

Construction Equipment

Document Title: Hydraulic brake system, description	Function Group: 520	Information Type: Service Information	Date: 2014/4/27
Profile: EXC, EW140D [GB]			

Hydraulic brake system, description

Travel brake

Step 1

When the diesel engine is started, pump **76** supplies oil to brake valve **38**. The oil flow passes through priority valve **38:1** and on via non-return valves **38:2**, **38:3** and **38:4** to brake accumulators **74** and to valve **38:5**, which controls the charging of the brake system. The charging is controlled via signal lines to both sides of valve **38:5**.



Figure 1 Step 1

20	Steering cylinder	77	Rear axle brake	38:1	Priority valve, brake
37	Priority valve, steering	78	Front axle brake	38:2	Non-return valve with spring
38	Brake valve	А	Servo pressure	38:3	Non-return valve
70	Centre passage	В	Return pressure	38:4	Non-return valve
74	Accumulator tank for brake pressure	С	Pump pressure	38:5	Valve, charging accumulators
76	Pump	D	Trapped oil		

Step 2

The area of the upper signal line on valve 38:5 is larger than the area of the lower signal line. Therefore valve 38:5 opens to

tank when accumulators **74** are fully charged. The pressure in the lower signal line on priority valve **38:1** drops and the priority valve changes over to the middle symbol, if the steering is not actuated (draining to tank via port EF in steering valve 37). If the steering is actuated, the pressure in the upper signal line on priority valve **38:1** increases and the upper symbol is engaged. The pump flow goes directly to the steering without passing through any restrictions.



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Figure 2 Step 2

20	Steering cylinder	76	Pump	С	Pump pressure
37	Priority valve, steering	77	Rear axle brake	Е	Raised return pressure
38	Brake valve	78	Front axle brake	38:1	Priority valve, brake
70	Centre passage	А	Servo pressure	38:5	Valve, charging accumulators
74	Accumulator tank for brake pressure	В	Return pressure		

Step 3

When the brake pedal is depressed, oil flows to both circuits T2 for the rear axle and T1 for the front axle. The pressure in accumulators **74** and on top of valve **38:5** drops. When the pressure has dropped to below 11.5 MPa (1668 psi, 115 bar), valve **38:5** changes position and the accumulators will begin to be charged again.

The signals from pressure sensor **SE5201** and pressure monitors **SE5221** pass via the machine control unit V-ECU.



Figure 3 Step3

20	Steering cylinder	76	Pump	С	Pump pressure
37	Priority valve, steering	77	Rear axle brake	Е	Raised return pressure
38	Brake valve	78	Front axle brake	21:1	Pendulum axle
70	Centre passage	А	Servo pressure	38:5	Valve, charging accumulators
74	Accumulator tank for brake pressure	В	Return pressure	38:6	Brake pedal

Digging brake

Mechanical locking

When the brake pedal **38:6** is depressed the pressure in the brake circuit reaches 0,5 MPa (72,5 psi, 5 bar), the brake lights light up via pressure sensor **SE5201** and brake light relay **RE5201**. When the pedal is locked with the catch **38:7** and the brake pressure increases further to 4–5 MPa (580–725 psi, 40–50 bar) a signal from sensor **SE5201** send's to the vehicle control unit V-ECU and activate a "timer". After two minutes' cut the voltage between V-ECU and the relay **RE5201** which result the brake lights **LA5201** and **LA5202** turnoffs.



Figure 4 Brake pedal with mechanical locking



Figure 5 Hydraulic and electric sub-diagram

38	Brake valve	38:7	Catch	RE5201	Relay brake lights
74	Accumulator tank for brake	LA5201	Brake light, right	SE5201	Pressure sensor brake
	pressure				
38:6	Brake pedal	LA5202	Brake light, left	V-ECU	Vehicle control unit



Figure 6 Symbols

LC3803	Central warning
LC5201	Brake pressure low

Basically:

If the pressure in the accumulators drops to below 8.0 MPa (1160 psi, 80 bar), this will be indicated on the instrument control unit I-ECU via pressure monitor **SE5221**. The symbol **LC5201** show's on the main screen, the central warning lamp **LC3803** lights up and the buzzer sounds when the engine is running.

Function check:

O Charge accumulators then switch off engine and turn the ignition key to position ignition on.

- O Depress the brake pedal until the pressure drops to the charging point of 11.5 MPa (1668 psi, 115 bar).
- O After that depress the brake pedal twice at full stroke and the warning lamp on IECU must not light up.
- O Remaining pressure must be > 8.0 MPa (1120 psi, 80 bar).
- O Depress the brake pedal now slowly further until the warning lamp lights up. Then it must be possible to perform four (4) full brake applications. At the fifth time there must be a minimum pressure of > 5.8 MPa (841 psi, 58 bar), see <u>910 Hydraulic pressure, specifications</u>. During full brake applications, the pedal must be pressed down completely and then released. Between each application of the brake pedal there should be a regeneration time of approx. 60 seconds.

Function check: brake lights and axle lock

If the pressure in the brake circuit increases to 0,5 MPa (72,5 psi, 5 bar), the brake lights light up via pressure sensor **SE5201**. If the pressure increases further to 6.0 MPa (870 psi, 60 bar), pendulum axle **21:1** will be locked via pressure sensor **SE5201** and the solenoid for axle locking MA9152 (without voltage).



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Service Information

Document Title:	Function Group:	Information Type:	Date:
Brake system, bleeding	520	Service Information	2014/4/27
Profile: EXC, EW140D [GB]			

Brake system, bleeding

Op nbr 520-037

Tools: Drain hose



Hot hydraulic oil and hydraulic oil under pressure may result in severe personal injuries

NOTICE

Always handle oils and other environmentally hazardous fluids in an environmentally safe manner.

1. Block the wheels.



Figure 1 Brake bleeder screw, front axle

- 1. Brake bleeder screw
- 2. Remove the protective cap from the bleeder screw (1).
- 3. Connect a cap key on the bleeder screw (1). **NOTE!**

Draining oil must be collected in a container.



Figure 2

Brake bleeder screw, rear axle

1. Brake bleeder screw

Connect the drain hose on the bleeder screw and the free end of the drain hose in a container.

- 5. Loose the bleeder screw (1) approximately half a turn.
- 6. Start the diesel engine and press down the brake pedal until oil free of air flows out.
- 7. Tighten the bleeder screw (1) when the brake pedal is pressed.
- 8. Stop the diesel engine.
- 9. Refit the protective on the bleeder screw.
- 10. Repeat the steps for all wheels.

11. Function check:

After any work has been done in a safety related electrical or hydraulic system, a function check must be performed. For information on how to perform the function check see other service information. See 520 Brake system, checking function

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