

Document Title: General description	Function Group: 500	Information Type: Service Information	Date: 2014/3/14
Profile: BHL, BL71B [GB]			

General description

General

The machine features a double brake circuit:

- one separate circuit for the service brake
- one separate circuit for the parking brake

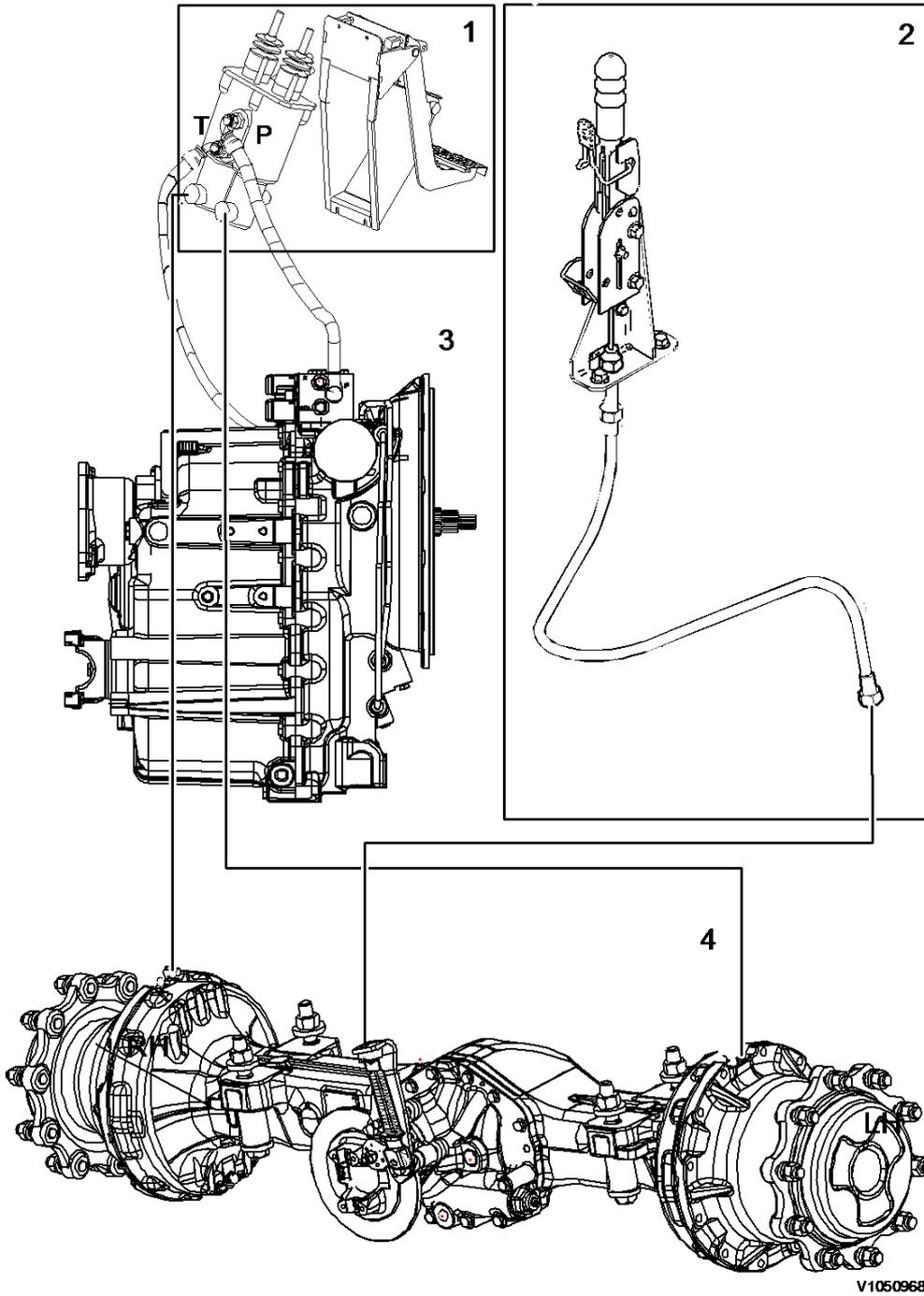
Service brake

The service brake system is hydraulically operated. It is divided into two circuits, to allow independent left and right braking. The machine is equipped with two brake pedals, one for each circuit.

The brakes, wet disc brakes with automatic wear adjustment, are located in the rear axle hubs. The brake boost valve is located in the cab and is supplied with oil by the transmission.

Parking brake

The parking brake is mechanically operated. It consists of a lever in the cabin and a brake disc with two brake pads, mounted on the input shaft of the rear axle.



V1050968

Figure 1
brake system

1. service brake assembly
2. parking brake lever assembly
3. transmission
4. rear axle with parking brake assembly

Document Title: Service brake, description	Function Group: 500	Information Type: Service Information	Date: 2014/3/14
Profile: BHL, BL71B [GB]			

Service brake, description

General

The service brake is a hydraulically operated brake system. The brakes, wet disc brakes with automatic wear adjustment, are located in the rear axle.

The brake system consists of a boosted twin cylinder auto compensating self bleeding brake valve which regulates the pressure in the brake circuit. Oil is supplied to the brake system from the transmission oil pump.

The brake valve is located under the front console in the cab.

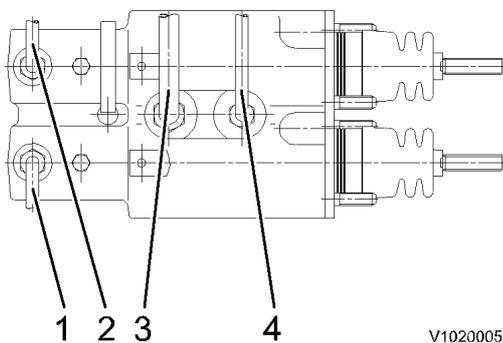


Figure 1
Brake valve

1. Connection to left rear wheel brake
2. Connection to right rear wheel brake
3. Tank line
4. Pressure line

There are two brake pedals. The left rear wheel brake is operated by the left pedal. The right rear wheel brake is operated by the right pedal. The pedals can be locked together by a steel locking bar.

Each brake pedal activates a master cylinder in the brake valve. An integral balance pipe in the brake valve balances the oil pressure for both brakes.

Each rear wheel can be decelerated separately by pressing either pedal (when the steel locking bar is open).

The brake valve is connected to the rear axle, where the wet brake multi-discs are activated.

The cooling of the brakes is achieved by the oil in the axle and the surface area of the axle itself.

When the speed is above 20 km/h (12.4 mph), the four wheel drive will be engaged automatically during braking, to transmit brake force also to the front axle.

Brake components in the rear axle

The Service brake has two brake discs and two steel plates in between. The two steel plates have different thicknesses – the one between the two brake discs is the thicker one. When installing the brake discs make sure that the holes in the discs are aligned to each other.

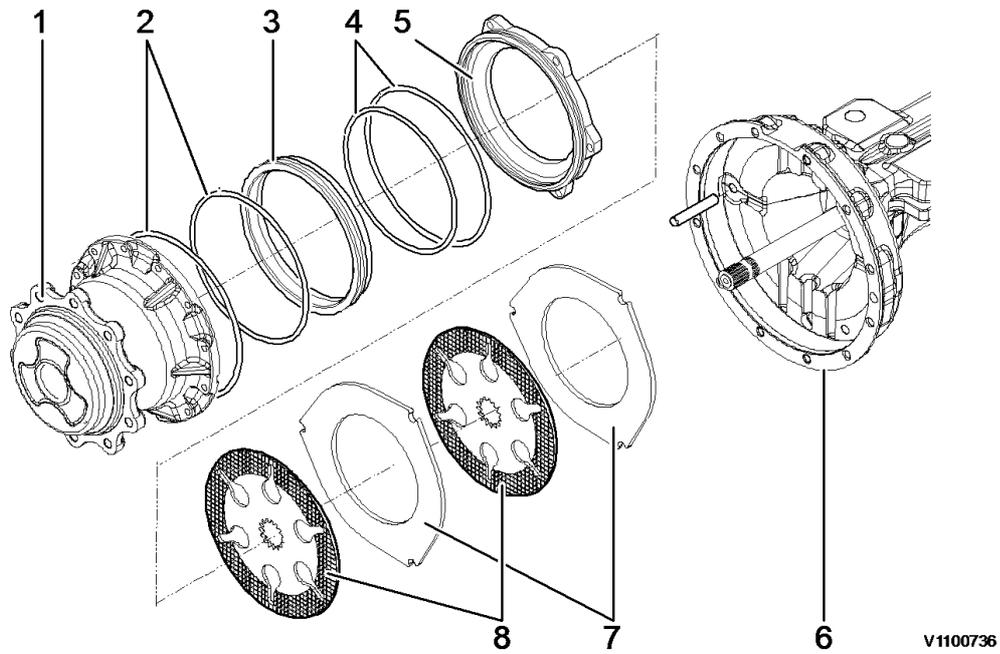


Figure 2
Service brake components

1	wheel hub	5	brake piston
2	O-rings	6	axle body
3	inner cylinder	7	steel discs
4	O-rings	8	brake discs

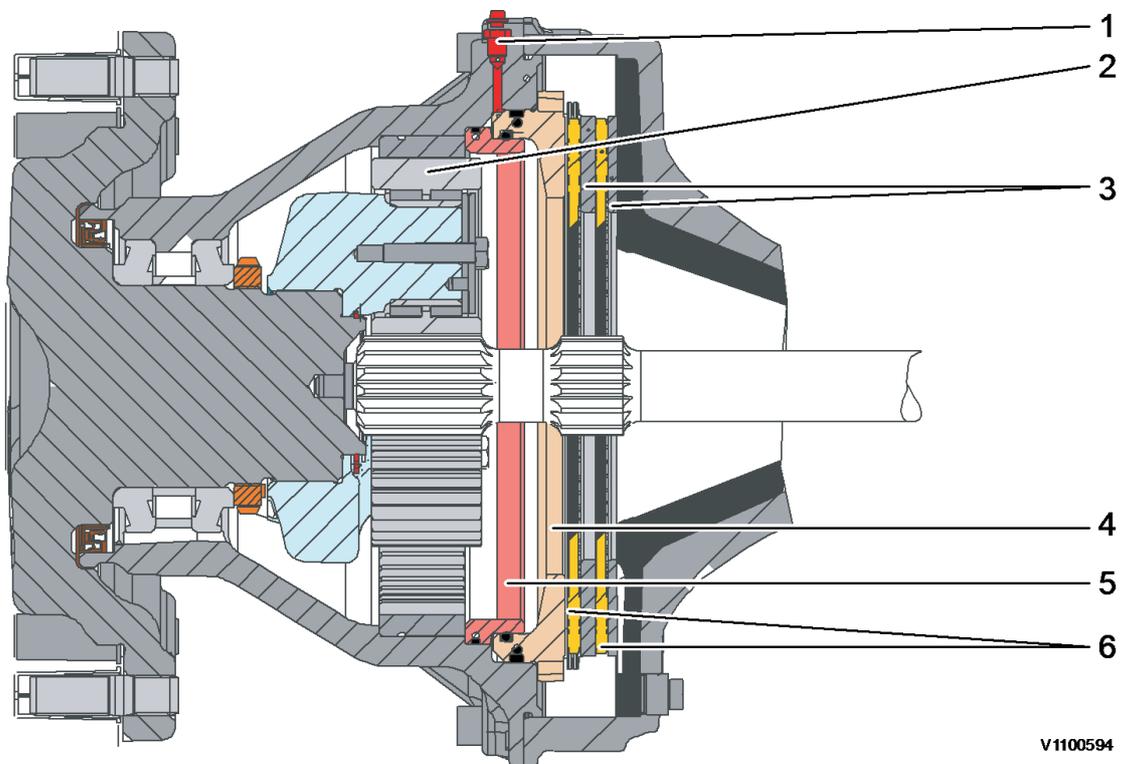


Figure 3
service brake, sectional view

1	air bleed nipple	4	brake piston
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2	gear	5	inner cylinder
3	steel discs	6	brake discs

Automatic adjustment

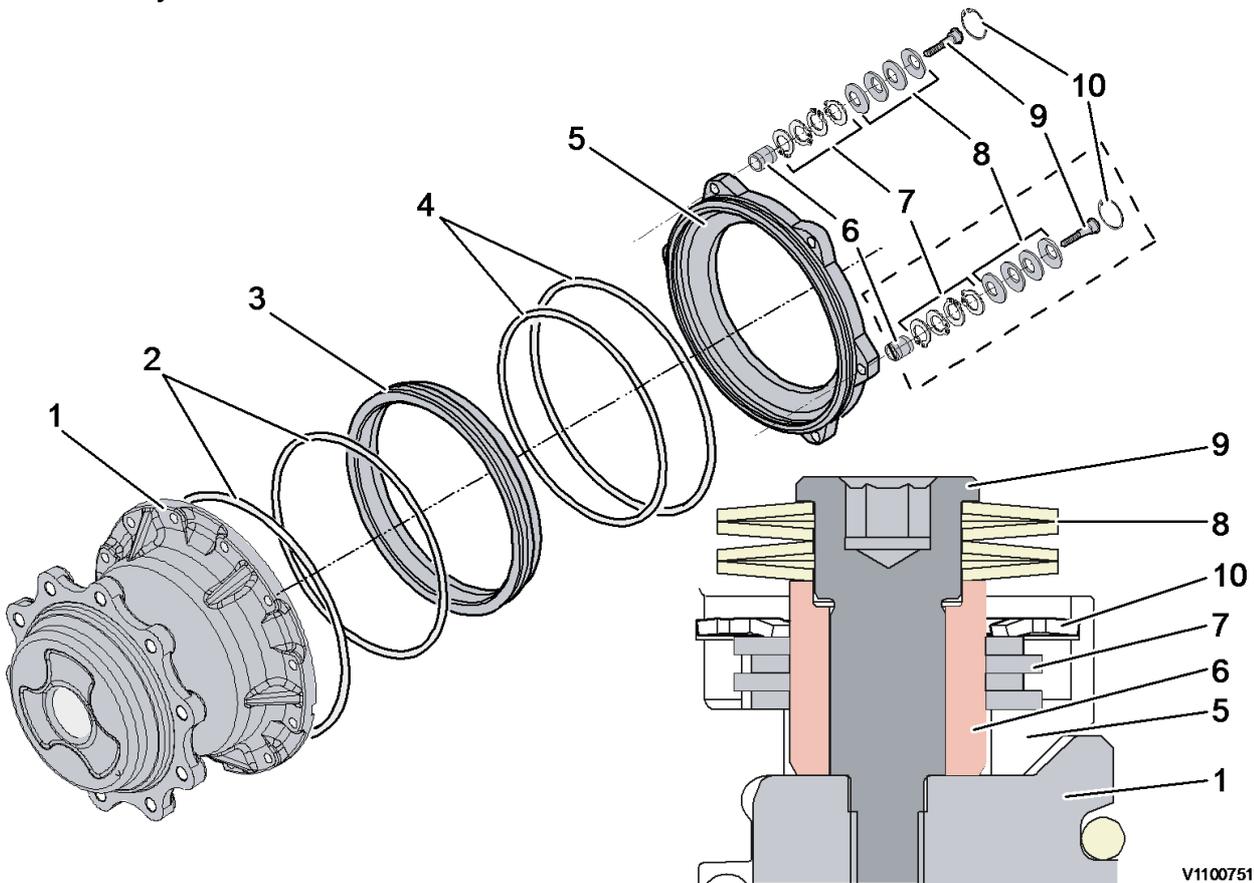


Figure 4
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1	wheel hub housing	6	sleeve
2	O-rings	7	retaining rings
3	inner cylinder	8	Belleville washer
4	O-rings	9	screw
5	brake piston	10	safety ring

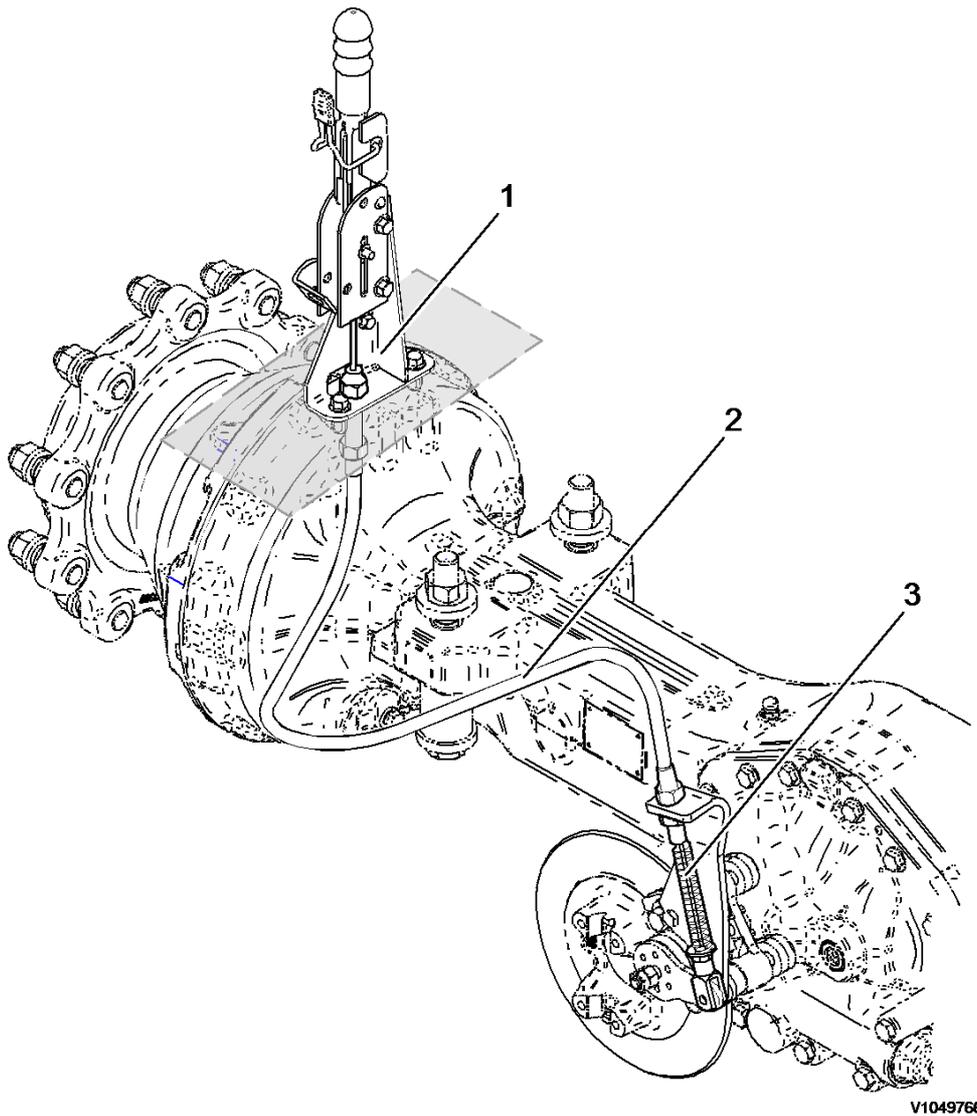
The service brake is equipped with three automatic adjustment devices. One automatic adjustment device consists of the sleeve (6), four retaining rings (7), the Belleville washer (8), a screw (9) and a safety ring (10).

The brake piston (5) is fixed on the wheel hub housing (1) with the screw (9) and the sleeve (6). On the sleeve, four retaining rings (7) are mounted and in the brake piston (5), the safety ring (10) holds the assembly down. When the service brake is applied, the brake piston moves out against the Belleville washer (8). After releasing the brake, the springs move the piston back into neutral position.

If the brake discs are worn, the piston travel becomes bigger. In that case, the piston is moved against the springs and when they reach the end of stroke, the retaining rings on the sleeve move upwards in order to achieve the appropriate brake force. Now the brake is released again but due to the displaced retaining rings, the piston doesn't move back until it hits the housing. Even if the brake discs are worn the pedal travel doesn't increase due to the movement of the retaining rings on the sleeve.

Document Title: Parking brake, description	Function Group: 500	Information Type: Service Information	Date: 2014/3/14
Profile: BHL, BL71B [GB]			

Parking brake, description



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Figure 1
parking brake components

1. lever
2. cable
3. parking brake assembly

The parking brake is mechanically operated. The parking brake assembly is mounted to the input shaft of the rear axle and the brake disc is connected to the propeller shaft. The brake calliper consists of two brake linings.

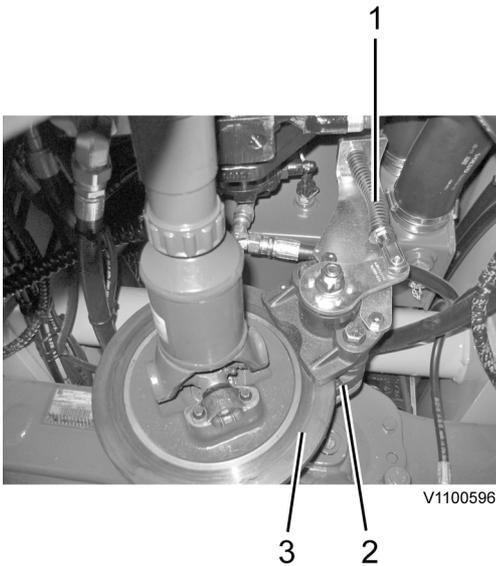


Figure 2
parking brake assembly

1. cable, parking brake/parking brake lever
2. brake calliper with brake linings
3. brake disc

The parking brake lever is located in the cab and it is connected by a cable to the parking brake assembly. The parking brake is applied by moving the parking brake lever upwards. The parking brake is released by lifting the release catch situated on the underside of the parking brake lever.

The parking brake is adjustable, see section [550 Parking brake cable, adjusting](#).

NOTE!

Applying of the parking brake declutches the transmission, automatically.

Document Title: Service brake, specification	Function Group: 500	Information Type: Service Information	Date: 2014/3/14
Profile: BHL, BL71B [GB]			

Service brake, specification

Service brake	
Type	Self-adjusting, oil immersed multi-disc brake
Number of brake discs (per side)	2
Number of brake counterdiscs (per side)	3
Brake disc thickness, new disc	6.7 mm (0.26 in.)
Brake disc thickness, minimum	5.8 mm (0.23 in.)
Brake disc, inner diameter	210 mm
Brake disc, outer diameter	290 mm
Brake disc, friction surface area (per disc side)	314,16 cm ²
Total friction surface area (four disc, two sides)	2513,27 cm ²
Separator disc thickness, new disc	8.0 mm / 5.0 mm (0.31 in. / 0.20 in.)
Separator disc thickness, minimum	7.6 mm / 4.6 mm (0.30 in. / 0.18 in.)
Parking brake	Mechanically operated

Service brake, maximal pressure	
Service brake, maximal pressure	0.43 MPa 43 bar 623.6 psi

Service brake pressure, Powershuttle	
Low idle	2200 rpm
1.3 — 1.4 MPa	1.3 — 1.55 MPa
13 — 14 bar	13 — 15.5 bar
188.54 — 203.05 psi	188.54 — 224.80 psi

Service brake pressure, Powershift (option)	
Low idle	2200 rpm
1.4 — 1.65 MPa	1.55 — 1.85 MPa
14 — 16.5 bar	15.5 — 18.5 bar
203.05 — 239.31 psi	224.80 — 268.31 psi

Document Title: Service brakes, function check	Function Group: 510	Information Type: Service Information	Date: 2014/3/14
Profile: BHL, BL71B [GB]			

Service brakes, function check

Op nbr 510-005

Conditions for service brake test

- Brake test must only be done within an area where it cannot cause accidents (risk of being run into from behind etc.).
- Acceptable values can only be obtained if the test is carried out on dry asphalt, dry concrete or other similar surfaces.
- Make sure that the working area around the machine is clear from people.
- The machine must not be loaded.
- The stabilisers must be retracted.
- Wheel chocks etc. must be removed from the wheels.

Service brake, checking

Carry out the brake test as required. Always use the seat belt when using the machine.

1. The service (foot) brake should stop the machine at a speed of 32 km/h (20 mph) within 16 m (54 ft 6 in), or from a speed of 40 km/h (25 mph) within a distance of 22 m (72 ft).
2. If the machine does not stop within these distances, troubleshoot and repair the service brake system.

Document Title: Brake discs, checking wear	Function Group: 517	Information Type: Service Information	Date: 2014/3/14
Profile: BHL, BL71B [GB]			

Brake discs, checking wear

For checking the wear of the brake discs and steel plates, see section [517 Brake discs, changing](#).

Document Title: Brake disc, replacing both sides	Function Group: 517	Information Type: Service Information	Date: 2014/3/14
Profile: BHL, BL71B [GB]			

Brake disc, replacing both sides

Op nbr 517-004

Brake discs, disassembly

1. Place the machine in service position 2, see [191 Service position 2](#).
2. Remove both rear wheels, see section [771 Rear wheel, removal](#).
3. Drain the oil from the rear axle, see section [173 Axles, changing oil](#).
4. Place a suitable container under the wheel hub to collect draining oil.



Take care of filters, oils and liquids in an environmentally safe way.

5. Loosen and remove the retaining screws except two to secure the wheel hub.



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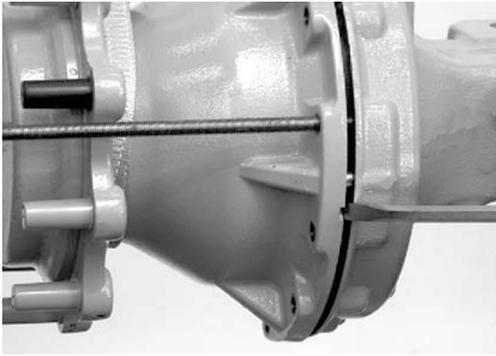
Figure 1
wheel hub, disassembly

6. Attach the wheel hub to a suitable lifting device.

Wheel hub weight:

120 kg
(265 lb)

7. To support the wheel hub removal, insert two rods into opposite holes of the axle housing.



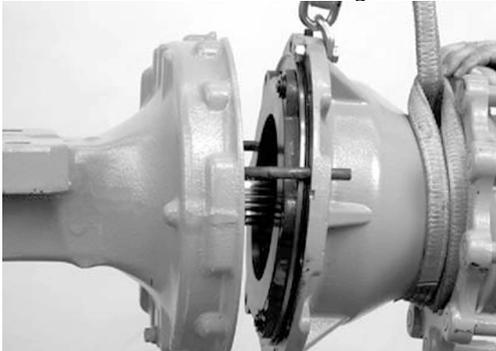
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Figure 2
wheel hub, disassembly



8. **The parts are heavy. Take appropriate safety cautions when handling them.**

Loosen and remove the remaining screws, carefully remove the wheel hub from the axle housing.



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Figure 3
wheel hub, removing
NOTE!

Make sure to remove the brake discs and the drive shaft together with the wheel hub.

9. Place the wheel hub upright on a workbench.
10. Mark the steel plate that has rested against the axle housing.



V1055573

Figure 4
wheel hub, steel plates and brake discs

11. Remove the steel plates and brake discs.
12. Repeat steps 4 –11 to remove the brake discs in the other hub.

Brake discs and steel plates, checking wear

13. Check that the brake discs and steel plates are free from signs of wear and burning, otherwise they have to be replaced.

Check the thickness of the brake discs and steel plates, see section [500 Service brake, specification](#) for recommended plate thickness.

NOTE!

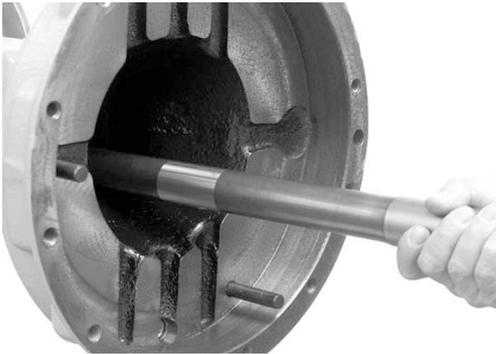
New brake discs must be soaked in oil for 24 hours before installation.

Brake discs, assembly

14. Insert the drive shaft into the axle housing.

NOTE!

Make sure to fit the drive shaft into the planetary gear set.



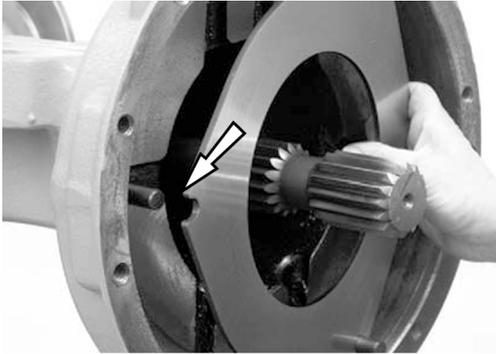
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Figure 5
drive shaft, assembly

15. Assemble the inner steel plate. When assembling the old steel plate respect the mark done during disassembly.

NOTE!

Align the steel plates to the pins in the axle housing.



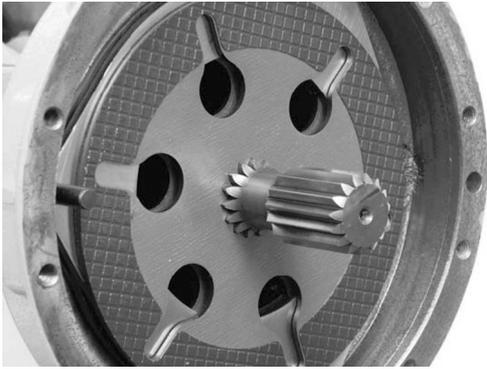
V1101032

Figure 6
steel plate, assembly

16. Assemble the inner brake disc, the second steel plate and the outer brake disc.

NOTE!

Make sure that the slots of the brake discs are aligned to each other.



V1101050

Figure 7
brake disc, assembly

! WARNING

17. **The parts are heavy. Take appropriate safety precautions.**

Attach the wheel hub to a suitable lifting device.

Wheel hub weight:

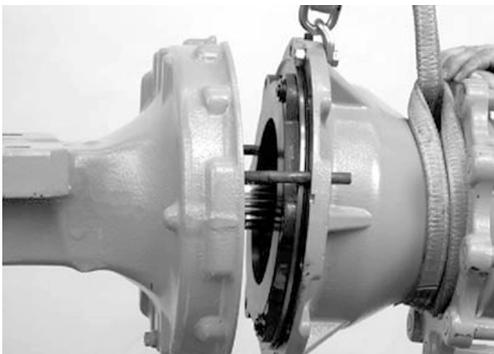
120 kg
(265 lb)

18. Bring the wheel hub in mounting position.

19. Install the wheel hub on the axle housing.

NOTE!

Pay attention to the gearing of the drive shaft.



V1101030

Figure 8
wheel hub, assembly

20. Apply a film of adhesive on the retaining screws.
Use a suitable adhesive for locking of threaded parts with a high strength, for example Loctite® 270 or Superbond® 331.
21. Assemble and fasten the retaining screws. See section [463 Rear axle, tightening torques](#) for recommended tightening torque.



V1055571

Figure 9
wheel hub, assembly

22. Repeat steps 14 – 21 to assemble the brake discs in the other hub.
23. Reassemble both rear wheels, see section [771 Rear wheel, installation](#).
24. Refill the rear axle with oil, see section [173 Axles, changing oil](#).
25. Perform a function check, see section [510 Service brakes, function check](#).

Document Title: Service brake pressure, checking	Function Group: 520	Information Type: Service Information	Date: 2014/3/14
Profile: BHL, BL71B [GB]			

Service brake pressure, checking

Op nbr 520-003

[11666051 Pressure gauge](#)

[14290266 Hose](#)

E1708, see [080 E 1708, Checking point](#).



Beware of any remaining pressure in the brake system.

1. Place the machine in service position 2, see [191 Service position 2](#).
2. Release the pressure in the brake system by depressing the brake pedal several times.
3. Disconnect one of the brake hoses from the rear axle.

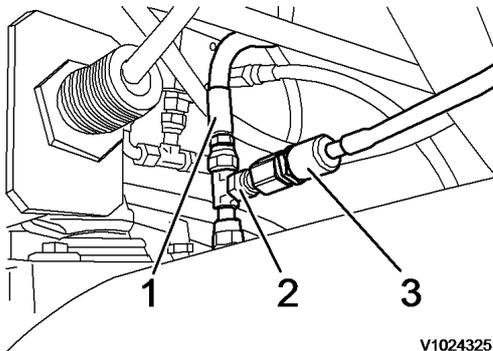


Figure 1
Checking service brake pressure

1. Brake hose
 2. E1708
 3. Hose (tool 14290266)
4. Fit E1708 and connect the brake hose.
 5. Fit the hose and the pressure gauge.
11666051 Pressure gauge
14290266 Hose
 6. Start the engine and run the engine at low idle speed.
 7. Press the brake pedal to the stop. Check the service brake pressure against specification, see [500 Service brake, specification](#).
 8. Stop the engine.

9. Remove the checking equipment and reconnect the brake hose.
10. Repeat steps 3–9 for the other brake.
11. Bleed the brake system, see section [520 Brake system, bleeding](#).

Document Title: Brake system, bleeding	Function Group: 520	Information Type: Service Information	Date: 2014/3/14
Profile: BHL, BL71B [GB]			

Brake system, bleeding

Op nbr 520-037

! WARNING

Beware of any remaining pressure in the brake system.

1. Place the machine in service position 2, see [191 Service position 2](#).
2. Lock the brake pedals together with the steel locking bar.
3. Start the engine.
4. Depress the pedals and hold them in applied position.
5. Place a suitable container under the brake bleed screw of the rear axle, to collect draining oil.

NOTE!

The following two steps must be performed by a second person.

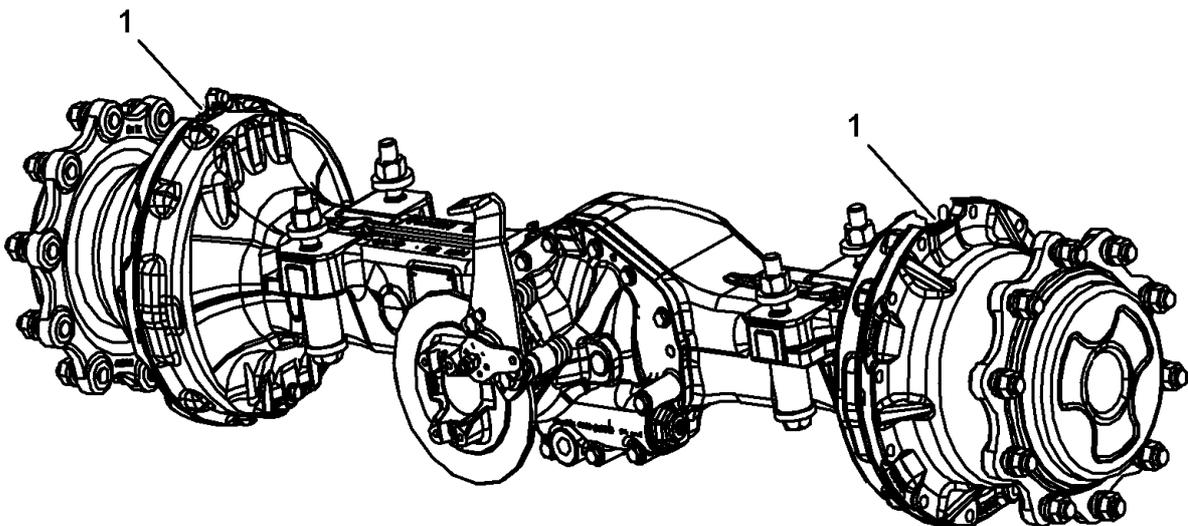
! WARNING

Operator and technician should be fully aware of each other when working around a machine while it is running.

6. Open the bleed screws on the rear axle.

! CAUTION

Take care of filters, oils and liquids in an environmentally safe way.



V1049843

Figure 1

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brake system, bleeding

1. bleed screws
7. Close the bleed screws until no more air is coming from the system.
8. Release the brake pedals.
9. Stop the engine.
10. Repeat steps 3–8 until no more air is coming from the system.

Document Title: Brake pedals, adjusting	Function Group: 520	Information Type: Service Information	Date: 2014/3/14
Profile: BHL, BL71B [GB]			

Brake pedals, adjusting

Op nbr

1. Loosen the lock nuts (2) and align both links (1) to the end of the push bars in the brake booster.

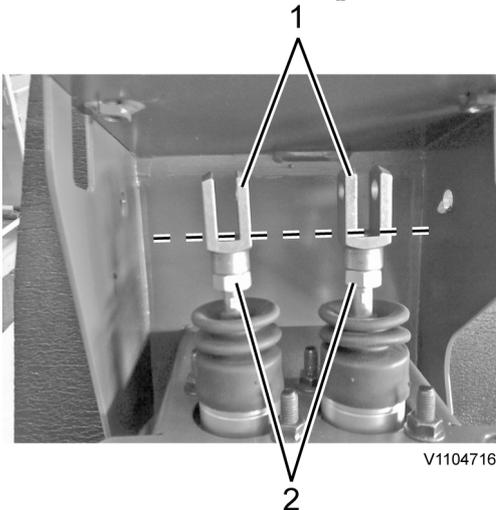


Figure 1
brake pedals, adjusting

1. links
2. lock nuts

2. Connect both links to the brake pedal assembly and assemble the locking devices (1).

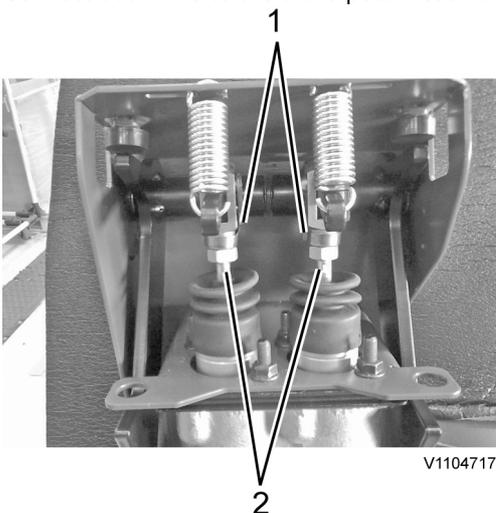


Figure 2
brake pedals, adjusting

1. locking devices
2. push rods with lock nuts