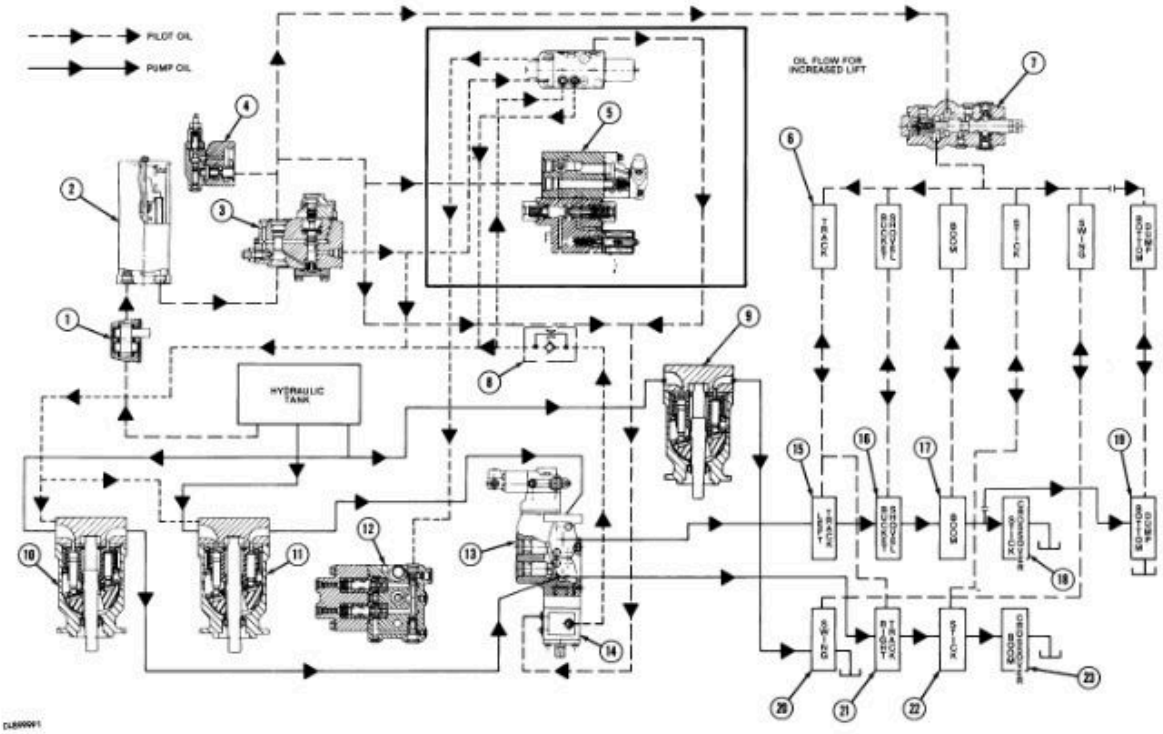
Systems Operation

SMCS - 7566

Introduction

Reference: For Specifications with illustrations, make reference to the Specifications For 235D Excavator and Front Shovel Hydraulic System, Form No. SENR5437. If the Specifications given in Form SENR5437 are not the same as given in the Systems Operation and the Testing and Adjusting, look at the printing date on the back cover of each book. Use the Specifications given in the book with the latest date.

Pump Flow And Pressure Control



Schematic For Pump Flow And Pressure Control

(1) Pilot pump. The gear-type pump supplies oil for the pilot system.

(2) Filter for pilot system.

(3) Underspeed control valve. This valve causes the signal pressure to the variable displacement pumps to change with a change in engine speed (rpm).

(4) Relief valve for the pilot system. This valve limits the pressure in the pilot system to 2310 kPa (335 psi). On machines with increased lift, this valve is part of control valve (5).

(5) Control valve group (machines with increased lift). Based on a pilot signal from the control valve, directs signal pressure to increase the setting of the main relief valve while decreasing pump flow during increased lift. Controls the pressure signal from the underspeed valve and summing valve to the pump servos.

(6) Control valves in the pilot system (five). All of these valves are manually operated. When in the NEUTRAL position, the spool in each of these valves stops the flow of pilot system oil through the valve (closed-center). Movement of the spool from the NEUTRAL position sends pilot oil to activate a control valve in the main system. A sixth valve is added for the bottom dump attachment (front shovel).

(7) Hydraulic and directional lock valve. When the valve is in the LOCKED position, there is no oil pressure to operate any control valve in the pilot system.

(8) Orifice check valve. This valve is used to make a selection between the signal from summing valve (14) and the signal from underspeed valve (3) to the pump servovalves.

(9) Swing pump. The variable displacement pump supplies oil to operate the swing motor. Illustration shows 6E3643 Pump used on 8KJ1-Up. See also "Schematic For Swing Control".

(10) Rear implement pump. This axial piston pump is a variable displacement pump. It supplies the main oil flow to operate the right track, stick and boom when the boom crossover valve is activated.

(11) Front implement pump. This axial piston pump is a variable displacement pump. It supplies the main oil flow to operate the left track motor, the bucket cylinder, the boom cylinders, the stick (for stick OUT) when the stick crossover valve is activated and the bottom dump cylinders when the machine is equipped with a bottom dump bucket (front shovel).

(12) Relief valve for main system pressure (mounted to item 13). When a pilot valve for machine travel is activated, this valve limits the pressure of the main system oil to 33 100 kPa (4800 psi). At all other times, it limits the oil pressure in the main system to 29 600 kPa (4300 psi).

(13) Combiner valve for main system oil. The individual check valves do not allow the flow of oil from the variable displacement pumps to combine (go together) except when the pressure on both pumps reaches relief valve pressure.

(14) Summing valve (mounted to item 13). This valve causes the signal pressure to the variable displacement pumps to change with a change in the output pressures from the front and rear axial piston pumps. It does not send a signal to the swing pump.

(15) Main control valve for the left track motor. This valve is controlled by the pilot valve for track movement. It controls the flow of oil from the front pump to the motor for the left track.

(16) Main control valve for the bucket/shovel cylinder. This valve is controlled by the pilot valve for bucket movement. It controls the flow of oil from the front pump to the bucket cylinder.

(17) Main control valve for the boom cylinders. This valve is controlled by the pilot valve for boom movement. It controls the flow of oil from the front and rear pumps to the boom cylinders.

(18) Crossover valve for stick operation. It controls the flow of oil from the front pump to the stick valve. When activated, it sends the flow from the front pump to the stick control valve. This gives the stick a faster speed during stick IN and OUT operation.

NOTE: Valves (18) and (23) are the same valve, but provide two different operations.

(19) Main control valve for the bottom dump cylinders. This valve is controlled by the pilot valve for bottom dump (front shovel). It controls the flow of oil from the front pump to the cylinders on the bottom dump bucket.

(20) Main control valve for the swing motor. This valve is controlled by the pilot valve for swing movement. It controls the flow of oil from the swing pump to the swing motor.

(21) Main control valve for the right track motor. This valve is controlled by the pilot valve for track movement. It controls the flow of oil from the rear pump to the motor for the right track.

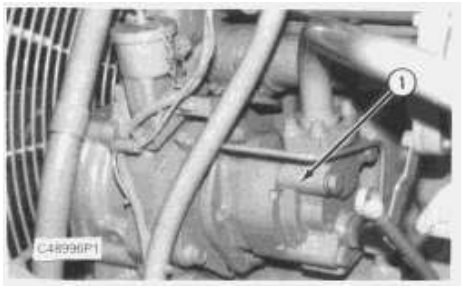
(22) Main control valve for the stick cylinder. This valve is controlled by the pilot valve for stick movement. It controls the flow of oil from the rear pump to the stick cylinder.

(23) Crossover Valve For Boom Operation. It controls the flow of oil from the rear pump to the boom valve. When activated, it sends the flow from the rear pump to the boom valve. This gives the boom a faster speed during boom RAISE operation.

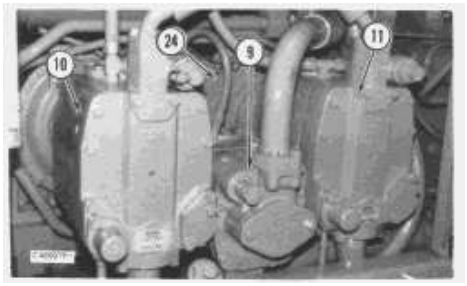
NOTE: Valves (18) and (23) are the same valve, but provide two different operations.

Introduction

235D Excavator



Pilot Pump (8KJ1-Up shown).
(1) Pilot pump.



Hydraulic Pumps (8KJ1-Up shown) (front view)
(9) Swing pump. (10) Rear implement pump. (11) Front implement pump. (24) Pump drive housing.

The 235D Excavator has four primary hydraulic pumps. The pilot pump is mounted on the engine timing gear cover and the other three pumps are mounted to the pump drive housing that is bolted directly to the flywheel housing. This allows the pumps to be directly driven by the engine. Any change of engine rpm will cause a respective change in the rpm of the pumps.

Rear implement pump (10) and front implement pump (11) are axial piston pumps with variable displacement that turn at 1450 rpm when the engine runs at its full load rate of 2000 rpm. The maximum output of each axial piston pump is 356 liter/min (94.0 U.S. gpm) at full load rpm. During normal implement operation, the maximum working pressure for each axial piston pump circuit is limited to 29 600 kPa (4300 psi). During travel operation or increased lift, maximum pressure is limited to 33 100 kPa (4800 psi).

The output flow of front and rear implement pumps (11) and (10) is used to:

1. Operate the hydraulic cylinders of the implements.

2. Turn the track motors that move the machine in FORWARD or REVERSE.

In addition to the two axial piston pumps used to power the implements and tracks, there is a axial driven variable displacement pump for swing mounted between them. This pump is driven by a gear arrangement at the same rpm as the engine. The output of swing pump (9) is 260 liter/min (68.7 U.S. gpm) at rated engine speed. Pressure in the swing circuit is limited to 27 000 kPa during swing acceleration and 20 700 during swing deceleration.

The gear type pump that is mounted to the timing gear cover provides oil for the pilot system. This pump is driven at