.

Assemble the Multi-Plate Brake Pack

⇒ Fig 20. (□ G3-19)

- 1 Working beneath the machine, assemble the reaction pins **20-F** followed by the friction pack into the gearbox casing. Note that a counter plate **20-J** is fitted first, followed by a friction plate **20-H** and so on. Fit the thrust plate **20** last.

Note: If removed during the dismantling, fit the park brake cable **8-A**. Feed the cable into the housing and connect the fork end to the brake actuator **8-F** with screw **8-E**. Make sure that 'O' ring **8-D** is undamaged and correctly fitted on collar **8-B**. Locate the collar inside the brake housing and retain with circlip **8-C**.

Note: Screw **8-E** is a special clevis pin. DO NOT fit a normal bolt or screw.

- 2 Make sure that the needle roller thrust bearing **20-E** is correctly located on the brake actuator assembly, if necessary use some grease to help retain the bearing.

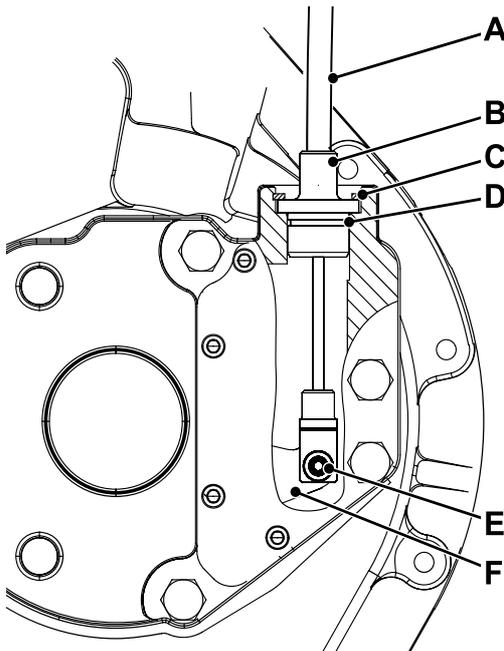


Fig 19.

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- 3 Before fitting the cover **20-D**, apply a bead of JCB Multigasket sealant to the mating face on the gearbox

casing as shown at **20-Y**. Fit the cover and 4 off bolts **20-A**. Torque tighten bolts **20-A**. ⇒ [Table 5. Torque Settings](#) (□ G3-18) Note that 2 off bolts at position **20-X** are not fitted at this stage. Carefully feed the park brake cable up into the cab, through the aperture in the cab floor.

- 4 Working inside the cab, reconnect the park brake cable to the park brake lever and adjust the lever. ⇒ [Adjustment](#) (□ G3-6)
- 5 Working under the machine view the brake friction pack through the housing aperture and check its operation. Play in the plates will be easily felt when the brake is off.
- 6 Before fitting cover plate **20-C**, apply a bead of JCB Multigasket sealant to the mating face on the cover **20-D** as shown at **20-Z**. Fit screws **20-B** (5 off) and remaining bolts **20-A** (2 off). ⇒ [Table 5. Torque Settings](#) (□ G3-18)
- 7 If any brake components have been renewed it must be assumed that the gearbox oil will be contaminated. Change the gearbox oil and filter, see [Section 3, Maintenance](#). ⇒ [Related Topics](#) (□ G3-2)

Note: A small quantity of gearbox oil will be transferred from the sump to fill the brake cavity when the engine is started. Check the gearbox oil level and top up if necessary, see [Section 3, Maintenance](#).

Table 5. Torque Settings

| Item | Nm | kgf m | lbf ft |
|-------------|----|-------|--------|
| 8-E | 9 | 0.9 | 6.6 |
| 20-A | 56 | 5.7 | 41 |
| 20-B | 16 | 1.6 | 12 |

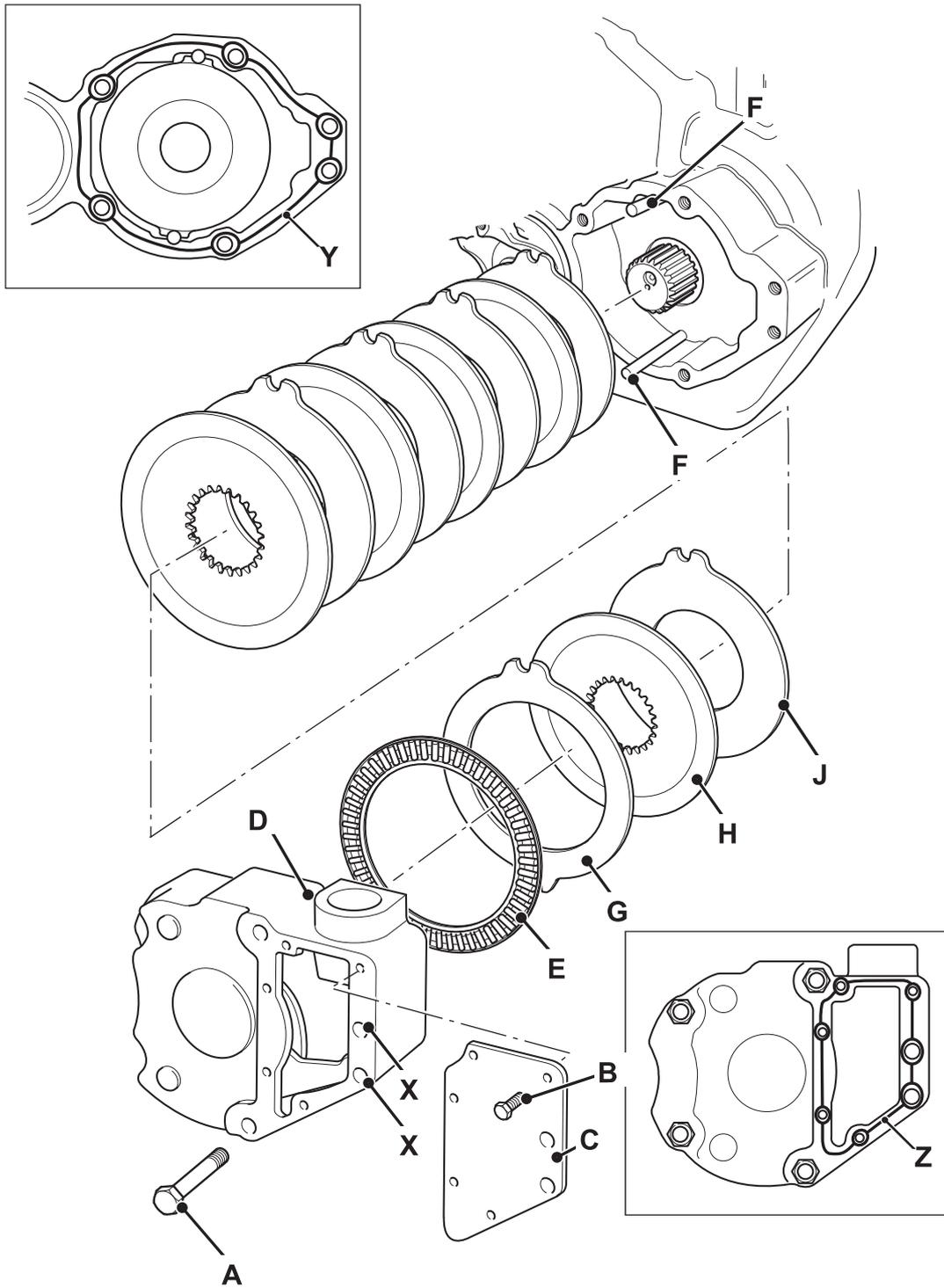


Fig 20. Multi-Plate Brake Pack

C002180-C7



Section G3 - Brakes Internal Park Brake SYSTEM

Dismantle, Inspection and Assemble

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Park Brake Calliper

Introduction

This topic contains information about a machine DEVICE. Make sure you are referring to the correct device. Refer to the applications table.

Descriptions and procedures relate to the device and not related systems. For information about the systems refer to the relevant topics.

This topic is intended to help you understand what the device does and how it works. Where applicable it also includes procedures such as removal and replacement and dismantle and assemble.

[⇒ Related Topics \(□ G4-2\)](#)

[⇒ Removal and Replacement \(□ G4-3\)](#)

[⇒ Removal \(□ G4-3\)](#)

[⇒ Replacement \(□ G4-3\)](#)

[⇒ Torque Figures \(□ G4-4\)](#)

[⇒ Dismantle, Inspection and Assemble \(□ G4-5\)](#)

[⇒ Dismantle \(□ G4-5\)](#)

[⇒ Inspection \(□ G4-7\)](#)

[⇒ Assemble \(□ G4-7\)](#)

Related Topics

Table 1. Related Topics in This Publication

| The table lists other topics in the manual that contain information related to this topic. Refer to the applicable topics to complete your procedures. Where applicable the text in this section contains cross references to this page to help you find the correct information. Some machines have different systems and devices. Make sure you refer to the correct topic, refer to <i>Section 1 - Applications</i>. | | |
|--|--------------------------------------|-------------------|
| Sections | Topic Titles | Sub Titles |
| 1 | <i>Applications</i> | ALL |
| 2 | ALL (Care and Safety) ⁽¹⁾ | ALL |

(1) *You must obey all of the relevant care and safety procedures.*

Removal and Replacement

WARNING

This is a safety critical installation. Do not attempt to do this procedure unless you are skilled and competent to do so.

Installation and mounting of the park brake caliper requires tightening of the mounting bolts to a specific torque figure. Do not attempt to do this job unless you have the correct tools available.

0010

WARNING

Before working on the park brake, park on level ground and put blocks on each side of all four wheels. 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.

BRAK-8-8

WARNING

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

13-3-1-3

Removal

Park the machine and make it safe. Vent the hydraulic pressure. Obey the care and safety procedures. [⇒ Related Topics \(□ G4-2\)](#)

- 1 Release the parking brake lever (lever horizontal).
- 2 Disconnect clevis **1-A**, note which of the three holes on the lever is used.
- 3 Remove clip **1-B** and disconnect the cable from the bracket.
- 4 Support the calliper and remove the two mounting bolts and hardened washers **1-C**. Lift the calliper clear of the brake disc.

Note: Do not remove transmission mounting bracket **1-D** unless it needs to be renewed.

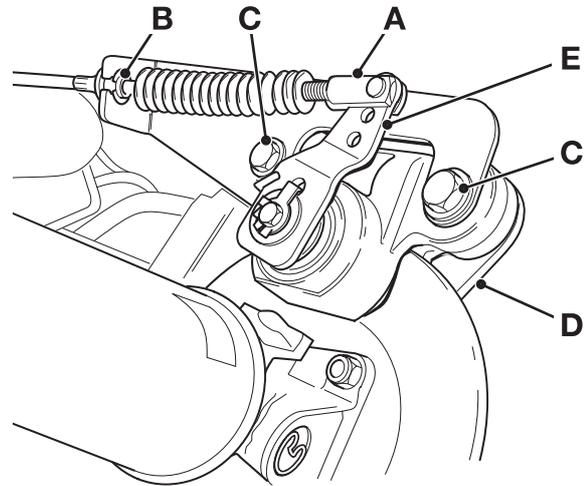


Fig 1.

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Replacement

Replacement is the opposite of the removal procedure.

During the replacement procedure do this work also:

- Locate the calliper on the brake disc. Fit new mounting bolts **1-C** with hardened washers and torque tighten. [⇒ Table 2. Torque Settings \(□ G4-3\)](#).
- Attach the cable to the mounting bracket and secure in place with clip **1-B**.
- Refit the clevis **1-A** into the relevant hole in the operating lever **1-E**.
- Make sure there is adequate freedom of movement of operating lever **1-E** to ensure a positive brake application, and that the lever returns to the rest position when the parking brake is released.
- Adjust the park brake cable. [⇒ Renewing the Park Brake Cable \(□ G3-11\)](#). Never unscrew the clevis to adjust the cable.

Table 2. Torque Settings

| Item | Nm | kgf m | lbf ft |
|------------|-----|-------|--------|
| 1-C | 255 | 26 | 188 |

Torque Figures

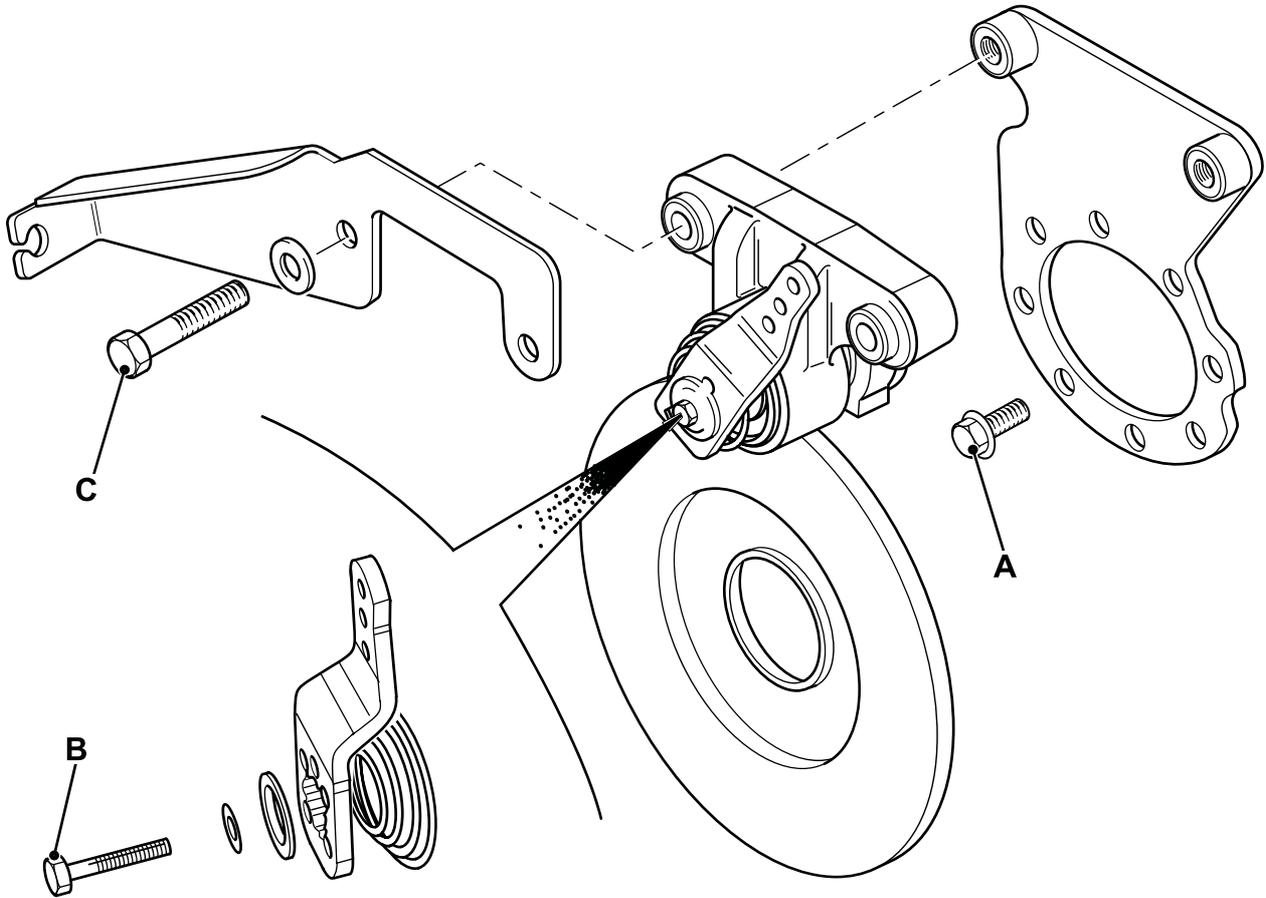


Fig 2.

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Where appropriate, the grade of bolt is indicated in parenthesis e.g. (10.9). Refer also to relevant dismantling and assembly procedures.

Table 3. Torque Settings

| Item | Nm | Kgf m | lbf ft |
|------------------|---------|-----------|------------------|
| A ⁽¹⁾ | 166 | 17 | 122 (grade 12.9) |
| B | 13 - 16 | 1.3 - 1.6 | 9 - 12 |
| C | 255 | 26 | 188 (grade 10.9) |

(1) Always use new bolts.

Dismantle, Inspection and Assemble

WARNING

This is a safety critical installation. Do not attempt to do this procedure unless you are skilled and competent to do so.

Installation and mounting of the park brake caliper requires tightening of the mounting bolts to a specific torque figure. Do not attempt to do this job unless you have the correct tools available.

0010

WARNING

Before working on the park brake, park on level ground and put blocks on each side of all four wheels. 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.

BRAK-8-8

WARNING

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

13-3-1-3

Dismantle

⇒ [Fig 3. \(□ G4-6\)](#). The numerical sequence shown on the illustration is intended as a guide to dismantling.

- 1 Remove the calliper and brake pads. ⇒ [Removal and Replacement \(□ G4-3\)](#)
- 2 Remove the screw **3**, and washers **4** and **5**. Hold lever **6** against the tension of the spring as the screw is removed.
- 3 Note the position of lever **6** relative to the splines of the rotor shaft **8**. Mark the end of the shaft and lever **6** to aid assembly. Remove lever **6** and spring **7**.
- 4 Push out rotor **8** and remove ball spacer **9** and ball bearings **10**. Take care not to lose the ball bearings.

- 5 Push out mounting bushes **11** and remove dust seals **12** and 'O' rings **13**.
- 6 Remove the rotor seal **14** followed by bearing ring **15**. Note that the rotor seal may be located on the rotor shaft or may have been left in the calliper housing **16**.

*Note: Shaft seal **17** will not need to be renewed unless excessively worn or damaged. If removal is necessary, press the seal out from inside the housing using a suitable spacer block and bench press. Clean out any remains of the seal after removal.*

Component Key ⇒ [Fig 3. \(□ G4-6\)](#)

- | | |
|----|------------------|
| 1 | Carrier side pad |
| 2 | Lever side pad |
| 3 | Screw |
| 4 | Washer |
| 5 | Washer |
| 6 | Lever |
| 7 | Spring |
| 8 | Rotor |
| 9 | Ball spacer |
| 10 | Ball bearings |
| 11 | Mounting bushes |
| 12 | Dust seals |
| 13 | 'O' Rings |
| 14 | Rotor Seal |
| 15 | Bearing ring |
| 16 | Housing |
| 17 | Shaft seal |

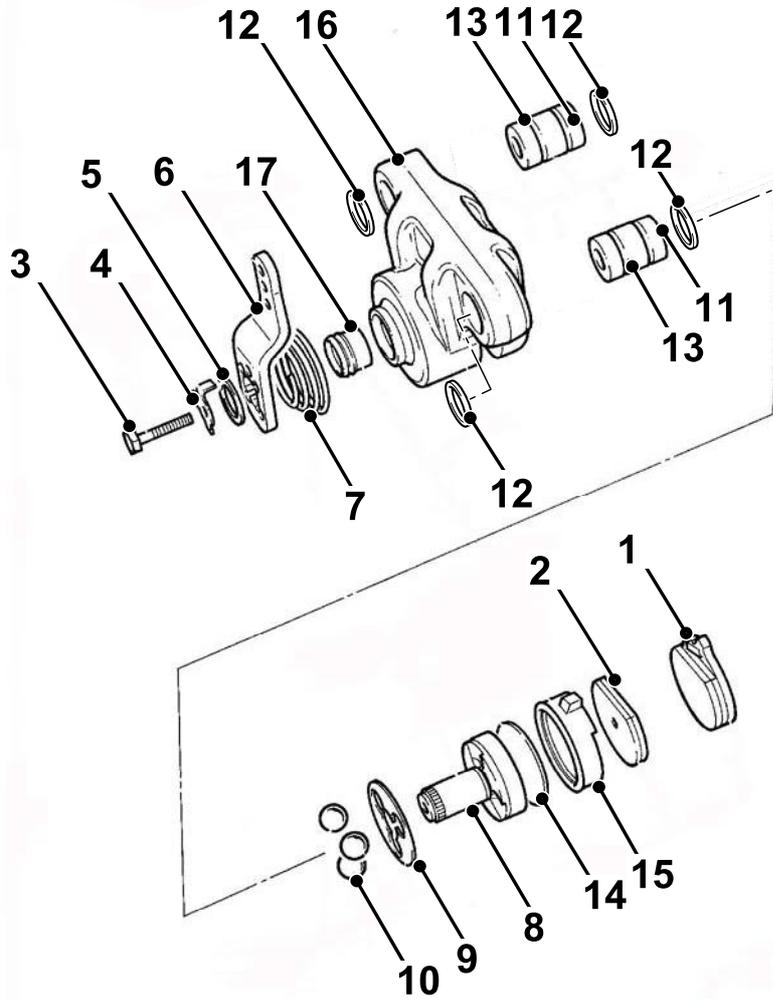


Fig 3. Park Brake Calliper

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Inspection

- 1 Clean and dry all parts. Check all parts are free from excessive wear, damage or corrosion. Light scores or stains should be removed. Renew corroded or deeply scored parts.
- 2 Check rotor **8** for damage or distortion. Renew if necessary. Always renew both brake pads if the parking brake has been used in an emergency. Check the ball pockets in housing **16** for signs of scoring, pitting, damage or corrosion. Renew the housing if damaged. Check spring **7** is not broken or distorted. Check the condition of the disc surface. Renew the disc if badly warped, pitted or worn. → [Park Brake Disc \(□ G5-1\)](#)

Assemble

→ [Fig 3. \(□ G4-6\)](#). The numerical sequence shown on the illustration is intended as a guide to assembling.

Before assembly make sure all parts are clean and serviceable.

- 1 Fit a new shaft seal **17** if removed. Install the seal as shown. Press the seal into the housing using a suitable spacer block and bench press.
- 2 Coat the shaft, outer diameter and ball pockets of rotor **8** and the ball pockets of housing **16** with silicone grease.
- 3 Insert the three ball bearings **10** into the pockets in the housing **16**. Insert ball spacer **9**.
- 4 Coat the bearing ring **15** with silicone grease and fit the ring to the inner diameter on rotor seal **14**. Assemble the rotor seal to the rotor **8**.
- 5 Slide rotor **8** through the casting and seat the ball pockets against the bearings.
- 6 Position spring **7** over the shaft of rotor **8**. Insert the large diameter end of the spring into hole **4-X** in the face of the housing.
- 7 Locate the small diameter end of spring **7** around the outside edge of lever **6** as shown at **4-Y**.

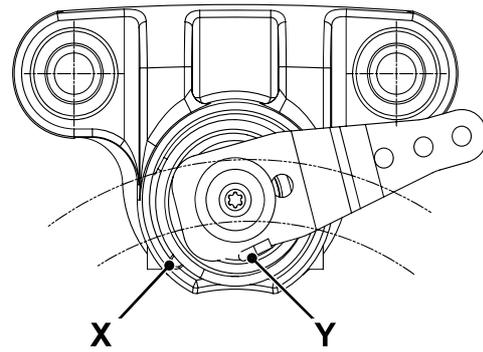


Fig 4.

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- 8 Fit lever **6**. Align the lever to the mark made during dismantling.
- 9 Hold the lever against the tension of the spring and fit washers **4** and **5** Fit screw **3** and torque tighten. → [Table 4. Torque Settings \(□ G4-7\)](#).
- 10 Fit the brake pads. → [Renewing the Brake Pads \(□ G2-9\)](#)
- 11 Lubricate the dust seals **12** and bushes **11** with silicone grease. Fit the dust seals to the housing and insert mounting bushes. Make sure that the dust seals locate in their location grooves on the bushes **11** and housing **16**. Fit new 'O' rings **13** and lubricate. Wipe off any excess grease.
- 12 Before fitting the calliper, ensure the lever rotates smoothly and that the lever side pad **2** returns to the off position when the lever is released.
- 13 Refit the brake calliper. → [Removal and Replacement \(□ G4-3\)](#)
- 14 Refit and adjust the park brake cable. → [Renewing the Parkbrake Cable \(□ G3-10\)](#)

Table 4. Torque Settings

| Item | Nm | kgf m | lbf ft |
|------|---------|-----------|--------|
| 3 | 13 - 16 | 1.3 - 1.6 | 9 - 12 |



Section G4 - Brakes Park Brake Calliper

Dismantle, Inspection and Assemble

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Park Brake Disc

Introduction

This topic contains information about a machine DEVICE. Make sure you are referring to the correct device. Refer to the applications table.

Descriptions and procedures relate to the device and not related systems. For information about the systems refer to the relevant topics.

This topic is intended to help you understand what the device does and how it works. Where applicable it also includes procedures such as removal and replacement and dismantle and assemble.

[⇒ *Related Topics* \(!\[\]\(ca91c249b0546c1424a84dfa11756b5e_img.jpg\) G5-2\)](#)

[⇒ *Removal and Replacement* \(!\[\]\(d1a88bef3b1503d05207105457efd072_img.jpg\) G5-3\)](#)

Related Topics

Table 1. Related Topics in This Publication

| <p>The table lists other topics in the manual that contain information related to this topic. Refer to the applicable topics to complete your procedures. Where applicable the text in this section contains cross references to this page to help you find the correct information. Some machines have different systems and devices. Make sure you refer to the correct topic, refer to <i>Section 1 - Applications</i>.</p> | | |
|--|--------------------------------------|------------|
| Sections | Topic Titles | Sub Titles |
| 1 | <i>Applications</i> | ALL |
| 2 | ALL (Care and Safety) ⁽¹⁾ | ALL |
| F | <i>Propshafts</i> | ALL |

(1) You must obey all of the relevant care and safety procedures.

Table 2. Service Tools

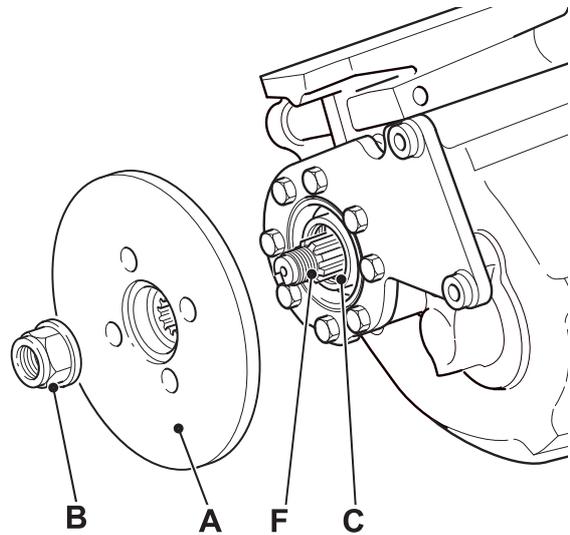
| <p>The table lists the service tools you will need to do some of the procedures in this topic. Make sure you have the correct service tools BEFORE you start the procedures.</p> | | |
|---|--------------------------|----------------------------------|
| Tool Reference | Tool Part Number | Description |
| T1 | 992/04800 ⁽¹⁾ | Flange Spanner - park brake disc |

(1) Tool available from JCB Service, refer to *Section 1 - Service Tools*

Removal and Replacement

Removal

- 1 Remove the park brake calliper. → [Park Brake Calliper \(G4-1\)](#)
- 2 Remove the drive shaft at the park brake disc. → [Related Topics \(G5-2\)](#)
- 3 Clean the brake disc and gearbox adjacent to the brake disc. Do not allow particles of grit to fall into the gearbox when the brake disc is removed.
- 4 While holding brake disc **1-A** with service tool **T1** unscrew output shaft nut **1-B**.
- 5 Discard the nut **1-B**.
- 6 Lift off the brake disc. If necessary use a soft face hammer to help remove the disc. DO NOT use a steel hammer, damage can occur to the output shaft bearings **1-E**.



Replacement

- 1 Make sure that the oil seal interface **1-D** on the brake disc is clean and free from wear or damage.
- 2 Apply JCB HP grease to the lips of oil seal **1-C**.
- 3 Fit the brake disc on to the output shaft **1-F**.
- 4 Hold the brake disc with service tool **T1**.
- 5 Fit a NEW stake nut **1-B**. Progressively torque tighten to 300 Nm (221 lbf ft).
- 6 Stake nut **1-B** into the slot in the shaft.

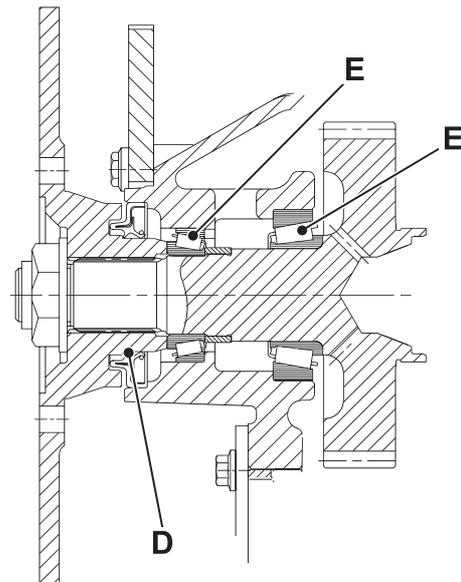


Fig 1.

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Section G5 - Brakes Park Brake Disc

Removal and Replacement

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Park Brake Switch

Introduction

This topic contains information about a machine DEVICE. Make sure you are referring to the correct device. Refer to the applications table.

Descriptions and procedures relate to the device and not related systems. For information about the systems refer to the relevant topics.

This topic is intended to help you understand what the device does and how it works. Where applicable it also includes procedures such as removal and replacement and dismantle and assemble.

[⇒ *Related Topics* \(!\[\]\(fee2cf1b4e911a36481719eb4dba7ae3_img.jpg\) G6-2\)](#)

[⇒ *Removal and Replacement* \(!\[\]\(4ba257e8092543bf03a7edc57c3beae1_img.jpg\) G6-3\)](#)

Related Topics

Table 1. Related Topics in This Publication

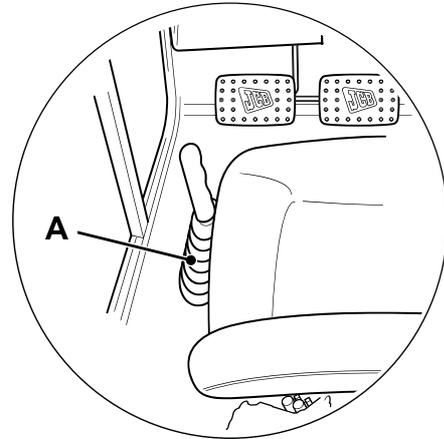
| The table lists other topics in the manual that contain information related to this topic. Refer to the applicable topics to complete your procedures. Where applicable the text in this section contains cross references to this page to help you find the correct information. Some machines have different systems and devices. Make sure you refer to the correct topic, refer to <i>Section 1 - Applications</i>. | | |
|--|--------------------------------------|-------------------|
| Sections | Topic Titles | Sub Titles |
| 1 | Applications | ALL |
| 2 | ALL (Care and Safety) ⁽¹⁾ | ALL |

(1) *You must obey all of the relevant care and safety procedures.*

Removal and Replacement

Removal

- 1 Park the machine and make it safe. Obey the care and safety procedures. → [Related Topics \(□ G6-2\)](#)
- 2 Put chocks under the wheels. Release the park brake.
- 3 Remove the rubber gaiter **1-A**.
- 4 Disconnect the electrical connector from the switch **1-C**.
- 5 Remove the electrical connector **1-D** from the park brake assembly.
- 6 Hold the switch **1-B** and remove screw **1-E**.
- 7 Remove the switch **1-B**.



Replacement

Replacement is the opposite of the removal procedure. During the replacement procedure do this work also:

- To align the switch correctly, engage the switch location dowel **1-F** with hole in the mounting bracket **1-G**.

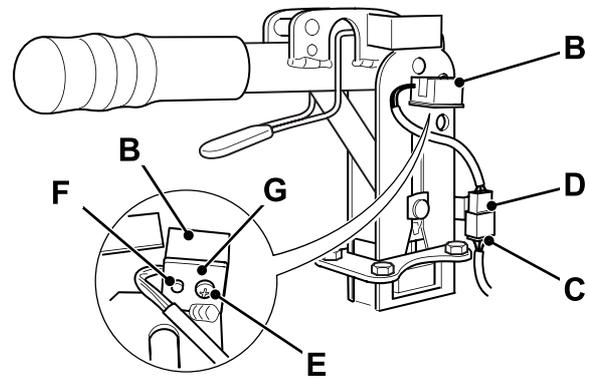


Fig 1.

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Section G6 - Brakes Park Brake Switch

Removal and Replacement

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Servo Exhauster Unit

Introduction

This topic contains information about a machine DEVICE. Make sure you are referring to the correct device. Refer to the applications table.

Descriptions and procedures relate to the device and not related systems. For information about the systems refer to the relevant topics.

This topic is intended to help you understand what the device does and how it works. Where applicable it also includes procedures such as removal and replacement and dismantle and assemble.

[⇒ *Related Topics* \(!\[\]\(a4abd7ed1c7809e2ee22677b7fb5d0fa_img.jpg\) G7-2\)](#)

[⇒ *Removal and Replacement* \(!\[\]\(192f21482edbe088069e1d0e4eb937fe_img.jpg\) G7-3\)](#)

Related Topics

Table 1. Related Topics in This Publication

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|--|---|---|
| Sections | Topic Titles | Sub Titles |
| 1 | <i>Applications</i> | ALL |
| 2 | ALL (Care and Safety) ⁽¹⁾ | ALL |
| G | ⇒ Single Axle Service Brakes SYSTEM (□ G1-1) | ⇒ Brake Vacuum Test (if applicable) (□ G1-8) |
| K | Cooling Pack | Removal and Replacement |

(1) You must obey all of the relevant care and safety procedures.

Removal and Replacement

If the brake performance is poor and the brake servo vacuum is suspected, carry out the brake vacuum test before renewing the servo exhauster unit. → [Related Topics \(□ G7-2\)](#)

WARNING

Before working on the brake system make sure the machine is on level ground and chock all four wheels.

BRAK-1-4

Removal

- 1 Park the machine and make it safe. Obey the care and safety procedures. → [Related Topics \(□ G7-2\)](#)
- 2 Disconnect the battery.
- 3 Raise the engine cover.

Note: Access to the servo exhauster unit is limited. If necessary remove the machine cooling pack to gain sufficient access. → [Related Topics \(□ G7-2\)](#)

- 4 → [Fig 1. \(□ G7-4\)](#) Working in the engine compartment, undo the clip and release the brake vacuum hose **A** from the pipe stub **B**. Disconnect the oil feed hose **C**. Blank off the open ends of the hoses to prevent ingress of dirt. Tie the hoses out of the way.
- 5 Undo the two screws **D** and carefully withdraw the servo exhauster unit from the engine. Discard the gasket **E**.

Replacement

Note: The servo exhauster unit is a non-serviceable part. If it is suspected as being faulty it must be renewed as a complete assembly.

Important: The special adaptor **F** is fitted with an oil feed restrictor orifice (3 mm diameter). Check to make sure that the orifice is not blocked before fitting the servo exhauster unit.

Replacement is the opposite of the removal procedure.

During the replacement procedure do this work also:

- Ensure the servo exhauster unit flange and engine mating face are clean. Fit a new gasket **E**.
- Carefully align the gear **G** so that the gear teeth engage with the drive gear in the engine.
- Torque tighten screws **D**. → [Table 2. Torque Settings \(□ G7-4\)](#)
- On completion test the brakes.

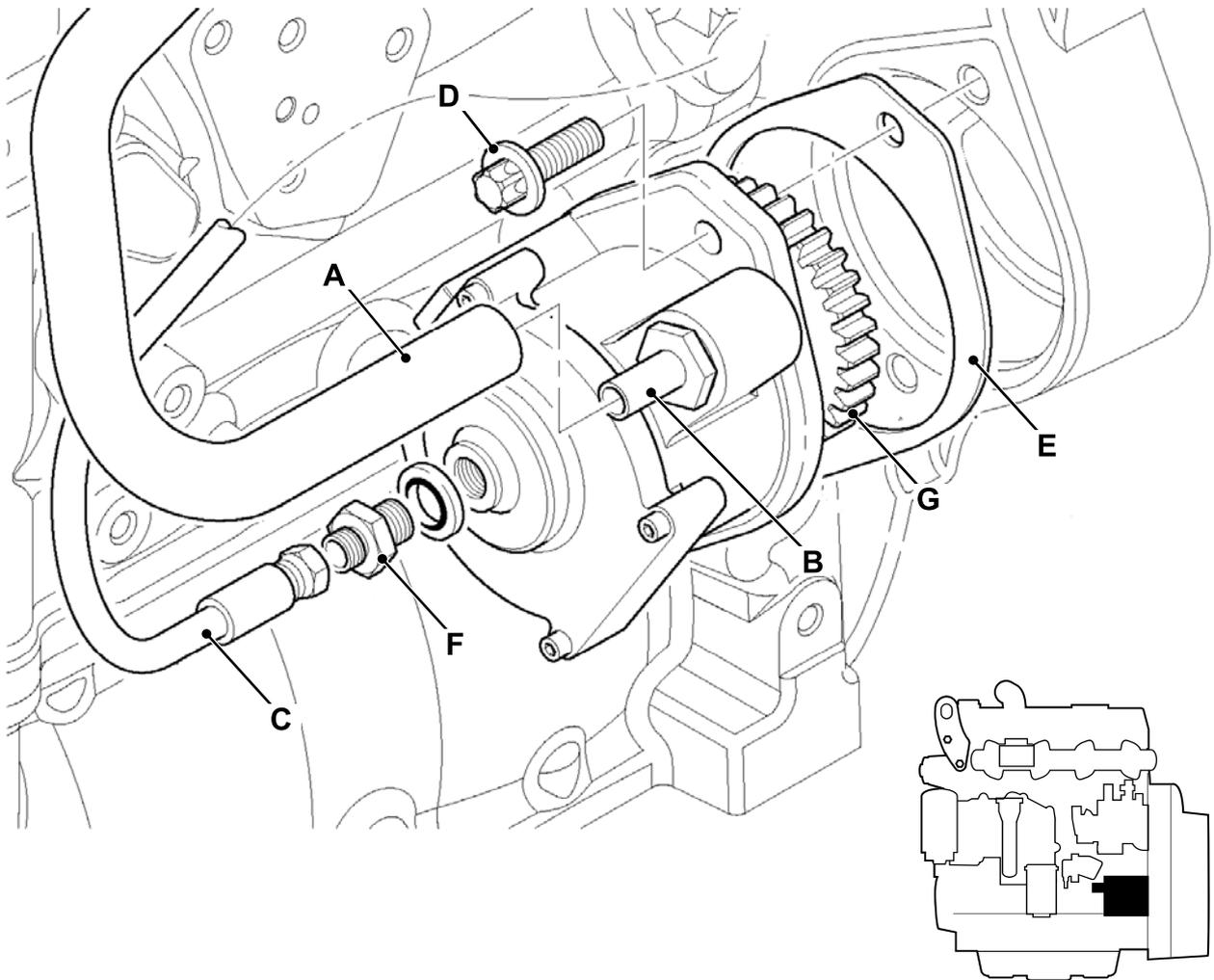


Fig 1.

C033440

Table 2. Torque Settings

| Item | Nm | kgf m | lbf ft |
|------|---------|-----------|---------|
| D | 43 - 51 | 4.4 - 5.2 | 32 - 38 |

Servo Unit, Single Axle Brakes

Introduction

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This topic is intended to help you understand what the device does and how it works. Where applicable it also includes procedures such as removal and replacement and dismantle and assemble.

[⇒ *Related Topics* \(!\[\]\(87b1d3ef84917af7042aca35293ed0a4_img.jpg\) G8-2\)](#)

[⇒ *Removal and Replacement* \(!\[\]\(410147ca91d817cfa0b908539ffa04b7_img.jpg\) G8-3\)](#)

Related Topics

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| Sections | Topic Titles | Sub Titles |
| 1 | <i>Applications</i> | ALL |
| 2 | ALL (Care and Safety) ⁽¹⁾ | ALL |
| 3 | <i>Routine Maintenance</i> | <i>Checking the Foot Brake Fluid Level</i> |
| G | ⇒ Single Axle Service Brakes SYSTEM (□ G1-1) | ⇒ Bleeding (□ G1-13) |

(1) You must obey all of the relevant care and safety procedures.

Removal and Replacement

Removal

- 1 Park the machine and make it safe. Obey the care and safety procedures. [⇒ Related Topics \(□ G8-2\)](#)
 - 2 Disconnect servo vacuum hose **1-A**. [⇒ Related Topics \(□ G8-2\)](#)
- Check the brake fluid level. [⇒ Related Topics \(□ G8-2\)](#)
 - Bleed the brake system. [⇒ Related Topics \(□ G8-2\)](#)

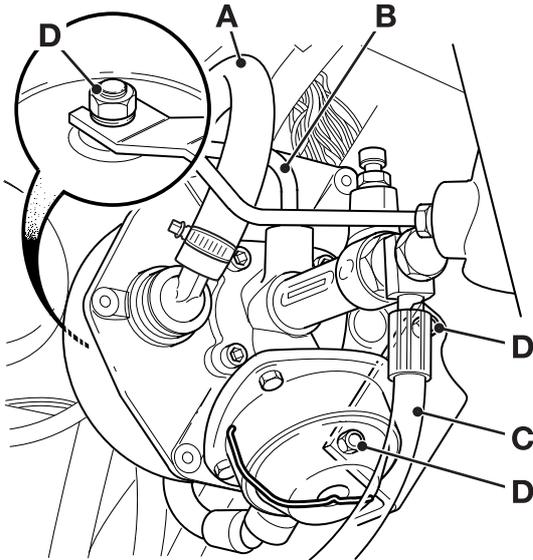


Fig 1.

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- 3 Disconnect and blank off master cylinder output pipe **1-B**. Plug the cylinder port.
- 4 Disconnect cylinder output hose **1-C**. Blank off the hose and plug the cylinder port.
- 5 Loosen the three securing nuts **1-D** and slide the servo unit out of its mounting bracket.

Replacement

Replacement is the opposite of the removal procedure.

During the replacement procedure do this work also:



Section G8 - Brakes Servo Unit, Single Axle Brakes

Removal and Replacement

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Master Cylinder

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[⇒ *Related Topics* \(!\[\]\(5089d549bd5af430aa197ded06da9e4e_img.jpg\) G9-2\)](#)

[⇒ *Removal and Replacement* \(!\[\]\(d447a39d466d76c338e0c282e090b13b_img.jpg\) G9-3\)](#)

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| Sections | Topic Titles | Sub Titles |
| 1 | <i>Applications</i> | ALL |
| 2 | ALL (Care and Safety) ⁽¹⁾ | ALL |
| 3 | <i>Routine Maintenance</i> | <i>Checking the Foot Brake Fluid Level</i> |
| G | ⇒ Single Axle Service Brakes SYSTEM (□ G1-1) | ALL |

(1) You must obey all of the relevant care and safety procedures.

Removal and Replacement

Removal

Note: The master cylinder is not serviceable and must be renewed if faulty.

WARNING

Before working on the brake system make sure the machine is on level ground and chock all four wheels.

BRAK-1-4

- 1 Remove clevis pin **1-A** to disconnect the master cylinder operating rod from the brake pedal mechanism.

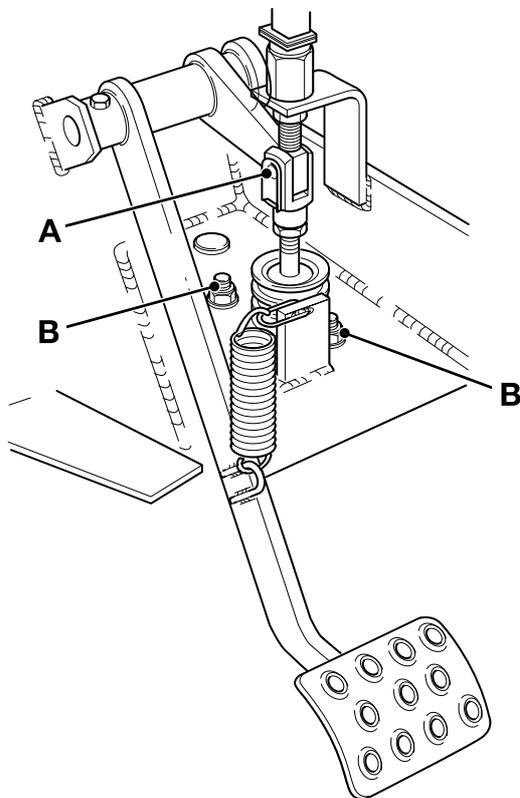


Fig 1.

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- 2 Disconnect plastic feed pipe **2-A** from the brake fluid reservoir and either blank off the pipe or drain the reservoir.
- 3 Disconnect the master cylinder output hose (or pipe, as applicable) **2-B**. Plug the cylinder port and blank off the hose (or pipe) to prevent ingress of dirt.

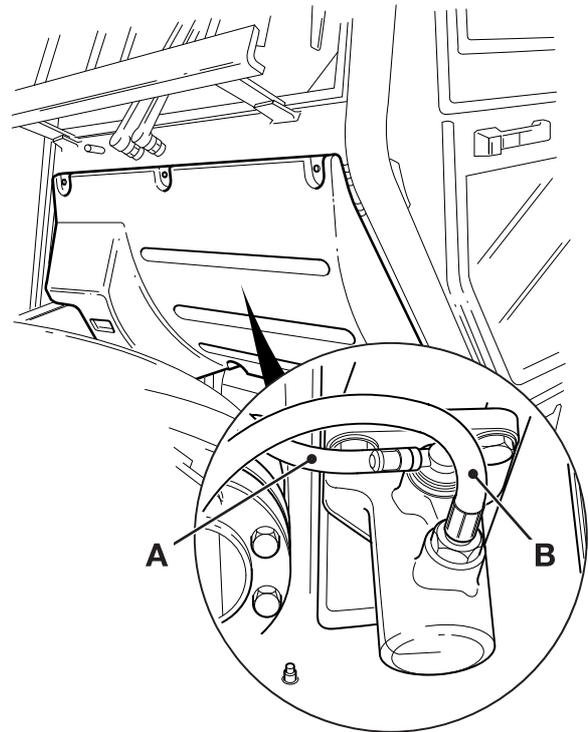


Fig 2.

768730-1

- 4 Remove screws **1-B** and lift the master cylinder clear of the machine.

Replacement

Replacement is the opposite of the removal procedure.

During the replacement procedure do this work also:

- Once the master cylinder is installed and the pipework connected check the brake fluid reservoir (see **Checking the Brake Fluid Level**, Section 3) and then bleed the brake system. [⇒ Bleeding \(□ G1-13\)](#).
- Check the operation of the brake light switch. Adjust if necessary. [⇒ Adjustment \(□ G1-15\)](#)

Fluid Reservoir

Introduction

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This topic is intended to help you understand what the device does and how it works. Where applicable it also includes procedures such as removal and replacement and dismantle and assemble.

[⇒ *Related Topics* \(!\[\]\(a869552069260a56977778d3c84b742e_img.jpg\) G10-2\)](#)

[⇒ *Removal and Replacement* \(!\[\]\(98c8137e9df843b5a8583d950351e8ea_img.jpg\) G10-3\)](#)

Related Topics

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|--|---|---|
| Sections | Topic Titles | Sub Titles |
| 1 | <i>Applications</i> | ALL |
| 2 | ALL (Care and Safety) ⁽¹⁾ | ALL |
| 3 | <i>Routine Maintenance</i> | <i>Checking the Foot Brake Fluid Level</i> |
| G | ⇒ Single Axle Service Brakes SYSTEM (□ G1-1) | ALL |

(1) You must obey all of the relevant care and safety procedures.

Removal and Replacement

Removal

- 1 Make sure that the engine cannot be started.
- 2 Remove the cover at the front of the cab. Refer to [Section 3 - Brakes](#). → [Related Topics \(G10-2\)](#)
- 3 Clean the reservoir **1-A** and tube **1-B**.
- 4 Seal off tube **1-B** with a clamp.
- 5 Remove and discard the clip **1-C**.

Note: When tube **1-B** is removed from the reservoir there will be brake fluid leakage. Be prepared.

- 6 Remove tube **1-B** from the reservoir. Put a cap on the pipe on the bottom of the reservoir.
- 7 Hold the reservoir and remove the nut **1-D** and bolt **1-E**.
- 8 Remove the reservoir. Keep the reservoir vertical.

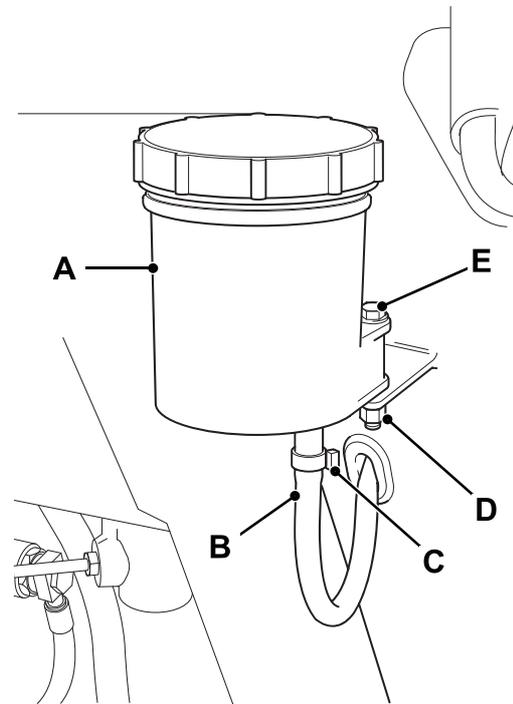


Fig 1.

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Replacement

Replacement is the opposite of the removal procedure.

During the replacement procedure do this work also:

- Examine the tube **1-B**. If it is defective replace it with a new one.
- Use a new clip **1-C**.
- Bleed the brakes. → [Bleeding \(G1-13\)](#)



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