Document Title:	Function Group:	Information Type:	Date:
General description	**500**	**Service Information**	**2014/4/16**
Profile: **WLO, L220D [GB]**			

General description

L220D is provided with an all-hydraulic brake system, divided into two circuits, with one circuit for the front axle and one for the rear axle.

The system consists of foot brake valve and accumulator block with three accumulators. One accumulator is for the front circuit, one accumulator is for the rear circuit and one accumulator which is in common.
The accumulators are precharged with nitrogen gas and their purpose is to store pressure and provide safe brake application with a good margin.

Oil is supplied to the brake system via the central valve from Pump 3 (P3) or Pump 2 (P2). P3 and P2 are positioned on the left side of the transmission.
P3 supplies the cooling fan and ensures that brake charging takes place during transport operation. P2 supplies the brake system passively when the working hydraulics is being used and the pressure exceeds approx. 12 MPa (120 bar) (1740 psi).

The purpose of the central valve is to distribute oil and pressure to the brakes, the steering (prioritised) and the servo and working hydraulics.

If the brake pressure drops below 8.0 MPa (80 bar) (1160 psi), this will be indicated on the operator display unit and in that a warning lamp and the central warning lamp will light up and the buzzer will begin to sound.

Both the front and rear axles are provided with wet disc brakes.
The front axle has double brake discs in each planetary gear.
The cooling of the brakes is achieved by each disc being installed with an impeller which works as a circulation pump for the axle oil.

The axles are provided with built-in wear indicators for checking the brake disc wear.

The axles can be equipped with external oil cooling, consisting of hydraulic motors, hydraulic pumps and heat exchangers (coolers).
When external oil cooling is installed, the oil in the axle circulates as soon as the engine has been started, that is even when the machine is stationary.
This equipment is integrated in the cooling system for engine, transmission and hydraulics.

For description of P2, see Section 6.

For description of integrated axle oil cooling and hydraulic pump, P3, see Section 2.

For description of central valve, see Section 9.

Brake charging

Charging and unloading is controlled electrically via brake-charging sensor SE504 on the accumulator block and brake-charging valve MA502 on the central valve. At the same time V-ECU receives a signal and feeds current to MA202.
The current to MA202 makes sure that the LS-signal to Pump 3 (P3) increases.
These components ensures that brake charging from Pump 3 (P3) takes place when the engine is being started and during transport operation. While the working hydraulics is in use, charging takes place passively from Pump 2 (P2).

Brake-charging sensor SE504 has a fixed difference of approx. 2 MPa (20 bar) (290 psi) between the unloading pressure 14 MPa (140 bar) (2031 psi) and the cut-in pressure 12 MPa (120 bar) (1740 psi).

When the brake pressure drops below 12 MPa (120 bar) (1740 psi), brake charging valve MA502 receives current from brake-charging sensor SE504. This causes P3 to receive LS-signal so that the pump angles out and brake pressure is built up.

NOTE!
When MA502 is energised, the oil flow to the cooling fan motor is interrupted and there will be no pressure at the check point on the central valve. This means that when starting the engine and as the brake system is without pressure, it will take approx. 5–8 seconds before the cooling fan starts.

When the brake pressure reaches approx. 14 MPa (140 bar) (2031 psi) the supply to MA502 is interrupted and thus the cooling fan motor again obtains a flow of oil. The pressure level for P3, when the brake system is unloaded, depends on the

need of cooling of the engine. The proportional valve MA202 determines the cooling fan speed and thereby the pressure level. MA202 is controlled by the V-ECU, which in its turn senses the temperature in the following systems.

1. Coolant temperature SE210
2. Transmission oil temperature SE405
3. Axle oil temperature front axle, SE410 (optional equipment)
4. Axle oil temperature rear axle, SE411 (optional equipment)
5. Hydraulic oil temperature, SE906

The system which has the highest temperature determines the cooling fan speed.
See description of cooling fan in Section 2.

If the brake pressure drops below 8.0 MPa (80 bar) (1160 psi), brake pressure sensor SE504 will actuate the warning lamp, central warning, buzzer and display unit text to inform the operator.

Foot brake valve

The foot brake valve is of the proportional type, which means that the output brake pressure is proportional to the pedal angle. The valve is divided into two circuits, one acting on the front axle brakes and the other on the rear axle brakes. The maximum output brake pressure is reduced to 8 MPa (80 bar) (1160 psi). Adjustment of the reduced brake pressure is done at the underside of the valve by increasing or reducing the stroke of the pedal.

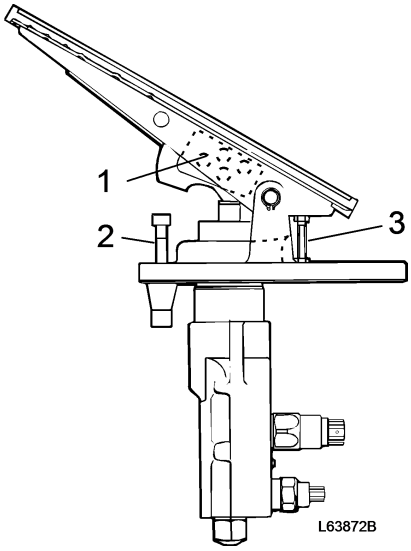

Figure 1

1. 1 Holes for changing pedal angle, four positions.
2. 2 Adjusting screw for output pressure
3. 3 Adjusting screw for clearance between pedal and piston

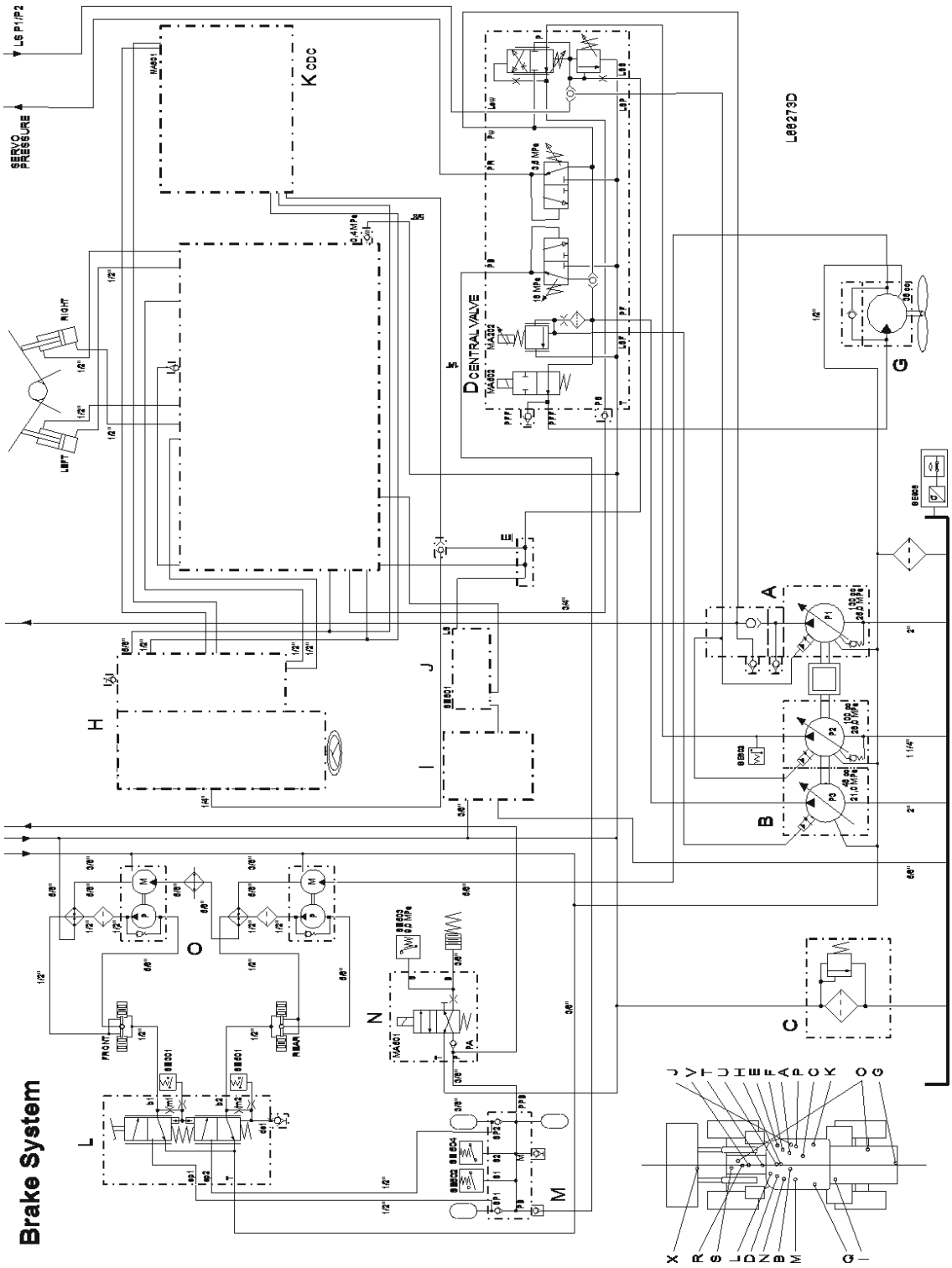

Figure 2
Hydraulic diagram, brake system

Document Title:	Function Group:	Information Type:	Date:
Brake discs, checking wear AWB50	**516**	**Service Information**	**2014/4/16**
Profile: **WLO, L220D [GB]**			

Brake discs, checking wear AWB50

Op nbr 51601

The following applies when checking:

Temperature:	**Normal working temperature**
Brakes:	**Applied**
Thickness new disc, two per wheel	**9.5 mm (0.374 in)**
Wear limit with applied brake:	**When the flat surface, B, of the pin is flush with the surface, A, of the nipple.**

Checking

1. Start the engine and charge the brake system.
   Stop the engine and apply the brake.

   NOTICE

   The brake must be applied during the whole wear check.

2. Remove the plug on the wear indicator.

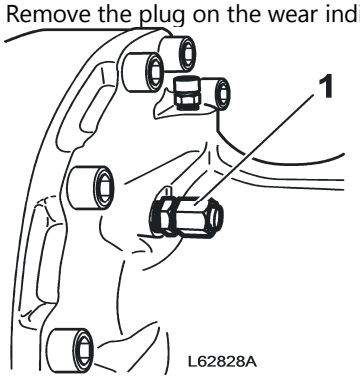

Figure 1
Wear indicator

1. Plug

3. Using a finger, press in the wear indicator pin against stop, see figure.

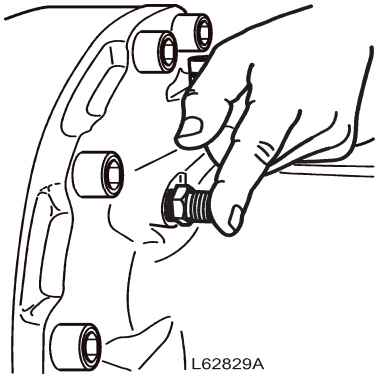

Figure 2
Pressing in wear indicator pin

4. The brake disc wear is indicated by the position of the flat surface of the pin, B, relative to the flat surface, A, of the nipple, when the pin is pressed in. The position of the flat surface of the pin varies depending on how worn the brake discs are. For new brake discs the flat surface of the pin should protrude 4.6 mm (0.18 in) outside the flat surface of the nipple, see figure.

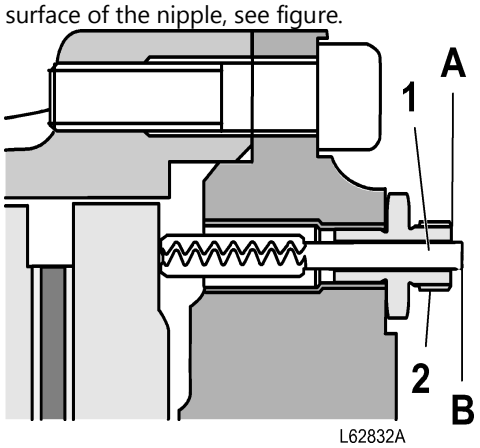

Figure 3
Indication of brake disc wear, (principle diagram)

1. Wear indicator pin
2. Nipple

A. Flat surface on nipple.
B. Flat surface on pin.

5. The brake discs are worn out and must be replaced, when the flat surface, B, of the pin is flush with the flat surface, A, of the nipple, see figure.

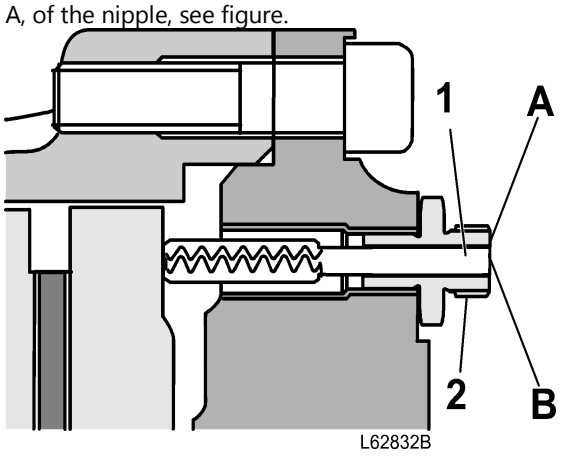

Figure 4
The brake disc is worn out, (principle diagram)

1. Wear indicator pin
2. Nipple

A. Flat surface on nipple.
B. Flat surface on pin.

6. Install the plug on the wear indicator.
   Let up the brake pedal.